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INFORMATIVE WATER SUPPLY CHALLENGES ON THE DEVELOPMENT OF TOWNS: A STUDY OF MINNA TOWN CENTRAL NIGERIA

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ABSTRACT

'Water is life' so a common saying of ages. The purpose of this paper is to examine the challenge faced by developing nations about scarcity of portable water supply in view of the ever increasing population and development of towns. Scholars have documented works on infrastructural deficiency in the third world towns and cities and have mostly looked at the problem with levity as government sees provision of safe water as privilege. This paper aims at establishing the effects of poor quality water supply on our lives and the consequent impact on the development of towns. The scope of the study is Minna Municipality which has been experiencing rapid growth since it became a state capital and the movement of Nigeria's federal capital city from Lagos to Abuja. The researcher utilizes both primary and secondary data. The research findings indicates that people prefer and converge more on where there is available and clean water and poor quality water supply brings about diseases.

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1. Introduction

The 20th century witnessed population explosion in the urban areas in such a monumental degree that has never been experienced in human history and the count is still ongoing. It estimated that 6.3 billion people will live in the cities at the middle of this century. Urban society mounts pressure on resources such as water. Water is used for domestic, clinical, and industrial purposes. However the supply and distribution of water are becoming rapidly problematic in many third world urban centres. In some cases it is due to the environment but in others situation is a result of neglect and insensitivity of government occasioned by unprecedented corruption that have characterized the society. Scholars have since pointed the need for available adequate water supply among other factor for the location of a town. Padoswski and Gorrellick (2014) posited that care need to be taken in the management of water to cities despite they have abundant supply because of the feature.

2. Literature Review

2.1 Literature on Challenges of water on Urban Development

In both large and small cities social and economic factors exhibit an incredible diversity of characteristics within the realm of; economic structures, levels of infrastructure, historic origins, patterns of growth, and degrees of formal planning. Fortunately, many of the problems that they face are strikingly familiar. One sure fact is that, as cities grow, they become increasingly diverse. Every city has its relatively more affluent and relatively poorer neighborhoods. But in developing countries, poorer neighborhoods are more associated with dramatically lower levels of basic services. Consequently, a large proportion of urban dwellers in developing countries suffer to a greater extent from severe environmental health challenges that are closely associated with insufficient access to clean drinking water.

A major recent United Nations report on the state of water supply in the world's cities found that water distribution systems in many cities in the developing world are inadequate, typically serving the city's upper- and middle-class neighborhoods but not rapidly expanding settlements on the urban fringe. In many cities, the scarcity of public water supplies forces many low-income urban residents to use other water sources such as private water vendors who charge many times more than the local public rate. Consequently, people in slums often must pay much more for lower quality water than other urban residents (Satterthwaite, 1997).

Estimation in recent times shows that about 1.1 billion people globally lack access to improved water supplies and 2.6 billion people suffer inadequate sanitation related problems. The global health burden associated with these conditions is staggering, with an estimated 4000–6000 children dying each day from diseases associated with lack of access to safe drinking water, inadequate sanitation and poor hygiene, (UNICEF & WHO, 2004). The UN Millennium Development Goals (MDG) aim: to reduce by half the proportion of people without sustainable access to safe drinking water and basic sanitation by the year 2015. Although, some parts of the world are making encouraging progress in meeting these goals, serious disparities still exist. The problem of access to improved drinking water is still a serious challenge in large parts of Asia where an estimated 675 million people are without safe drinking water sources. In Sub-Saharan Africa, over 319 million people lack access to improve and reliable drinking water sources, (WHO 2015) and only 36% of the population has access to basic sanitation, (WHO, 2001).

There is serious danger in consuming even the so called pipe borne water as microbial contamination in parts of the distribution system may lead to risks of endemic illness. Studies by Payment et al, found out that the distribution system may have contributed to gastrointestinal illness as observed in study of households which drank tap water compared to households which drank tap water with additional treatment, or bottled water (Payment et al., 1997). As shown in a study conducted in Wales and northwest England between 2001 and 2002, which found that a very strong association ($p, 0.001$) exists between self-reported cases of diarrhea and reported low water pressure at the home tap from survey of 423 subjects (Hunter et al., 2005). Although there has been concern about pathogen intrusion in water distribution systems as a possible health risks from pressure loss (LeChavier et. al, 2003), the study provides solid evidence of that risk. The presence of Biofilms in distribution systems may provide a favorable condition for some bacterial especially opportunistic pathogens which cause disease primarily in people with weak immature immune systems. These pathogens can find their way into the distribution system from fecal contamination and then multiply and even colonize parts of the

distribution system. Thus the more reason people found of drinking water from the public tap source are equally prone to regular infestation of typhoid and other water borne related diseases.

