

## Urbanization and the Risk of Flooding In the Congo; Case of The City Of Brazzaville

Nzoussi Hilaire Kevin <sup>1</sup> Prof Li Jiang Feng <sup>2</sup>

*1 School of Public Administration, China University of Geosciences, Wuhan, 430074  
China*

*2 School of Public Administration, China University of Geosciences, Wuhan, 40074  
China*

**ABSTRACT :** *Urbanization is the process by which cities grow. For over a decade, African cities in general have had a very significant population growth. And Brazzaville, the political capital of the Republic of Congo has not remained on the sidelines of this exponential growth. This is probably due to the political and economic stability singularly marked by oil upturn. This rapid urbanization contributes to defy all the forecasts made in terms of urbanization and poses many problems. Population growth leads to an occupation with no real urbanization standards of public space in the city which causes uncontrolled building, with major flooding during rainy periods to disproportionate consequences.*

**KEYS WORDS;** *Urbanization, risk, flooding, Congo, city, Brazzaville*

### I. INTRODUCTION

Urbanization is a very old phenomenon that dates back several years. Congo particularly population growth is the major causes of migration to urban centers (Mauriac and al, 1988) .This impressive urban growth that has its roots in the rural exodus (Vennetier, 1990) .The city is a place of concentration, communication node (Lacour, 1999) .The city is also a gifted place, with logs (Trion, 1997) . Massive arrival of urban neo-urbanites requires coaching and social integration to address urban needs .Drop-off window However, the city still has the realities that we sometimes seems to ignore. Urban development works for town planning reasons, the anarchic occupation of space, high rainfall and the special extension are all problems that are the cause of flooding in the city of Brazzaville. This article aims to study urbanization and the risk of flooding in the city of Brazzaville, and offers appropriate solutions in order to remedy situations of flooding as floods are still a concern in recent years the population of Brazzaville.

### II. STUDY AREA

The city in our study is that of the city of Brazzaville. Brazzaville is the political capital of the Republic of Congo, and the first agglomeration of the country .It is located on the right bank of the Congo River. Brazzaville was divided administratively in 2011 in 7 districts which are; Makélékélé, Bacongo, Poto-Poto, Ouenzé, Talangai, Mounkali and Mfilou as shown in this figure (Fig.1).

