



**ASSESSMENT OF WATER SUPPLY IN STUDENTS HOSTEL (A CASE STUDY OF
WAZIRI UMARU FEDERAL POLYTECHNIC, BIRNIN-KEBBI**

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Abstract

This research was carried out to assess the water supply in students' hostels (male and female) of Waziri Umaru Federal Polytechnic, with the view of identifying the impact of students population on water supply, the following methods were used. Assessment of sources of water supply, assessment of student's hostel accommodation, administration of structured questionnaires, descriptive analysis tool (charts), map and satellite imageries. From the results there were two major sources of water supply, pipe borne water (9.30%) and underground (90.70%) the average daily water volume used by a student was 60 litres when compared to 120 litres which is the recommended standard. The recommended standard in both male and female hostels accommodation total is 576 and the existing population in both male and female hostel was 864. On the average 52.14% of the respondents agreed that water supply is inadequate, the assessment of the efficiency of water maintenance of the main sources was carried out, were 67.44% respondents strongly disagree with the maintenance level, this also contribute to the inadequate supply of water. From the above findings, it is evident that overcrowding and improper maintenance has a negatively impacted students living conditions which if not attended to may lead to social disorder, improper hygiene standard and gross environmental pollution. It is against this background that adequate infrastructural planning must be ensured.

Keywords: *Assessment, water supply, overcrowding, accommodation and students' hostel*

INTRODUCTION

Hostels in higher institutions vary in sizes depending on the number of students living in the provided accommodation. The more populated the student hostel is, the higher the need for adequate water supply at the appropriate time. Water is essential for human survival. It has been reported that the total amount of water in the world is about 1400 km³, of all the above volume only 1% or less than is fresh water (Baron et al, 2007)

Without water there would be no life on earth. The human body consists of 65% of water. Apart from the day to day requirements, water is needed for irrigation, power generation, recreation, industrial production among others. Accommodation is one of the most basic needs of human beings without, man will be disorganized. Overcrowding as a concept in environmental psychology is viewed as a situation in which individuals are confronted with environmental circumstances beyond their control. Stokols (1976).

Impact of overcrowding on population was found out it affects student academic performance: due to increase in physical contact, lack of sleep, lack of privacy and poor hygiene (www.en.m.wikipedia.org/wiki/overcrowding; retrieved 17-09-2020 Recently, in its joint progress report WHO/UNICEF (2012) reported that about 66 Million Nigerians lack access to potable water and sanitation. Nigeria ranked third behind China and India on the list of countries with the largest population lacking access to improved drinking water. Also, the growing populations and industrial development demand ever increasing supplies of water (Ogunnowo, 2004).



Statement of the problem

Overcrowding in our hostel pose a great challenge to our students especially in the consumptions of hostel utilities (water, electricity and usage of toilets. This increase in student's population exact pressure on the available water supply there by rendering it insufficient. Also, absence of electricity supply usually denies the students from accessing portable water supply which bring huge stress before they can get water whenever the electricity fails and the incapability of the available water tank to retain water for a long period of time added to the problems. Water is inevitable as man is concerned. The most precious gift of life water is required because without water, life is not livable. The insufficient water supply in the student hostels affects the students living condition necessitates the need to assess the water supply in Waziri Umaru Federal Polytechnic, Birnin-Kebbi student's hostel with a view to determining the impact of over-crowding make necessary recommendations planning the students' healthy living. These problems can be easily solved by assessing the supply of water with a view to make necessary recommendations to improve the situation as the need demands.

Aim and objectives

The aim of this study is to assess the water supply in students' hostels of Waziri Umaru Federal Polytechnic with a view to make appropriate recommendations towards improving water supply in the study area.

Objectives

- i. To identify the sources of water supply in the study area
- ii. To examine the adequacy or otherwise of water supplied to the hostels
- iii. To assess the problems facing water supply in the study area
- iv. To compare the contemporary hostel population to the recommended planning standards.

