

## Mode of water governance in the department of Couffo in the era of decentralization in Benin

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### Abstract

Water is a precious resource. Its access is a common problem because of its uneven repair on land. The realities of drinking water supply diverge from one environment to another. In Benin, the problem of drinking water supply arises in several localities. The Couffo department is no exception to this reality. This study aims to analyze the different modes of access to water in the era of decentralization in the municipalities of the Couffo department. The methodology adopted is based on documentary research, field surveys and direct observations. At the end of this study, the investigations carried out showed a diversity of modes of access to drinking water in the Couffo department. In addition, 48% of the study population uses water from AEV. The Communes have several AEVs located in the arrondissements and the water is distributed through standpipes in the arrondissements. Also, 35% of the population is unaware of modernized water supply structures. Efforts have been made in the water sector in the Couffo since the country gained international sovereignty. However, although these legal provisions are likely to improve the management of water resources, shortcomings are noted in the application of the texts. Such a situation cannot help achieve the Sustainable Development Goals. It is essential to put in place measures to improve the knowledge of the populations of the department of Couffo in water supply structures for greater accessibility.

**Keywords:** Access to water; Supply structures; Couffo Department; Benin

### 1. Introduction

Water, a vital element, loaded with symbols, cultures and spiritualities, has never been treated as an ordinary commodity. In all countries, it is at the heart of political, media and associative debates, a hot topic, and rightly so (Thompson et al., 2001). A resource essential to life, non-substitutable, and, what is more, existing in a fixed quantity, water has become the cause of large-scale geopolitical and commercial conflicts (UNDP, 2006). The supply of drinking water in sufficient quality and quantity is a major problem faced by developing African cities (Wyss, 2001). Moreover, not having access to it is the main obstacle to development and almost one in five people in the world, i.e. 1.2 billion, do not have one (UNDP, 2006). The majority of these people, or 75%, live in rural areas in a developing country, making this challenge particularly complex to meet (UN-Water, 2009).

In rural communities in Benin, the water problem is still a central concern for both local and central authorities. Hydraulic and sanitation infrastructures contribute to the improvement of the living environment of the populations. But, for the installation of these works, the beneficiary communities are not sufficiently associated, nor sufficiently prepared for their maintenance. This situation translates into a lack of appropriation and management of equipment by

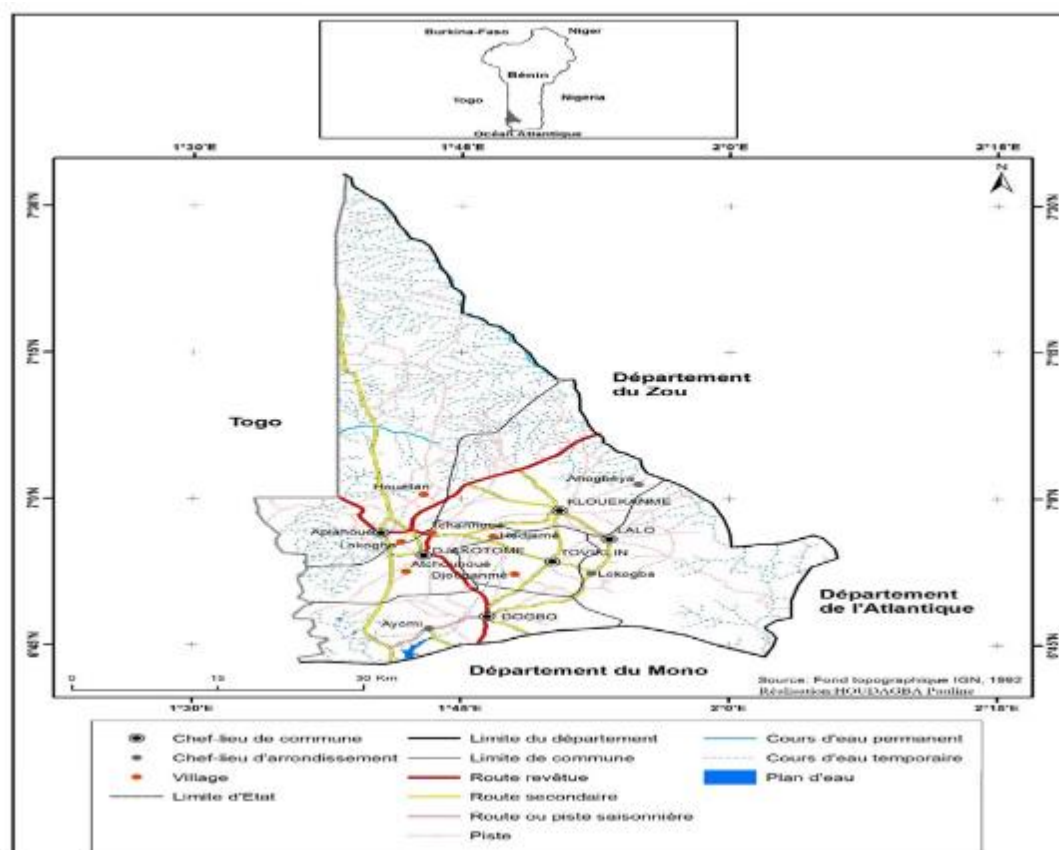
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the populations, with the consequence that the structures are abandoned in the event of a breakdown (DG-Eau, 2006). In the department of Couffo, access to water is a problem common to several municipalities. The modes of water governance are multiple and vary from one municipality to another. In the era of decentralization, efforts are being made in the water sector. However, the populations do not have a broad knowledge of modern sources of supply and continue to indulge in non-recommended sources. This is the cause of waterborne diseases.