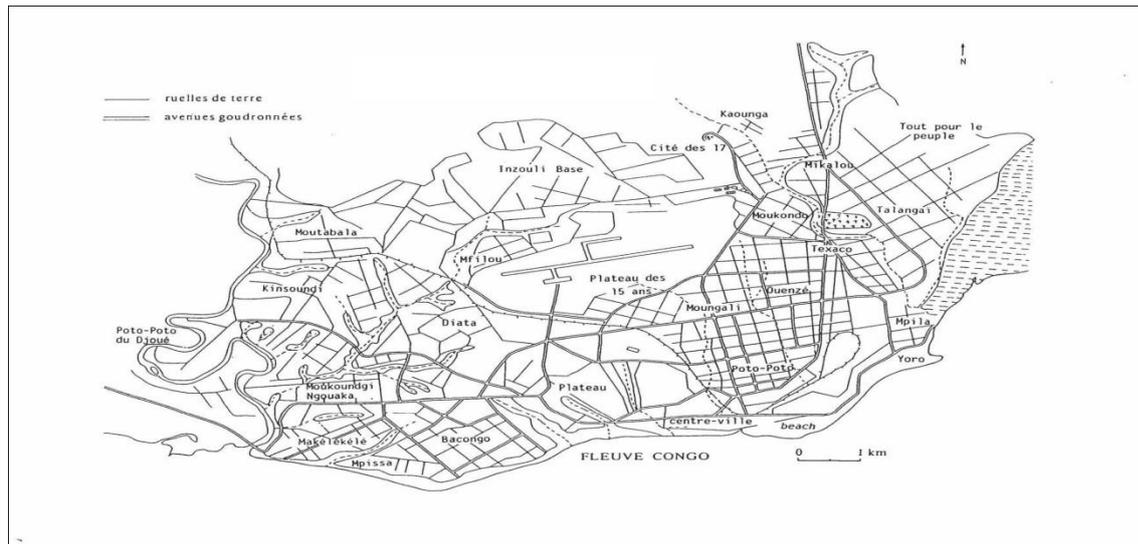


Fig 1; the map of Brazzaville city

But due to the spatial growth of the city other two additional districts were born towards the end of 2011. They are Djiri and Madibou. As city with multiple functions, Brazzaville attracts many neo-urbanites who come from everywhere. It is located in the pool of the department. It is bounded to the north and south by the pool of the department, to the east by the Congo River and to the west by the pool of the department. Geographic coordinates of the city of Brazzaville; Latitude 4 degrees 16 south, longitude 15degrés16 East. His current area of 263.9 km<sup>2</sup> with a population of 1 .373 .382. Inhabitants (CNSEE 2007)), a 5204hab / Km<sup>2</sup> density.

### III. CAUSES OF URBAN GROWTH

" In urban areas, the demo-economic approach invites to remember that cities have the function to attract as many people as compatible with basic needs in urban areas. A city without poor would be comparable to an apartheid city, trying to put the shelter of migratory pressures. It is not the presence of the urban poor need to worry, but the average time that new citizens bring to a level compatible with productivity and income of the living conditions in the middle of Home '(Tchawe, 2003).For this author, the city has an attractive character, and does not worry about the role of the city but the time take neo-urbanites to easily integrate. So there is no city without poor.

**The rural exodus :** Several causes are at the root of urban growth of the city of Brazzaville. These causes are both endogenous and exogenes.The endogenous factors are of two types. This is particularly the rural exodus and population dynamics (Vennetier, 1990). Increase of the population of Brazzaville foreshadows an increase in demand for services and goods (Nzoussi, 2014d).Rural-urban migration can be defined as the mass displacement of country people to the city. It is the cause of the swelling population of the city of Brazzaville. Indeed, several neo-urban is coming to town in search of work or to continue studies (academic secondary education, skills training ...), or in search of better material being. According to them, the city has all the possibilities consisting having money and achieve a social life worthy of the name. This movement of the population is favored today by the establishment of transport networks which have intensified in recent years .We are witnessing a suburbanization of the city of Brazzaville. This movement is quite opposite in developed countries or peoples densely central areas with cities are gradually emptied of their inhabitants because of several factors; pollution, saturation of transport networks, rental constraints the cost of living .

The city is the environment that has a large monetary possibility due to the diversification of jobs and provides money. Gold and silver have become indispensable in the countryside with the spread of the monetary economy (Idem) .It allows the empowerment of young people and connect them to other lands especially with the development of new information technologies and communication. Rural-urban migration contributes 2.5% of the growth of the city of Brazzaville .This phenomenon is not new even if it has become increasingly recurrent. It dates even before independence of the Congo in 1960. when more work had been undertaken to modernize the city of Brazzaville particularly funded FIDES (Investment Fund for Economic and Social Development) .We have witnessed massive displacement of villagers to the city a labor-intensive for the modernization of the city of Brazzaville. Several national and foreign researchers were then boards on the

issue. Among them Vennetier (1963), the rural exodus the Phenomenon of significant scale and has had a negative impact on the development of an urban hierarchical structure. Auger (1968) has observed that the rural exodus hampers the development of agricultural production due to the imbalance between town and country. Balandier (1954) already noted in 1955 that is to say a- 5 years before independence, the negative side of the rural exodus and said that has more disadvantages than advantages. The future of the city in food becomes uncertain because of the explosive urban growth coming from rural areas. The rural exodus leads to negative consequences in both urban and rural areas. In rural areas, rural lose bodied men actually had to work hard to feed the urban populations. Some villages also disappear because of the rural exodus. In urban areas, the increase in population leads to many evils (theft, rape, robbery ...).