METHODOLOGY

- Assessment of sources of water supply: a field survey was embarked on, to assess the source of water supply in the study area found out that the major source of water supply in the study area is

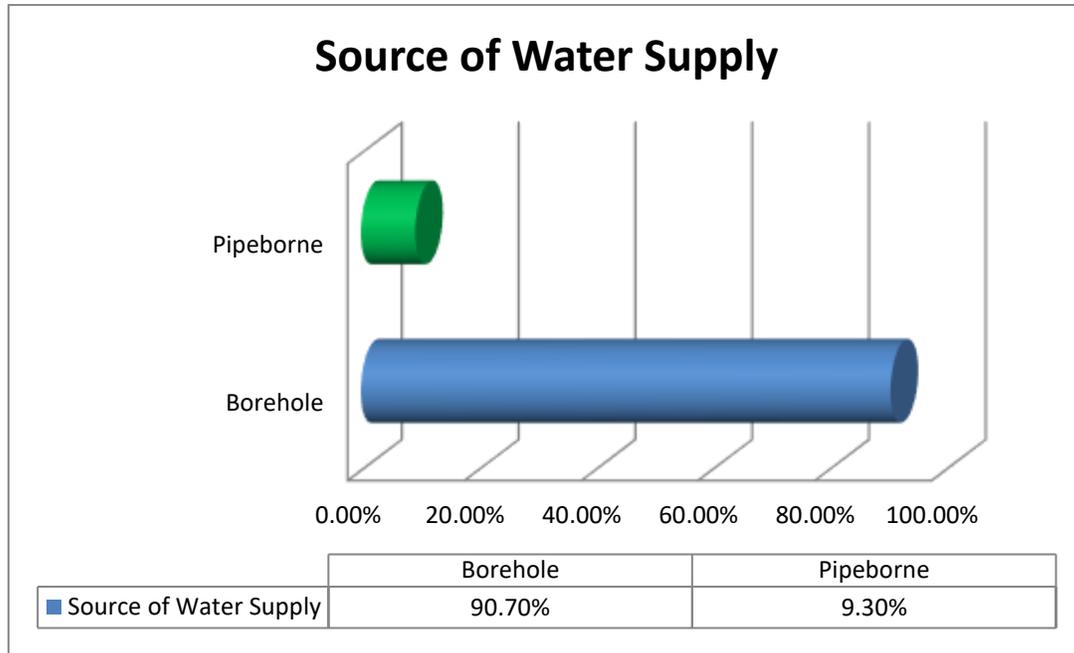
underground water (borehole). There were two 2 main boreholes drilled, the one located close to the central administration block has a storage capacity of 25,000 liters, while the second bore hole located at the college of engineering workshop complex has a storage capacity of 10,000 liters both of which operated jointly to supply water to the campus twice daily (morning and evening).

- Assessment of student's hostel accommodation: In assessing students' accommodation, reference was made to an existing document of works and physical planning unit of the institution there by know the total numbers of rooms in both the male and female hostels. Then verbal interviews were conducted to confirm the exact number of students in a room.
- Administration of structured questionnaire: Questionnaire was administered to students who applied for a bed space and were successful. A total number of eighty-six (86 questionnaires was administered for this research work. Cited in appendix
- Statistical Analysis: Descriptive statistical tool analysis was done.
- Maps and satellite imageries were used to show locations of the study areas

DISCUSSION

Generally, it was discovered that there are two 2 main sources of water supply to the Polytechnic community (students) hostels vis pipe borne which comprises of 9.30% while that of (municipal supply which comprises of 90.70%. From the table 1 above results, it can be agreed that the daily average liters of water used by an individual is 59.6 liters. Water supplied to the students was found to be generally inadequate going by 52.14% of respondents to meet up efficient water supply, proper maintenance needs to be observed. It is against this background that the efficiency of maintenance was carried out where 67.44% respondents strongly disagree with the maintenance level, this correlates very well with the inadequate supply of water in addition to the increase in student population in the hostels water

RESULT



Source: Field Survey, 2019

Figure 2: Sources of Water

Figure 2 reveals the sources of water, 90.70% of the respondents declared that the source of water to the hostel is borehole while 9.30% of the respondents declared that the source of water to the hostel is pipe borne water. This shows the major sources of water supplied to both male and female hostels is through boreholes.

Table 1: Liters of Water Used Per Day by the Respondents

Liters	Frequency	Percentage (%)
40	7	8.15
60	13	15.12
80	9	10.46
100	24	27.90
Above 100	33	38.37
Total	86	100

Source: Field Survey, 2019

Table 1 above describes the liters of water used by the respondents per day. 38.37% of the respondents used above 100litres, 27.90% used 100litres, 15.12% used 60litres, 10.46% used 80litres and 8.15% of the respondents used 40litres of water per day. This indicates that most of the respondents used above 100litres of water per day with 38.37%.

