
WATER SUPPLY AND POPULATION PROJECTIONS: CASE OF BENIN CITY

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ABSTRACT

The UN general assembly, in December 2003 proclaimed the years 2005 to 2015, as the international decade for action "water for life". A decade of action; the primary goal of the "water for life" decade is to promote efforts to fulfill international commitments made on water and water related issues by 2015 and this 'water for life' is part of its millennium development goals. The provision of adequate water supply and sanitation to the rapidly growing urban population is increasingly becoming a problem for governments throughout the world. The absence of virtually any reliable current demographic data has not prevented national and international bodies from generating estimates and projections of population and population growth in Nigeria, the population of Benin city 1.225 million is growing by 3.3% for Nigeria and average of 1.14% or the world per annum and this has place tremendous pressure on the main source of water the government own Ikpoba River dam facilities. The population projection is to range from 1.45 million in 2010 to over 2.35 million in 2025 and the water demand of the city per day is to range from 172 million litres in 2010 to over 280 million litres in 2025.

Keywords: Population, Projection, Population Growth rate, water demand

INTRODUCTION

Clean water is a priceless and limited resource that we have begun to treasure only recently, after decades of population and waste. Because of the natural tendency of systems to become disordered, it requires a great deal of energy to remove dissolved, dispersed, and suspended particles from water. (Silberberg, 1996).

Water is essential for life. Yet millions of people around the world face water shortage. Millions die every year from water borne diseases. This is an urgent matter of human development, and human dignity. (Annan, 2005).

Historically, water development have contributed to the growth of major civilizations of the past, and thus it is not surprising to find that some of these great civilizations developed along the banks of major rivers like the Nile, Tigris, Euphrates and Indus (Tolba, 1980).

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The volumes of water on the earth are large. The oceans, Seas and Rivers including streams, springs and lakes alone account for about 97% of the total water resource. Unfortunately, neither one of them is immediately available for water supply; sea water, because each litre contains 35g of salt, and polar ice because it is so far away from the habitable portion of the globe. (Fair etal, 1966).

Table 1: Distribution of world’s water resources

Location	Percentages
Oceans (seas)	97.3
Fresh	2.7
Distribution of fresh water	
Ice caps & glaciers	77.2
Groundwater	22.4
Lakes & swamps	0.35
Atmosphere	0.04
Streams channels	0.01

(Biswas etal, 1980)

Water and Man

Water, according to the Greek philosopher **Pinder** of the fifth century, BC. “Is the best of all things”. One may consider it to be an over-statement, but it certainly is not surprising when it is considered that water has been one of the most important resources throughout the history of man. Water makes human, animals, and plant life possible, and without it, life and civilization cannot develop or survive. Wars have been fought in the past over the availability of water, and even led to disputes over international water bodies.

Human Physiology: The structures and physiological process of the body are based, to a large degree, on the properties and interactions of atoms, ions, and molecules. Water is the major solvent in the body and accounts for 65% to 75% of the total weight of an average adult. Of this account, two-thirds is contained within the body cells (intracellular compartment), the remainder is contained in the extra cellular compartment, including the blood and tissue fluids (Fox, 1996).

Almost every part of the body contains large amounts of water:

- A 50kg adult contains about 31 litres of water
- A 10kg child contains about 8 litres of water.

We can live without food for a week, but we cannot live without water more than a few days. That is why giving drink is so important when people lose a lot of water, such as during diarrhoea. (King and Burgess, 1992).

Need for Water: People need water for the following reasons and more:

- To make body cells and fluids, such as blood, digestive juices and tears.

- For digestion and assimilation of food.
- To keep the lining of the mouth, gut lungs and other parts of the body moist and healthy.
- A constituent of endocrine secretions (hormone).
- A constituent of the reproductive secretions.
- For the regulation of the body temperature (urine and sweat).
- For osmoregulation of the body system.
- A constituent of cells and the protoplasm.

Daily Water Need: An adult man needs two-three (2-3) litres of water a day (drinking). People need extra water when:

- They sweat a lot during hot weather, or when they take (do) a lot of exercises.
- They have a fever.
- They lose water because of dehydration due to diarrhoea or vomiting.

Table 2: Showing estimates of daily demand

Water use (/day or week)	Demand (Litres)
Drinking	1.26
Teeth brushing	0.46
Cloths washing	7.04
Toilet flushing	23.15
Cooking	33.1
Utensils	24.8
Bathing	29.3
Total	119.11

Source: Idiata, D.J Field work 2007

Water plays a very important role in sanitation and hygiene. In order for people to maintain a very high health status and immunity level the quality of water we drink and water storages around our places of habitation must be considered.