**The spatial dynamics :** Spatial dynamics is the most visible phenomenon of urban growth. Just as the rural exodus, this phenomenon is not new and dates back several decades. Neo-urbanites who settle in the city do not occupy the central districts because of the high cost of living rises .They thereby occupy the outskirts of a growing neighborhoods disproportionate. These way are as marginalized due to lack modern urban amenities (schools, roads, hospitals, electricity, market ...) and are victims of several evils. Like most African cities, Brazzaville bears the mark of a colonial past. The true downtown residential area is the home of the rich men, and the suburb is the materialization of the poor areas. The spatial dynamics of the city of Brazzaville is very chaotic and unplanned. This is caused both by landowners and public authorities that city dwell in the city.

The population growth of the city of Brazzaville, which is 7% per year has distorted all expectations that were established in the master plan of the city of Brazzaville (Brazzaville Act of Symposium, 1986) .In 1974 had 321,000 inhabitants Brazzaville in 1985 it had 590,000 inhabitants, 611,000 inhabitants in 1986,760.000 inhabitants in 1990, 1242.000 in 2000.In 2007it was estimated at 1,337,382 inhabitants (CNSEE, 2013). Between 1974 and 1984, for example, the population of Bacongo increased from 38,500 to 56,500 inhabitants per hectare, that of Moundali and mud built from 117, 000 to 145 000 people per hectare. The increase in the population contributes to the densification of old neighborhoods and especially the extension of the peripheral areas. Thus, all the forecasts of the limits of the city of Brazzaville today require a redesign of the public authority's .This is why, on 17 May 2011 other two other districts were created ( Madibou and Djiri). Spatial dynamics has brought many consequences both socially and environmentally.

#### IV. MIGRATION

The Republic of Congo Brazzaville in general and in particular is also a land of immigration. As a capital city that she takes strangers from several horizons.Indeed, immigration is not a new phenomenon. During the industrialization of the country around 1960, Brazzaville during the colonial period Brazzaville played a major role by receiving immigrants neighboring countries. The latter were either for studies (in the case of the National Institute of Education of Central Africa built only in the Congo, and to receive all the peoples of Central Africa studying in the goal of becoming teachers) is looking for employment. Thus, the people of Chad, DRC, Gabon and RCA have long stayed in Congo and others remain to this day there. Added to this are people coming from West Africa.Obviously, Brazzaville attracts a large population of West Africa. The latter came for lucrative reasons. A mud built and Moundali for example, West Africans hold the bulk of trade. All these migrations are juvenile's majority. It is young people who participate in this migration which has become inevitable today. This is caused by the growing phenomenon of unemployment (Augier, 1972).

**The natural movements :** The natural movements are characterized by three main factors that determine the evolution of the population of the city of Brazzaville. This is the birth rate, mortality and natural increase.

**The birth rate :** The birth rate is the ratio of the total number of births per thousand inhabitants. Its formula is as follows;

Number of birth

TN = ----- X1000

Total population

Indeed, in 1984, recorded a civil Brazzaville 19812.L'état birth records the following births; 1999.17945 13210 in 2000 and 21295 in 2001 (Balkiabiya, 2008) .With a high birth rate, around 42%0.Also, Brazzaville she carries the causes of population growth with high birth as shown in the above totaled. The population pyramid of Brazzaville would be a pyramid with a wide base with a tapered top. This is the type of underdeveloped countries of the pyramids with a very important youth, dynamic economic activities, so having a large workforce. But the summit would be tapered, symbolizing few. Life expectancy (the average number that a person is supposed to last on earth before dying) in the country is 50 years for men and 55 years for

women. Women who are of childbearing age in Brazzaville are growing. This explains high fertility. The Brazzaville fertility rate declined from 5.8% 0 in 1984 to 3.5 in 2005.