Table 2: Adequacy of the Supply of Water in the Hostel

<i>Water supply adequacy</i>	Frequency	Percentage (%)
<i>Highly Adequate</i>	12	13.95
<i>Adequate</i>	23	26.74
<i>Moderate</i>	6	6.98
<i>Inadequate</i>	28	32.56
<i>Highly Inadequate</i>	17	19.77
Total	86	100

Source: Field Survey, 2019

Table 2 above reveals the adequacy of the supply of water in the hostel. 32.56% of the respondents responded inadequate, 26.74% responded adequate, 19.77% responded highly inadequate, 13.95% responded highly adequate and 6.98% of the respondents responded moderate. This connotes that there is inadequacy in the supply of water in both male and female students.

Table 3: Agreement on adequacy of water

<i>Level of agreement</i>	Frequency	Percentage (%)
<i>Strongly Agreed</i>	28	32.56
<i>Agreed</i>	31	36.05
<i>Neutral</i>	4	4.65
<i>Disagree</i>	15	17.44
<i>Strongly Disagree</i>	8	9.30
Total	86	100

Source: Field Survey, 2019

Table 3 above interprets if there is enough water for all the needs of the respondents. 36.05% of the respondents agreed that there is enough water

for all their needs, 32.56% are strongly agreed, 17.44% disagree, 9.30% strongly disagree and 4.65% of the respondents are neutral. This indicates that there is enough water for all the needs of the respondents with 36.05%.

Table 4: Maintenance efficiency

<i>Level of agreement</i>	Frequency	Percentage (%)
<i>Strongly Agreed</i>	3	3.49
<i>Agreed</i>	10	11.63
<i>Neutral</i>	15	17.44
<i>Disagree</i>	30	34.88
<i>Strongly Disagree</i>	28	32.56
Total	86	100

Source: Field Survey, 2019

Table 4 above explained if there is proper maintenance of water supply facilities in the hostel. 34.88% of the respondents responded disagree, 32.56% strongly disagree, 17.44% responded neutral, 11.63% agree and 3.49% of the respondents strongly agree. This shows that there is no regular maintenance of water supply facilities in both male and female hostels. It is further established that water storage facilities are adequately and regularly

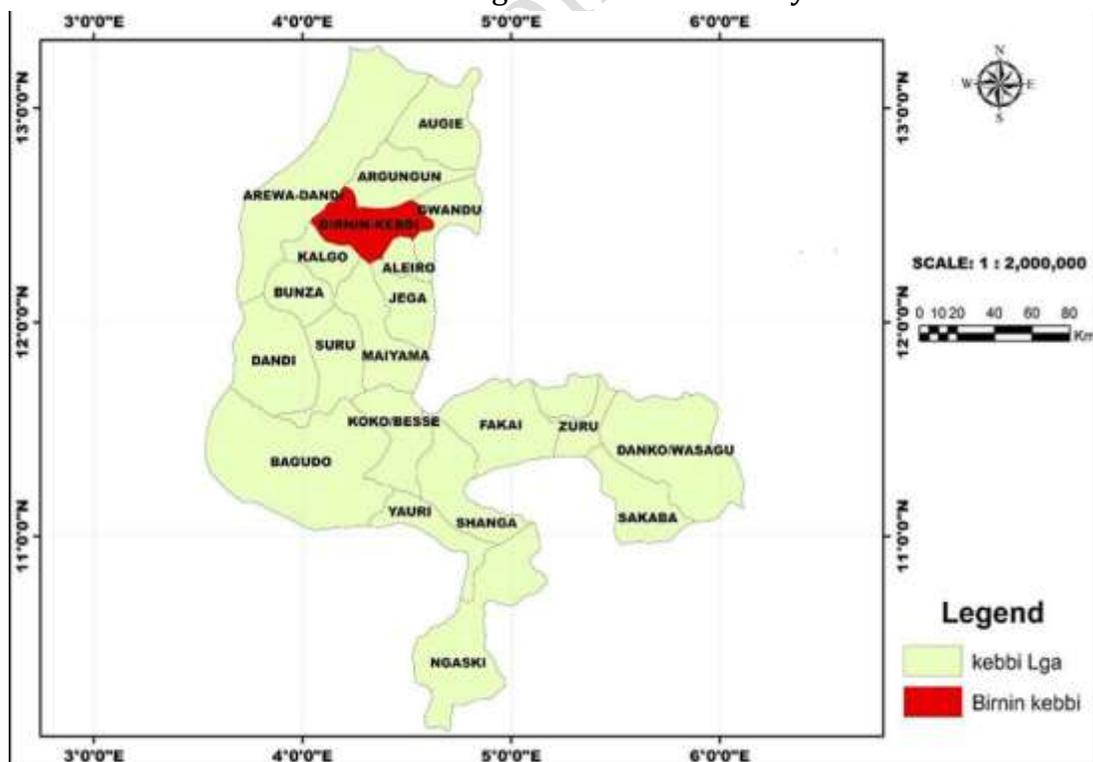
Table 5: Analysis of the Recommended Standards and Existing Population in Both Male and Female Hostel