## 2. Material framework and study methods

Located at 6°57'43" North latitude and 1°48'06" East longitude, the department of Couffo is located in the south-west of the Republic of Benin. It is bounded to the north by the department of Zou, to the south by that of Mono, to the east by the department of Atlantique and to the west by the Republic of Togo. It extends over an area of 2,404 km<sup>2</sup>, a population of 524,586 inhabitants in 2002 and a density of 218 inhabitants/km<sup>2</sup> and is subdivided into six (6) municipalities with Aplahoué as the capital. These other communes are Djakotomey, Dogbo, Klouékanmè, Lalo, and Toviklin. These communes are subdivided into 50 arrondissements and 367 villages and city districts (figure 1).



**Figure 1** Geographic location

## 3. Study materials and methods

### 3.1.1. Type of study

This is a descriptive, cross-sectional and retrospective study that took place in the department of Couffo. It aims to analyze access to water in the six municipalities of the Couffo department in Benin.

### 3.1.2. Study population and sampling

The study population is made up of households, local elected officials and all those involved in water supply. A sample of 184 households was investigated by the reasoned choice method in the six municipalities of the department.

### 3.1.3. Study data

The data collected as part of this study are those relating to water governance modes, water governance modes and water supply structures in the study area.

### 3.1.4. Data collection techniques and tools

Survey questionnaires, interview guides and the observation grid were used to collect qualitative and quantitative data. The digital camera was used to take several shots.

#### Literature search

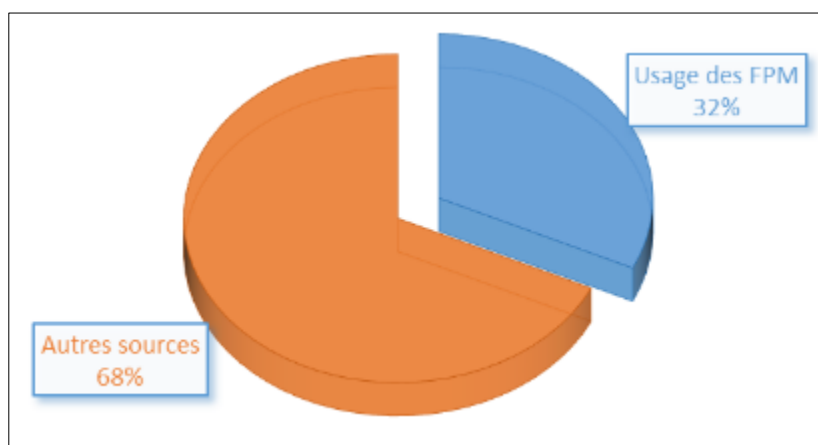
It concerns research that has enabled a compilation of information available in reports and studies on water governance. Articles and comments posted on the Internet are also among the main sources of documentation used, as are DEA and thesis dissertations on the subject. This research made it possible to make a synthesis of knowledge on the subject. Documents on water governance such as laws and regulations relating to hygiene and sanitation were also consulted nationally and internationally.