Historically, pipe borne water to the household has been directly associated with improved hygiene and reduction in diseases. However, over the years water infrastructures have become aged, thus the growing recognition that water distribution systems are vulnerable to intrusion and contamination and may contribute to endemic and epidemic waterborne diseases. Analyses of the data from the waterborne disease outbreak passive surveillance system in the United States indicated that the total number of reported waterborne disease outbreaks has decreased since 1980. This may be due to improved water treatment practices and the Surface Water Treatment Rule which reduced the risk from waterborne protozoa. However, the proportion of waterborne disease outbreaks associated with problems in the distribution systems is increasing. Causes of waterborne outbreaks from 1971 to 1998 was examined by Craun and Calderon who noted that, in community water supply systems, 30% of 294 outbreaks were associated with distribution system deficiencies, leading to an average of 194 illnesses per outbreak (Craun and Calderon, 2001). The author further agreed that the distribution system contamination was one single most important cause of disease outbreaks in community water systems over that time period (Graun and Calderon. Contamination from cross-connections and back siphonage caused 51% of the outbreaks associated with distribution systems. Contamination of water from main and household plumbing problems caused 39% of the outbreaks, and there is contamination from storage facilities which is responsible for the remaining 10% of outbreaks.

Between 1999 and 2002, out of the 18 reported outbreaks in community water schemes, 9 (50%) of these were associated to the problems in water distribution network (Lee, 2002).

Problems with water quality in the distribution system are especially serious in middle income and developing countries where there are inadequate resources to maintain the distribution system infrastructure and disinfectant residual. Rapid urbanization in developing countries is often accompanied by overwhelming demands on existing water systems and illegal connections to distribution systems in poor neighborhoods. Many systems have cracks and high leakage. An international survey of water loss in 1991 shows the percentage of water supplied and reported that in industrialized countries 8% to 24% constitute amount of water lost. Comparatively, in middle income or newly industrialized countries, the quantity ranged from 15% to 24%, while in developing countries, it was estimated at between 25% and 45% (WHO, 2015). Frequent power outages contribute to low or negative pressure in the pipes which allows contaminated water or waste water surrounding the pipes to be drawn in through any cracks. The most severe and largest documented waterborne disease outbreaks in the last two decades have been associated with cross-contamination in the distribution system for instance typhoid in Dushanbe, Tajikistan, 1997, cholera in Cape Verde, 1994–1997, Guinea Bissau, 1996 and Trajillo, Peru, 1990 (Renkevich, et al, 1998). Water is paramount to human life; water is also a basic requirement for the human body. Certain quantity of water is necessary to human health in several ways: water for ingestion, water for hygiene and water for food production. Adequate water for ingestion and food preparation is necessary for human health. Estimates of minimum daily water intake range from 1.8 to 5 liters per , capita per day (Gleick, 1996: 83-92). However, water consumption increases in warm climates, with physical activity and during pregnancy and lactation. A recent WHO review recommended a minimum of 7.5 liters per capita per day to meet the requirements of most people under most conditions (Howard and Bartram, 2003).

3. Research Method

The research employs the use of both primary and secondary data. The primary data involved the use of government documents in the archives and face to face semi structured interview with relevant informant (Franklin, 2013:183) while the secondary data was obtained through the review of related literature (Gunn and Flaire, 2013: 20). The combination of these major sources was used to analyze and interpret the data which gave the concrete reality of the effect of the challenges of good water supply on the development of towns.

4. Findings

Various administration of Minna town since 1976 when it became the Capital City of Niger State have spent huge amount of public fund with a view of providing adequate and safe water supply to the town however, following the constant influx of population and its consequent effect the challenge persisted and continued to impact on the development of Minna town.

The history of pipe-borne water in Minna goes back to the colonial era when its authorities established the Bosso Dam in the 1930s, then followed by the Chanchaga water works and later the Tagwai Dam at the inception of the Niger State in 1976. Over time the facilities met the desired demand but population increase and outright neglect of facilities has brought the town to a level whereby only 35% of the population enjoy tap water yet not on daily basis.