<i>S/N</i>	Hostel	Standard		Existing		Deficiency	Remarks
		<i>Available No. of Rooms</i>	<i>Population</i>	<i>Available No. of Rooms</i>	<i>Population</i>		
1.	Male	108	432	108	648	216	Inadequate
2.	Female	36	144	36	216	72	Inadequate
Total		144	576	288	864	288	Inadequate

Source: Field Survey, 2019

Table 5 above shows that the existing population in both male and female hostels does not follow the required recommended standards by the institution and this result to the overstretching of existing water supply facilities.

1. **Assessment:** Assessment is the systematic basis for making inferences about the learning and development of students. It is the process of defining, selecting, designing, collecting, analyzing, interpreting and using information to increase students learning and development
2. **Water Supply;** The process of self-provision or provision by third parties in the water industry. Water supply is the available water provided to fulfill a need. The need could be domestic, industrial or agricultural. The water must fulfill both quality and quantity requirements.
3. **Overcrowding:** Fill (accommodation or a space) beyond what is comfortable/safe or permissible.
4. **Accommodation:** Accommodation is used to refer to buildings or rooms where people live or stay
5. **Students Hostel:** These are an affordable option for students living away from home for first time and a great way to meet other students. Students' hostel can also refer to the space set aside for students to reside during their course of study in an institution.



This implies that water gives life. But given the massive rate of urbanization and rising urban population, the problem of inadequate public water supply to urban resident in Nigeria had become chronic in recent years. Indeed, public supply of safe and adequate water to urban environment is an integral part of wholesome urban infrastructure (Ogunnowo, 2004).

The discussions above are the engineers view about water supply, but the view of a planner is that which concerns the layout and adequate provision of welfare facilities that guarantees friendly, healthy and habitable environment. An environment without water is not good enough. People can live where there is no electricity, road, drainage and a few other welfare facilities but it is not possible to live without water. With these assertions, therefore, water supply to any settlement is of prime importance and need to be properly planned and provided for a sustainable settlement.

According to Vikrant *et al.*, (2015) in their study on Environmental impact analysis of a water supply system: study of Indian university campus revealed that at university campus the main source of water is ground water.

According to Agabi and Utange, (2013), they observed that to the planners and engineers charged with the responsibility of planning for water in the community, what is paramount is for everyone to have access to the commodity in safe mode and at affordable cost.

The implication of this to planning activities is that there must be deliberate effort to ensure adequate provision of water to all (UN Water, 2012).

Table 6: Water Consumption Rate in Institutions

S/N	Institution	Liters
1.	Hospitals	250
2.	Polytechnic	300 for Residents, 100 for Students
3.	Hotels	250
4.	Secondary school	60

Source: Obateru, (2003).

Table 6 above describes the water consumption rates in institutions. Hospital uses 250litres of water per day, Polytechnic uses 300litres for residents and 100 for students, Hotels uses 250litres and Secondary school water consumption rate is 60litres per day. This implies that the allotted water consumption rate for students in the polytechnic is 100litres.