#### Field work

The field surveys took place in May 2021. The surveys concerned 184 households spread over the six municipalities of the Couffo department. All actors in the water governance sector have been affected. These are households, local elected officials, executives of the town halls concerned and the technical and financial partners involved in water supply, as well as SONEB officials. in the water in each municipality of the department of Couffo.

#### Direct observation

This method was used to collect qualitative data in addition to the interviews. It made it possible to visualize the water points and water supply structures and the behavior of households in terms of the use of water at the source.



Source: Fieldwork, Couffo, Houdagba, 2021

**Figure 2** Use of FPM in the department of Couffo

According to the DG-Eau (2008), an FPM is considered a water point (PE) and must therefore serve a maximum population of 250 inhabitants. An additional water point is then to be provided for each additional section of 250 inhabitants (photo 1 and 2).

The two boreholes presented in photo 1 and photo 2 were carried out by two different institutions in 2009 in the village of Lanta and Montchohoué in the Commune of klouékanmè. The borehole in photo 1 was carried out by CGC-Benin, a local association, while the second FPM was carried out by Global Aid Network, a Canadian organization, in association with the Government of Benin. The difference between the two works is clear from the point of view of the structure and the quality of the equipment used for the realization. Therefore, the Global Aid Network drilling looks more resilient than the CGC-Benin drilling.



Shooting: Houdagba, May 2021

**Figure 3** Borehole with human motricity in Lanta gohoungohoué, klouékanmè commune and Borehole with human motricity in Montchohoué, commune of klouékanmè

#### Autonomous Water Station (PEA)

The Autonomous Water Station (PEA) consists of a borehole or well equipped with a motorized pumping system connected to a storage tank. The water is distributed directly at the foot of the reservoir by a ramp with taps and this water must then be transported to the places of consumption by the users. PEAs are perfectly justified and profitable in very densely populated areas: at least 1,000 people in grouped housing, i.e. four (4) equivalent water points (figure 4).



Shooting: Houdagba, May 2021

**Figure 4** An autonomous water station (PEA) in Davitohoué, Commune of klouékanmè Financed by: PSDCC/FADec (a) and A modern autonomous water station (PEA) connected to the AEV in Toviklin (b)

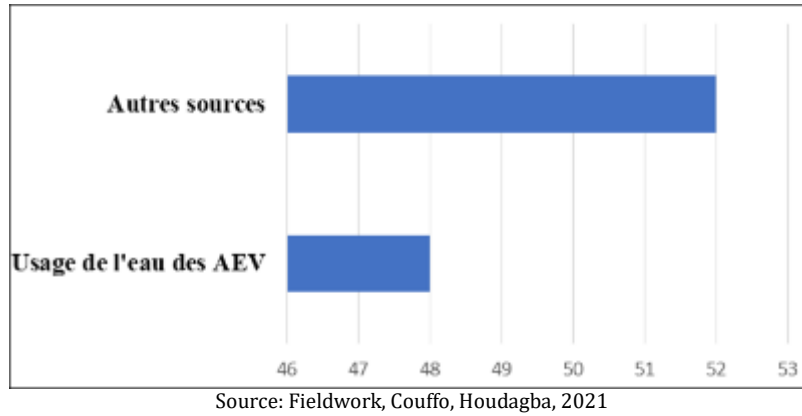
Figure 4 show some PEAs in Klouékanmè and Toviklin. Despite the non-negligible use of this category of work and the large number of people it serves with drinking water, the DG-Eau would consider that the construction of the majority of these works does not respect construction standards in the matter, the hygienic conditions and the quality of the water distributed would also be questionable.

#### AEV

The Village Water Supply (AEV) generally consists of a borehole equipped with a motorized pumping system connected to a storage tank called a water tower and to a water distribution network. AEVs are a good solution for supplying drinking water to large villages totaling more than 2000 inhabitants or for groups of villages and localities close to each other (DG-Eau, 2008). According to surveys, 48% of the population in the study area uses water from AEVs. Municipalities have several AEVs located in the arrondissements and water is distributed via standpipes in the arrondissements (Figure 5).

The water from the AEVs is distributed by underground pipes using standpipes (BF) and special connections. According to the DG-Eau, a BF is equivalent to two water points, therefore must serve 250 inhabitants times two, i.e. 500 inhabitants. An AEV can have several BF's.