**Mortality :** The mortality rate is the average number of deaths per thousand inhabitants. Its formula is as follows;

$$TN = \frac{\text{Number of deaths}}{\text{Total population}} \times 1000$$

Total population

1,555 deaths was recorded in the 1984 census, Brazzaville noted 1999.6072 6090 deaths in 2000 and 6132 in 2001 (Balkiabiya, 2008) .The proportion of deaths under 5 years was 12.3% 0 in 1984. In 1999, fewer deaths a year were evaluated in 1090 (ibid).

But following a land of investigations, it has been shown that infant mortality is down today with very low rates. This is justified by the fact that national public health policy made a considerable effort in fighting against epidemics and other diseases related to mortality. In 2005, for example, infant mortality was 69% .This decrease in mortality is also explained by the schooling of the young woman who has reached a level of education and higher education and health progress.

**Life expectancy :** The rate of natural increase is the difference between the birth rate and death rate. Its formula is as follows;

**TAN = TN-TM :** The Brazzaville natural growth rate even symbolizes the evolution of the population of the city proper. In other words, it is indeed the excess of births over deaths.

### V. CAUSES FLOODING

There are several causes are the cause of flooding in the city of Brazzaville. These are;

**Climate change :** The city of Brazzaville is built on a soft rock, and has existed for several years. It was founded in 1880 date at which the King Makoko and De Brazza had signed the friendship treaty that allowed the Congo to pass under French protection. Since then the city has always existed and displays the shape of a city in which to live. However, climate changes in recent years arouse much dissatisfaction and dismay regarding the population of Brazzaville. Urban water these days are the subject of reflection well advanced by economists, management scientists and planners on urban water services management methods, their actors (public / private), regulations Land and overlays generated by the managements of urban water (Barraqué and Nahrath, 2009; Renaud-Hellier, 2006)

**The spatial growth and development works in the city :** Urban growth is apprehended from the notion of urban fabric which describes the city and its Changes over time. The location of cities and their development has led to extensive legislation. It allows urban planning at various levels to avoid uncontrolled growth (Valey, 2011) .But, in the city of Brazzaville, there is an illegal occupation of urban space without genuine rule of urbanization.The suburbs who are marginalized and lack infrastructure (Dureaud et al, 2000) .The habitat types, tenure of land to build in Brazzaville and horizontal building pose serious problems. (Moutsara, 1986). Estimated at 122,000 inhabitants in 1961,420.000 in 1981, around 900,000 in 1998 and in 2007 1. 373 .382 (Yekoka 2008), the population growth poses real not only administrative problems, but as the management of space and population (Nzoussi, 2014b).

**Rainfall :** Located in the tropics, Brazzaville has an inter tropical climate. Maximum temperatures are around 35 degrees .To be convinced, observe the outlined below (Fig .2).

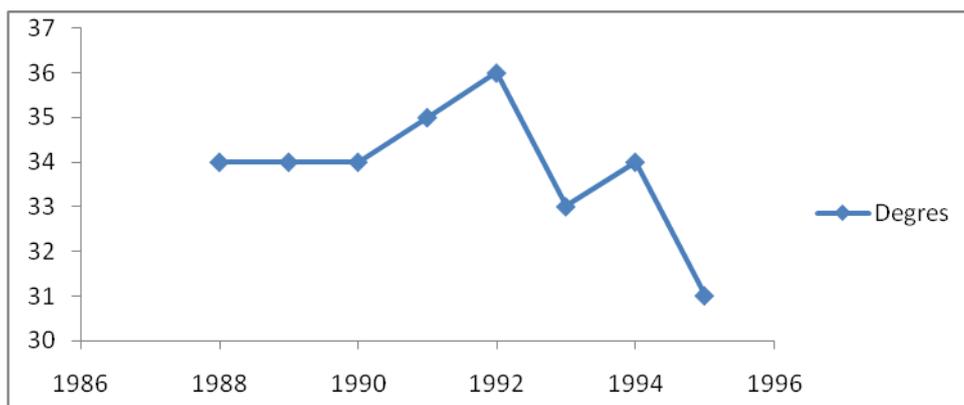


Figure 2; Maximum temperatures in the city of Brazzaville from 1988 to 1995

During the rainy season, for against the dry season temperatures reach sometimes 15 degrees. The figure below illustrates this (Fig 3).