The problem rather got a to height since 2007 when the main supply dam at Tagwai became almost over taken by massive sand deposit (silted) thus only little quality of water it could keep and the virtual collapse of the water works at Chanchaga. Endemic corruption and outright lack of maintenance culture led to the breakdown of the machines and distribution pipes thus, forcing the board to ratio its daily supply to the ever expanding town.

Records from the water board shows that currently Minna is expected to consume over 20 million liters per day but only 45% of supply is met. Cases of broken pipes and leakages have constituted a major problem and setback in the provision of pipe borne water to the dwellers of the town hence about 40% of production is lost to leakages from the source of distribution to the end user. The table below illuminates on leakages in the water supply pipes for Minna metropolis:

Table :Water leakages in Minna Town 1976 to 2015

S/NO	Year of pipe leakage	Size	Type of pipe	Total Distance of leakage
1	1976-86	DN 200mm	Asbestos	24,000mt
2	1986-96	DN 450mm	Ductile pipe	27,450mt
		DN 600mm		
		DN 500mm		
3	1996-2006	DN 250mm	UPVC	19,320mt
		DN 300mm	Asbestos	
4	2006-2015	DN 100mm	UPVC	12,120mt
		DN 75mm		

Source: Niger State Water Board Minna

Such massive leakages in the supply pipes have been responsible for endless cases of Typhoid and other gastro-intestinal diseases including malaria among the dwellers of Minna town. It was therefore to that effect that; the State Water, Sanitation and Hygiene Surveillance and Control Committee on 17-19 January 2017 investigated private table water producers in Minna town. The study sampled eighty eight (88) table water production firms within Minna town. It was found out that only (35) 40% of the table water producers scaled through the physical, chemical and Bacteriological test analysis carried out. The remaining 53 table water production firms had issues during the test. Some of the samples analysis shows presence of *Salmonella*, *E. coli*, Total Coliform Count and faecal *Steptococcus* (NGSG, May 2017). In an interview with a medical Doctor it was stated that these could contribute the spread of water related diseases like: typhoid fever, dysentery, diarrhea, cholera and gastroenteritis in the town. Data from general hospital Minna shows the prevalence of Malaria and Typhoid fever for male and female covering 2009-2013 as follows:

Table: Prevalence of Malaria and Typhoid fever in Minna Town 2009 - 2013

2009		2010		2011		2012		2013	
MF	TF								
12,702	2,162	30,627	1,696	25,760	2,048	33,392	2,075	25,768	2,217

Source: General Hospital Minna

5. Discussion

Portable and safe water supply to many parts of Minna still remain a mirage as most of the new extensions and expansions of the town have not been reached by the water board pipes. Such places as: Gusasi, Maikunkele, Air force base, Rafin Yashi, Gidan Mangoro, Gidan Kwano Gongwapi, Sauka ka huta 11, Maitumbi extensions, F.M Station, Gurusu, Fadikpe, Gbegenu, Talba quarters, Tayi and a host of lot more communities that are now part of Minna town.

Thus challenge of water supply affect the development of Minna town as it hinders the health and wellbeing of the people. A healthy society is a productive one, with poor and unsafe water supply, people in Minna suffer from diseases most of which are caused by the water they consume. Poor quality water supply has also led to the prevalence of Cholera and Diarrhea diseases in Minna which resulted in illnesses and even some deaths. The figures below show trend of the diseases from 2012-2016.

Table: Trend of Cholera and Diarrhea in Minna Municipality 2012-2015

Year	Disease	Cases	Death
2012	Cholera	0	0
	Diarrhea	23,189	25
2013	Cholera	18	0
	Diarrhea	1,891	0
2014	Cholera	4	1
	Diarrhea	689	1
2015	Cholera	12	2
	Diarrhea	452	9

Source: Niger State Ministry of Health, Minna

The provision of both qualitative and quantitative water is integral for the wellbeing of the environment, society and the economy (Moe and Rheingans, 2006). Access to clean water is indeed a right and that is why the period 2005 to 2015 has been declared as the international decade for Action on “Water for Life (<http://www.un.org/waterforlifedecade/>).”

In Minna town perennial water shortage which has been exacerbated by non charitable attitude of the authorities concerned has in no small measure affected the development of the town. Development seem to concentrate in areas where water can be easily reached however at times it becomes a general situation and the water vendors make their day by selling unsafe water at exorbitant prices.