Table 7: Standards of Design of Water Supply Facilities in Higher Institutions

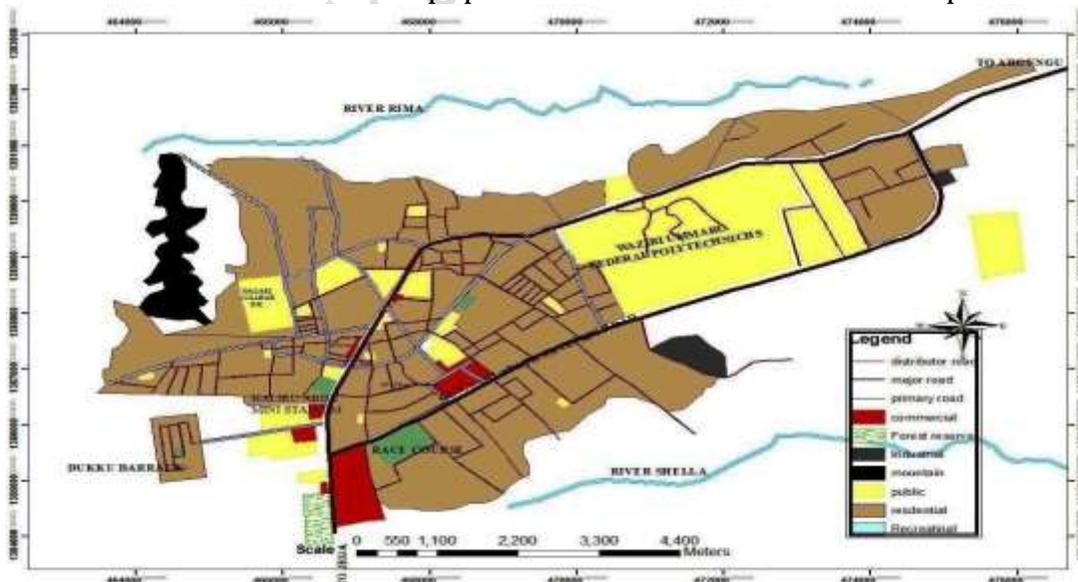
S/N	Water Supply Facilities	Requirements
1.	Water Tap	1 for 250 students

2.	Urinals	1 for 60 students
3.	Water closet	1 for 40 students
4.	Overhead tank	2500 litres for 250 students

Source: Obateru, (2003).

Table 7 above interprets the standard of design of water supply facilities in higher institutions. One water tap is meant for 250 students, one urinal is for 60 students, one water closet is for 40 students and the overhead tank of 2500 litres should serve 250 students.

Portable water supply in the campus is mainly from borehole where underground water is sourced. The provision of hostels located separately for males and females on the campus are intended to provide accommodation for desiring students. The male hostel located towards the northern axis of the institution has a total of 9 single storey buildings concentrated on an area of about 580sq meters. Altogether, there are 108 numbers of rooms measuring 6m by 3m designed to accommodate an average of 4 students in a room. Considering the number of available spaces, only 432 students are adequately accommodated which is shortfall of what is required to cater for the housing needs of the male population. The female hostel is a 36-room single storey building located towards the south western side of the institution. Considering the limited number of rooms and an average of 4 students in a room, only 144 out of the total female population are accommodated. This makes the situation more severe. Generally, available records show that less than 20% of the total student population is accommodated on campus.



Source: <http://www.state.gov/r/ei/bgn/2836.htm>

Figure 2.1: MAP OF BIRNIN KEBBI SHOWING WAZIRI UMARU FEDERAL POLYTECHNIC BIRNIN KEBBI

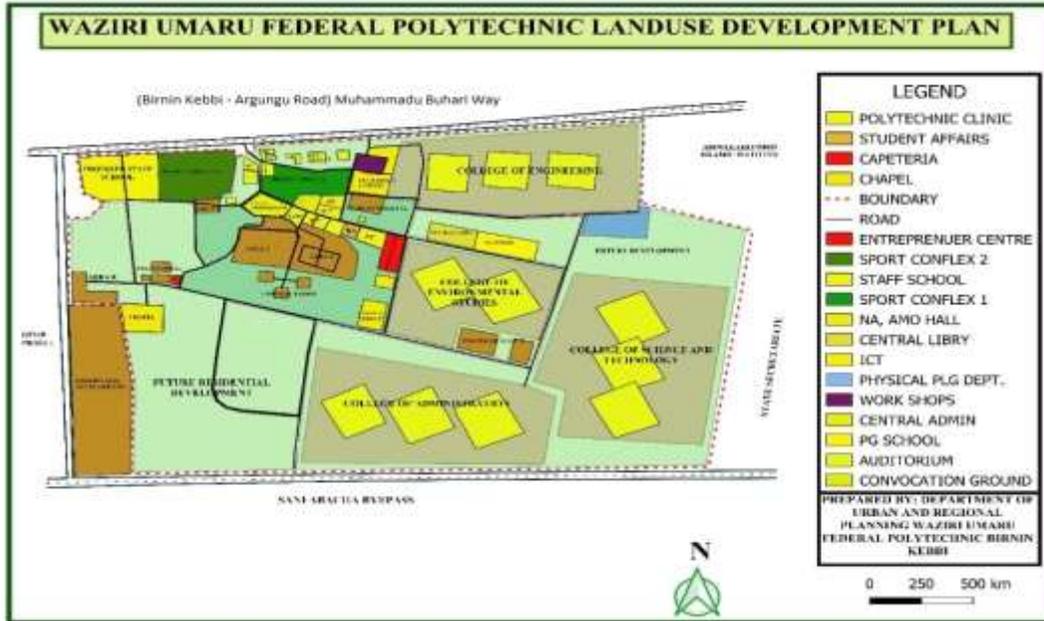


Figure 4: MAP OF WAZIRI UMARU FEDERAL POLYTECHNIC SHOWING THE STUDY AREA.