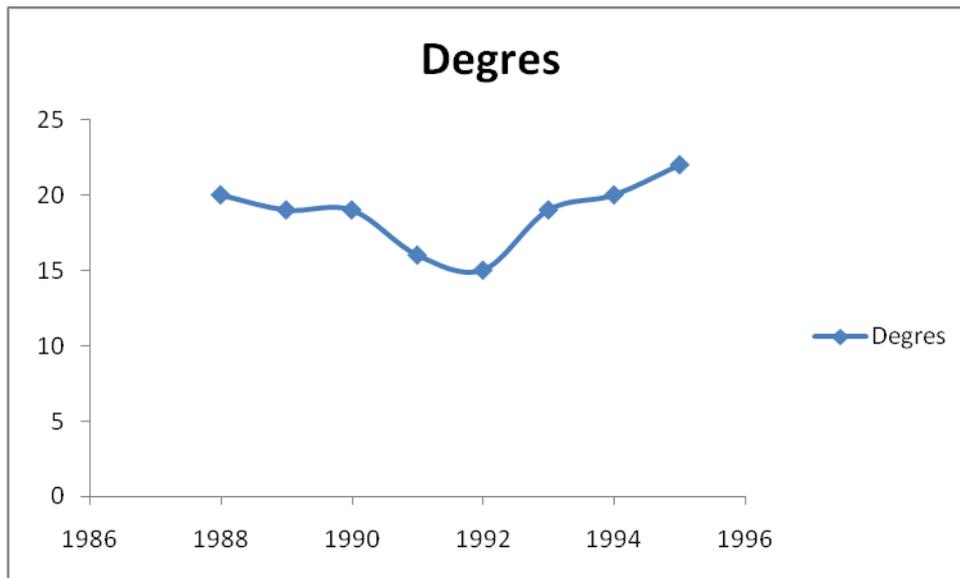


Figure3 minimum temperatures of the city of Brazzaville from 1988 to 1996

Rainfall formerly ranged between 1500 and 1800mm of water / year. But now with climate change that threatens the planet besides, rainfall in the city of Brazzaville is now above average 1500mm of water, and cause significant damage to the topography of the city. We must not forget that the city is built on a soft rock which is the sand. For proof, just watch the figures below ( see Fig. 4, Fig. 5 for evidence).From these days the emphasis of this scourge is becoming increasingly shrill and is criticized by more than one Brazzaville because of the disaster and devastation that continues to inflict on the populations most affected are the poor layers.



Fig. 4 flooding in the city center of Brazzaville in November 2014



Fig; 5The flooding in the northern districts of Brazzaville (Talangai and Ngamakosso)

**The floods and their consequences :** The population growth implies (...), good governance to better meet the needs of the population (Nzoussi, 2014b) .This why the flood issue challenges the government consciousness. Flooding causes very dangerous consequences. Water levels in some neighborhoods sometimes reach the knees, with the first victims schoolchildren who arrive late to school, some students may flee during the day. Officials and traders sometimes have difficulty moving because of transport that have already become so problems. The climate change will be at the origin of these overflows waters of the flooding. Neophytes think it raises the pipe problem. Roads are made without pipes and without landscaped sidewalk. While pioneer roads that the Romans had already understood the importance of pipes to drain the water. These waters flowing train with them a lot of debris and harmful bacteria to human health. So the poor vulnerable are often the most affected. Brazzaville is a real devastation to the difficult conditions of urban life is added the phenomenon of flooding. In 2013 several families were afflicted by floods Bacongo Mfilou and Talangai In November 2014, for example, some 600 families in Brazzaville have become homeless in the northern districts of Brazzaville because of the phenomenon of flooding. Hundreds if not thousands of families who once lived in their homes are now in the street begging which leads to urban poverty.