**Figure 5** Use of AEVs in the department of Couffo

The following photos illustrate some fountain terminals connected to the AEV and water tower in the study environment.



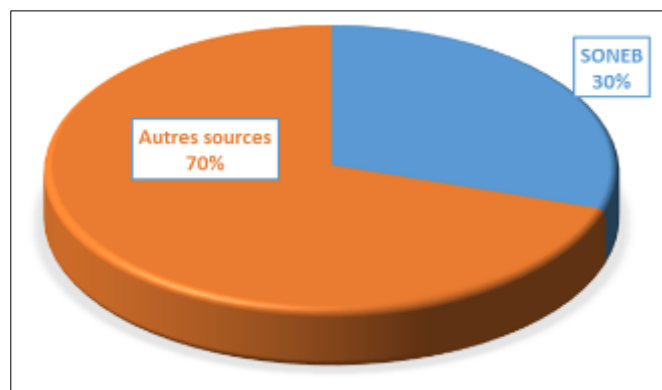
Shooting: Houdagba, May 2021

**Figure 6:** Bollard Fountain (BF) in Natabouhoué, Commune Toviklin (a), Bollard Fountain (BF) in Ahogbeya, Commune of Klouékanmè (b), Storage tank (water tower) of the AEV in Akouègbadja, Commune of klouékanmè (c) and AEV storage tank (water tower) in Tokpohoué-Gbékéhoué-Akodebakou-Sokouhoué, Commune of Djakotomey. Financed by: Kingdom of the Netherlands (d)

### 3.1.5. Modernized sources

The modernized water sources taken into account are SONEB works. This is the SONEB water distribution system. According to the investigations carried out, 30% of households use SONEB sources compared to 70% who use other drinking water supply sources (Figure 7).

It should be noted that the current DWS system of SONEB in the study area is more accentuated in urban areas (figure 8)



Source: Fieldwork, Couffo, Houdagba, 2021

**Figure 7** Use of AEVs in the department of Couffo



Shooting: Houdagba, May 2021

**Figure 8** SONEB water sales point in ( ) in the municipality of Klouékanmè

### 3.1.6. Modern wells

Modern wells systematically include a reinforced concrete casing and collection by perforated nozzles over several meters. The risks of landslides and drying up are lower than for traditional wells. They can be equipped with more or less improved drainage systems. Photo 10 illustrates a modern well in the Commune of klouékanmè.



Co-funded by: ADV Ahogbèya and PSDCC in 2007 Shooting: Houdagba, May 2021

**Figure 9** Large-diameter modern well in Ahogbèya, Commune of klouékanmè

Despite this more or less modern equipment, the sanitary situation on the majority of modern large-diameter wells is doubtful, hence the DG-Eau (2008) estimated that the modern open well cannot be considered as a source of water. 'drinking water supply. This means that nowadays, wells are much more carried out by private individuals and NGOs. The DG-Eau is said to be abandoning the construction of modern wells in favor of FPMs and AEVs.

There is an influx of women around the Water Point (PE) that constitutes the PM observed. According to the DG-Eau, a modern well meeting normal hygiene conditions is equivalent to a water point and can therefore serve 250 inhabitants.

#### ⌘ Unapproved water sources

In the department of Couffo, there is a whole series of works whose water consumption is not recommended before any treatment or purification. This is rainwater collected in containers whose cleanliness is not always guaranteed and surface water which is naturally loaded with suspended matter. Rainwater is commonly collected for drinking. To this end, some households build cisterns to collect rainwater from the roofs of sheet metal houses equipped with gutters. They are a method of collecting and storing rainwater. They are the main sources of water supply for drinking and domestic use for 41.66% of the populations of the study area in the rainy season. When rainwater is collected by means of gutters, it is not subject to any treatment before consumption.

#### Traditional wells

Modern wells systematically include a reinforced concrete casing and collection by perforated nozzles over several meters. The risks of landslides and drying up are lower than for traditional wells. They can be equipped with more or less improved drainage systems. The photos below show some traditional wells in the study communes.



Shooting: Houdagba, May 2021

**Figure 10** Traditional well in hlonhlonmitonhou, klouékanmè center (a) and Traditional well with pneumatic rim in a district of Toviklin-center (b)

These wells observed in the study area are used by the populations to meet their various water needs (consumption, oil palm processing activity, etc.). To draw water from these wells, people use a bucket attached to a rope.