Water is usually a storehouse for many disease-causing organisms (pathogens). This could be by means of providing reservoir for the pathogens or as a breeding place.

Some of the diseases related and associated to water are namely:

- Malaria(plasmodium sp)
- Blood fluke (schizoid soma)
- Filariasis (Inuchereria Bancroft)
- Diarrhea
- Yellow fever
- Cerebro-spinal meningitis etc (Idiata, 2007).

POPULATION PERSPECTIVE

The world's current (overall as well as natural) growth rate is about 1.14%, representing a doubling time of 61 years. We can expect the world's population of 6.5 billion to become 13 billion by 2067 if current growth continues. The world's growth rate peaked in the 1960s at 2% and a doubling time of 35 years (www.geography.about.com/lr/population). Latest official current world population estimate, for mid-year 2009, is estimated at **6,790,062,216** (Rosenberg, 2010).

The absence of virtually any reliable current demographic data has not prevented national and international bodies from generating estimates and projections of population and population growth in Nigeria. The World Bank estimate of Nigeria's 1990 population was 119 million, with an estimated annual growth rate of 3.3 percent (<http://countrystudies.us/nigeria>)

Nigeria's population is growing at an annual rate of 3.2 percent and stands at just over 140 million, a 63 percent increase in 15 years, population commission chairman Samu'ila Mukama has said (Hugh, 2006). Rapid population growth has placed incredible stress on earth's resources. The provision of adequate water supply and sanitation to the rapidly growing urban population is increasingly becoming a problem for governments throughout the world. Increased population growth generally represents problems for a country - it means increased need for food, infrastructure, and services. These are expenses that most high-growth countries have little ability to provide today, let alone if population rises dramatically (www.geography.about.com/lr/population).

According to Ezugwu (2010) in a research work carried out at Okada town in Edo State shows a total outbreak of diseases during rainy season due to poor to be 2416 and that during dry season to be 843 for a population of about 20,000 based on 2001 estimates. Globally, 2.3 billion people suffer from diseases linked to water. Providing safe drinking water and adequate sanitation would have major health benefits. Some benefits include an estimated 2.1 million fewer deaths from diarrheal diseases, 150 million fewer cases of schistosomiasis, and 75 million fewer cases of trachoma. Water-borne diseases, also known as "dirty water" diseases, result from using water contaminated by human, animal, or chemical wastes. These diseases cause an estimated 12 million deaths a year, 5 million of them from diarrheal diseases. Most of the victims are children in developing countries.

Estimated Projections for Water and Population

The bulk of the total water supply output comes from the Ikpoba river dam, which supplies over 51 percent of the total and it was designed for 2 million people (Idiata & Enabulele, 2006).

The principal agglomeration of the world puts the population of the city at **1.225** million in 2005 (Brinkhoff, 2006) and base on the population growth rate estimate of 3.3% for Nigeria and 1.14% for world, the population of the city for 2010, 2015, 2020 and 2025 will be using

the formula (Abdulrahman, 2009).

$$P_n = P_o \left\{ 1 + \frac{r}{100} \right\}^n$$

Where:

- P_n = Future population
- P_o = Initial population
- r = growth rate (3.3% and 1.14%)
- n = period (5 yearly)

From (table 2) demand is 119.11litres per person per day for the activities (Idiata, 2007). Considering the above the projections is shown in table 3 below.

Table 3: Showing projections of population and water demand.

Year	Population using 3.3% growth rate	Water demand per day (litres)	Population using 1.14% growth rate	Water demand per day (litres)
2010	1,440,900	171,627,122	1,296,435	154,418,404
2015	1,694,866	201,875,527	1,372,036	163,423,203
2020	1,993,595	237,457,122	1,452,046	172,953,151
2025	2,344,977	279,310,182	1,536,721	183,038,878

CONCLUSION

From the population and water demand projections as seen in table 3 it therefore follows that the water situation will get more intense as more people i.e. about 1.45 million in 2010 to about 2.35 million by 2025 will rely on the same water sources and water quantity since it is constant for their domestic, industrial, agricultural and other uses.

RECOMMENDATION

In other to ensure that portable water is supplied in needed quantity to the masses, to meet the various water uses as enumerated in the write up the following recommendation is deemed fit:

- Government should endeavour to make sure that the water installation facilities are functioning properly.
- Water boards should ensure that their piping networks are protected and not damaged and all illegal connections disconnected.
- Water standard and quality should be adhered to.
- Private individuals should be encouraged to participate in water resource development.
- Government can subsidize borehole drilling by providing equipment and expertise.
- Government should employ water engineers to serve as consultants.
- Personal hygiene should be emphasized to deal with water contamination and pollution.

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