## VI. CONCLUSION AND RECOMMENDATIONS

At present the issues of flooding in ASS (Africa South of the Sahara) cities general in Congo in particular should concern any urban who would live in an environment and peaceful city. The urbanization of Brazzaville is partly responsible for the observed floods in the city, accompanied collateral damage and all the attendant evils. So to solve this problem, the authorities who are in charge of managing the territory and people should make healthy and enforcement measures in order to find a lasting solution to this thorny issue that is becoming increasingly worrying. Thus it is the duty of the state to prohibit the Brazzaville to build on wetlands, which are dangerous to their lives. Build quality urban roads in order to guide rain water. Enforce action with respect to any resident who tried to settle in areas at risk. Post a law of the land use which is to ban the sale of plots in swampy areas. Since the city is built on a soft rock which is the sand, the state must build for vulnerable population's quality of social housing in order to save their lives from the dangers of flooding. Prohibit landowners to sell land in hazardous environments without measurement Subdivision and Development beforehand. Implement the project co-led between Congo and the World Bank to identify all parcels in areas in danger of flooding in order to bring tangible solutions.

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## REFERENCES

- [1] Auger, A., the study of relationships towns and countryside in developing countries, Paris, ORSTOM, pp 738 to 741.1968.
- [2] Auger A., Traditional food supplies to the population of Brazzaville. Contribution to the urban-rural geographic scale in tropical Africa in urban growth in black Africa and Madagascar NCRS, Paris, pp273-298, 1972.
- [3] Balandier G., Black Brazzaville Sociology, Paris, A. Colin, 274p, 1955.
- [4] Balkiabiya K.D.S Spatial dynamics and environmental problems in Brazzaville, UMNG, 54p, 2008.
- [5] Barraqué et al, uses and regulation of urban water, spaces and societies in magazines, Vol, 139, eras Editions, Paris, 244 p., 2009
- [6] Dureaud and al, movements in Metropolis, Paris, Anthropos IRD 2000.
- [7] Lacour C.et al Metropolisation -Growth, diversity and fractures, Paris, Economica, 1999 194p.
- [8] Mauriac F. and al, The African politics 31 Congo Brazzaville suburb, Paris, Karthala, 140 p 1988.
- [9] Motsara A., Conference Proceedings, 25-28 April 1986 Brazzaville, 12p, 1986
- [10] Nzoussi H.K , Decentralization, local governance and types of transportation in Brazzaville, International Journal of Science and Research (ISJR) vol 3 (8) (eISSN2319-7064), p146-149, August 2014b.
- [11] Nzoussi H.K and al, The issues of residential mobility in the Congo case of the city of Brazzaville, American Journal of Educational Research (AJER) Vol.2 n0 10 (eISSN, 2327-6150), p.906- 910 October 2014c.
- [12] Nzoussi H.K, Management of the urban environment in Brazzaville, Problems and Prospects, European Scientific Journal (ESJ) Vol 10 N0 29 (eISSN1857-7431), pp 209-2016, october 2014d,
- [13] Tchawe E. The supply and food distribution in Douala (Cameroon); social logic and spatial practices of actors, University Sorbonne, PhD Thesis, 455p, 2003.
- [14] Troin J., 1997 the cities of the Mediterranean, Paris, Edisude, 110p
- [15] Valy J., Urban Growth and the risk of flooding in Brittany, Rennes 2 University, PhD Thesis, 544p, 2011.
- [16] Vennetier P., Urbanization and its consequences in the Congo in the books overseas, Paris, n063 p.263-280, 1963.
- [17] Vennetier P, what cities in tropical Africa? But problems of rapid urbanization newsletter Geographical Society of Liège, PP63-75 1990.
- [18] Yekoka F. spatial practices and urban imbroglia in Brazzaville, analysis of public administration dysfunction of space Condensa 2008.