#### 3.1.7. Natural springs

The Communes have several natural water sources often located in the middle of the dense vegetation of the slopes. The following photos show water withdrawals from undeveloped springs and the river.

It is important to mention that these water sources are not taken into account by the DG-Eau as drinking water points. Despite this, the surveys revealed that the water of the Couffo River is consumed by more than 60% of the population of this locality. On the other hand, the natural source of water called Doko d'Azovè is not consumed, but is used by the population for market gardening activities and especially for cultural purposes.

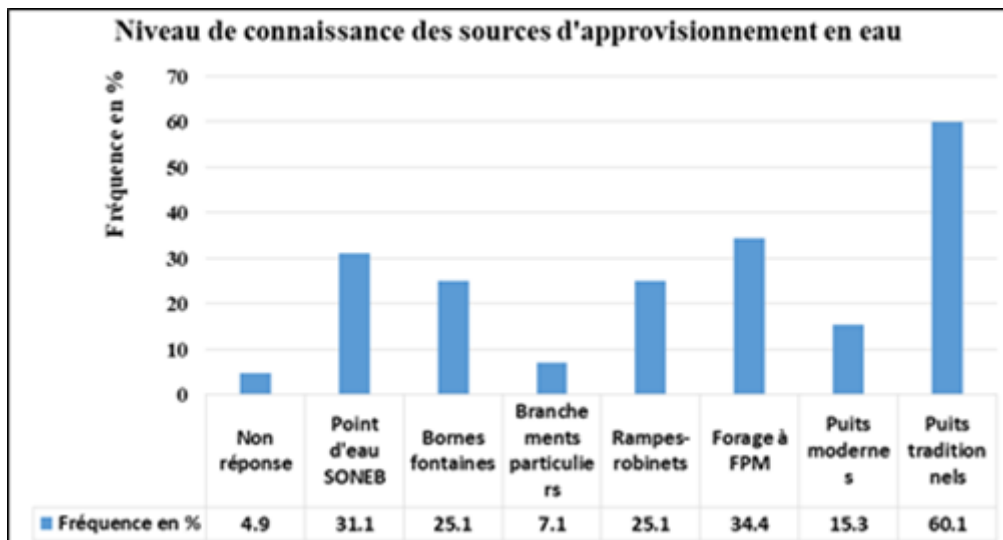


Shooting: Pauline, May 2021

**Figure 11** Natural source (Couffo River) of water supply in Ahogbèya, Commune of Klouékanmè and Use of natural water sources for cultural purposes in Azovè Commune of Aplahoué

### 3.2. Household knowledge of sources of water supply

Figure 12 shows the level of knowledge that the populations in the study area have of these sources.



**Figure 12** Household knowledge of sources of water supply

Examination of Figure 12 shows that traditional wells, human-powered boreholes and SONEB water points are the best known by local populations.

## 4. Discussion

The investigations carried out within the framework of this study showed that the populations of the Couffo department mainly use two sources of water supply: recommended sources and non-recommended sources. The recommended sources include, among other things, the water points of the National Water Company of Benin (SONEB), standpipe installations, private connections, tap ramps, FPM drilling and wells (modern and traditional). Sources not recommended are rainwater and surface water. All the villages visited have few drinking water distribution structures,



32% of households use FPMs. 30% of households use SONEB sources, 48% use AEVs as a source of water supply. These results are similar to those of Mialo (2018) who in his study on "drinking water and diarrheal diseases in the commune of Lalo in southern Benin" discovered that the drinking water supply rate in the Commune of Lalo is 88.3%. Despite this rate well above the norm in rural areas, which is 69.3%, the populations of the said Commune experience difficulties in meeting their drinking water needs. Méguida, (2020) found that in the commune of Aguégues, SONEB water is consumed by 71% of the population, boreholes and private wells are used by 22%, the Village Water Supply used by 7 % and the Ouémé River consumed by a few people. As this study is cross-sectional, it is difficult to comment on the functionality of the water distribution structures throughout the year.