6. Conclusion

Water is an integral part of human life and forms part of the major requisite resources that must be considered when citing or establishing a town. Its usefulness in our, farms, health centres, factories and above all homes cannot be over emphasized this simply because we can't do without it. Following the recent global upsurge in population and the attendant expansion towns and cities the ability of most third world nations' government to defeat the menace of shortages and at most time outright lack of safe drink water becomes elusive. Thus the population is left to the vagaries of water vendors. In Minna Town despite the available dams which need serious attention the pipes are old and outdated hence broken almost everywhere leading to leakages and contamination. Thus more people are sick these days because of the quality of water intake. To save life government need to revitalize the Bosso and Tagwai Dams and the Chanchaga water works to meet up with the daily requirement of the people. The old iron pipes need to be entirely changed and above all proper treatment must be regular.

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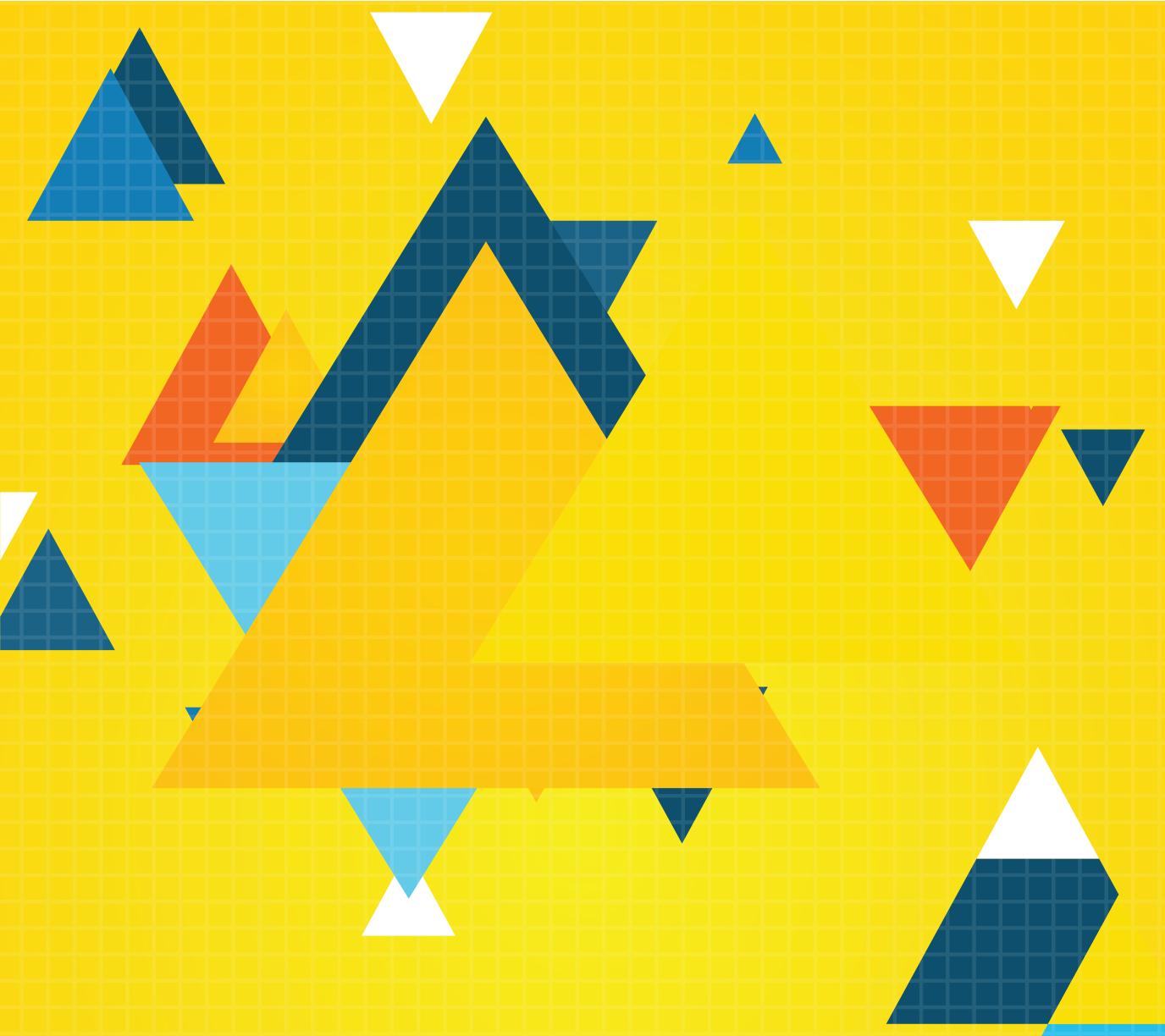
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