Study Area

The Waziri Umaru Federal Polytechnic Site is located along Birnin Kebbi-Argungu road (now renamed Muhammadu Buhari way). The site is sandwiched between Muhammadu Buhari way at the western part and to the East by Sani Abacha By-pass. To the North, it is bounded by State Government Secretariat Gwadangwaji and to the South, by Patrick Aziza road. The total area of the site is about 470.808 hectares, while the built-up area covers less than 30% as shown in the figure above.

Table 8: Analysis of the Recommended Standards and Existing Population in Both Male and Female Hostel

S/N	Hostel	Standard		Existing		Deficiency	Remarks
		Available No. of Rooms	Population	Available No. of Rooms	Population		
1.	Male	108	432	108	648	216	Inadequate
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Total		144	576	288	864	288	Inadequate
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Source: Field Survey, 2019

Table 8 above shows that there is significant difference between the recommended standards and the existing population of both male and female hostels where the recommended standards were 108 as against the existing population in both male and female hostels of 432 and 648, indicating a deficiency of 216 for male and 72 for female students, respectively and this result to the overstretching of existing water supply facilities.

SUMMARY:

Findings from the study revealed that;

The minimum water requirements of 120litres per person in a day is not met by the water supply agency thus both male and female students in the institution are still facing difficulties in getting the required quantity of potable water.

Water supply system is not properly maintained, and some are even in a state of dilapidation which affected water supply and distribution in the study area. The population of the student's increases over time due to squatters and this leads to overcrowding which in turn results to overstretching of the existing water supply facilities. This makes some students to rely on alternative sources of water supply that might not be conducive and safe for their health. The distance for the students in both male and female hostels to get potable water is far from their respective rooms and this inconvenient their access to the water with much stress.

Conclusion

Based on this research, it was found that the higher number of the respondents perceives the effect of inadequate and insufficient portable water supply for their daily use. The students suggested the introduction of water board department for proper management and maintenance of water supply schemes in the student's accommodations for safe, reliable and effective delivery. This study therefore creates an opportunity for further research on ways of improving water supply in the study area.

Recommendations

In order to achieve the purpose to which this research work is drawn up, the following recommendations were made for adoption; The institution should ensure enough water supply in the student's hostels. There should be proper funding, maintenance and monitoring of water supply systems in both male and female hostels. The institutions should provide adequate and enough water storage facilities that can retain water for a long time when and in case of no electricity supply. Adequate planning of infrastructure should be assured especially in the students' hostels. The institution should provide an enabling environment for private sector to participate in building more hostels in the campus.

REFERENCES

- Agabi J., and Utange J.Z., (2013): Basics of Infrastructure Development Planning. Elshaddai Publishers, Tudun Wada Ring Road, Jos, Nigeria
- Bernard, H. R. (2002). *Research Methods in Anthropology Qualitative and Quantitative Methods. 3rd Edition*, Altamira Press, Walnut Creek, California.
- Obateru O., (2003): Standards on Educational Facilities, Evans Brother Publishers.
- Ogunnowo, Y. (2004): Water resources: A geography of Nigeria development; edited by Stokols, D. 1976. Experience of crowding in primary and secondary environments. Environmental environmental behavior, vol. 8. Pp 46-86
- United Nations Population Reference Bureaus (2012) Wagner and Lanoix, J.N Geneva (2001): Defective sanitation and water supply in rural areas in Nigeria, Oxford University Press London.
- Vikrant B, Nitesh S, Rebekka G, Stefan A, Christoph H, and Sangwana K. S. (2015): Environmental impact analysis of a water supply system: study of an Indian university campus. Birla Institute of Technology and Science, Pilani-333031, India. CIRP 29: pp 46-48
- WHO & UNICEF, (2010). Global Water Supply and Sanitation Assessment 2010 Report. WHO/UNICEF- Joint Monitoring Programme (2012) for Water Supply and Sanitation