In addition to these hydraulic works, rainwater is collected by several techniques and is used in association with other works. The use of rainwater reduces the distances travelled, the time lost to go to a water point. These results are in line with those found by Azonhè (2009) in the Tchi depression. He concludes that the collection of rainwater which reduces the drudgery of water in terms of distance and is very practiced in the Tchi depression. Originally, rainwater is pure on the microbiological level, but on the chemical level, it often lacks certain elements essential to health such as sodium, magnesium, manganese, iron and iodine (Coulibaly, 2005). But, it happens that rainwater is loaded with materials suspended in the atmosphere which pollutes it before its collection. According to Viland et al. (2001), this practice is very popular in developing countries, where rainwater that runs off roofs is collected by various recovery systems. In addition, these authors add that these waters are weakly mineralized, and contaminated by air impurities, the storage method and certain pollutants related to roof materials. Apart from rainwater, surface water is the second non-recommended source of water used by the population of the department of Couffo. These are the Couffo River, ponds, backwaters that people use for domestic needs. Viland et al. (2001) confirm that in developing countries the use of surface water (backwaters, rivers, rivers, etc.) is a very popular mode of supply. However, these waters are characterized by the presence of dissolved gases, in particular oxygen. In warm tropical and equatorial regions, these waters are very rich in colored humic acids. These waters have a variable quality depending on the temperature, the seasons and the pollution due to the activities they generate. However, they are all heavily contaminated and must imperatively undergo a basic treatment to be consumable. This is not the case in the department of Couffo.

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## 5. Conclusion

The analysis of the legal and institutional framework relating to the governance of water and sanitation in the context of decentralization in the Republic of Benin, particularly in the department of Couffo, has shown that efforts are being made in the water since the country's accession to international sovereignty. However, although these legal provisions are likely to improve the management of water resources, shortcomings are noted in the application of the texts. There are a number of sources of drinking water supply in all the municipalities of the department of Couffo. But, the physical properties, the depth and the flow of the different types of rocks on the one hand; the long distances covered, the number of hours lost by some women, and the uneven distribution of hydraulic structures are all factors that make it difficult to access drinking water in the study area. The other very important factor is the availability of water in the dry season. All these constraints do not promote effective and sustainable access to drinking water in the department. As a result, households resort to sources of water that are not recommended for drinking. Situation that leads to a high prevalence of cases of waterborne diseases in the study area.

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## Compliance with ethical standards

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### *Disclosure of conflict of interest*

The writing of this manuscript is without conflict of interest. Each of the authors contributed to the success of this manuscript.

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## References

- [1] Mialo E. Drinking water and diarrheal diseases in the commune of Lalo in southern Benin. Doctoral thesis from the University of Abomey-Calavi. 2018; 269.

- [2] Azonhè T. Systemic analysis of the environmental determinants of malaria and diarrheal morbidity among populations in the agricultural sector in the Tchi depression in southern Benin. Doctoral thesis, EDP/GENV/FLASH/UAC. 2009; 238.
- [3] Coulibaly K. Study on the physico-chemical and bacteriological quality of well water in certain districts of the district of Bamako: Faculty of Medicine, Pharmacy and Odonto-Stomatology. 2005; 69.
- [4] Villand M, Montiel A, Duchemin J, Laruviere M, Zarrabi P. Water and health: practical guide for stakeholders in rural Africa, PS-EAU: Edition du GRET. 2001; 109.
- [5] Méguida A. Drinking water supply and health of the populations of the municipality of Aguégoués (lower valley of Ouémè-Benin). Doctoral thesis from the University of Abomey-Calavi. 2020.
- [6] Thompson J, Porras IT, Tumwine JK, Mujwahuzi MR, Katui-Katua M, Johnstone N, Wood L. Drawers of Water II: 30 years of change in domestic water use and environmental health in East Africa, London, IIED. 2001.
- [7] Wyss K, Ndiaye M, Yémadji ND, Jacolin P. Cities on borrowed time in the Sahel. Experiences in Chad and Senegal. ITS/ENDA-GRAF, Edition L'Harmattan, Paris. 2000; 276.
- [8] UNDP. Summary of the Human Development Report. 2006; 59.
- [9] UNDP. Contribution to the preparation of PRSP II in Togo. Report of the Water, sanitation, environment and living environment sectoral committee Volume 1: Water and sanitation Final version. 2012; 129.
- [10] UN-Water. Sanitation is essential for health • Fact sheet. 2008; 1, 2.