GIS-BASED ANALYSIS OF FACILITIES IN PUBLIC PRIMARY SCHOOLS IN FUNTUA EDUCATIONAL ZONE, KATSINA STATE, NIGERIA

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A THESIS SUBMITTED TO THE SCHOOL OF POST GRADUATE STUDIES, AHMADU BELLO UNIVERSITY, ZARIA, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE DEGREE IN REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEM

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DECLARATION

I hereby declare that the work in this thesis entitled **GIS-Based Analysis of Facilities in Primary Schools in Funtua Educational Zone, Katsina State, Nigeria** has been carried out by me in the Department of Geography. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this thesis was previously presented for another degree or diploma at this or any other Institution.

_____ _____

Ahmed ABBA Date

CERTIFICATION

This thesis titled "**GIS-BASED ANALYSIS OF FACILITIES IN PUBLIC PRIMARY SCHOOLS IN FUNTUA EDUCATIONAL ZONE, KATSINA STATE, NIGERIA**" by Abba AHMED meets the regulations governing the award of the degree of M.Sc. Remote Sensing and GIS of the Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

To my parents, family, and colleagues.

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I am most grateful to God Almighty for His blessings, mercies, protection, and guidance which led to the completion of this work.

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ABSTRACT

This study analyzed the facilities in public primary schools in Funtua Educational zone using GIS. The data acquired for this research includes, records of names and addresses of the primary schools, geographical coordinates of all the primary schools with the aid of handheld GPS receiver, georeferenced and digitized administrative map of the Funtua Educational zone, and 77 copies of a questionnaire were administered to the Head Teachers of all the 77 primary schools in the educational zone. ArcGIS 10.1 was used for analysis. A relational database was created for the available facilities in public primary school which was queried, and the results are presented in tables and charts. The study revealed that there is high concentration of primary schools in southern educational zone even though central zone had higher enrolment. Enrolment of boys is higher than the enrolment of girls in the study area. Nearest neighbour analysis tool in ArcGIS revealed that the pattern of public primary schools distribution in Funtua Educational zone was dispersed. Also the study showed that only 30% of primary school in the study area had six or more classes, 86% of the schools had staff rooms, 95% of the primary schools need library facility, 8% had computer room, while all the primary schools had playground, and none of the primary schools had Elementary laboratory and Meteorological station. The recommendations of the study include: teachers should be encouraged to acquire more educational skills, government and non-governmental organizations with the P.T.A should provide adequate facilities in schools that are deprived so as to improve academic performance, and also there is need to create an information and communication technology unit that will be responsible with creating and managing of geospatial information that will aid decision making.

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ABBREVIATIONS

CSV	-	Comma-separated values
FGN	-	Federal Government of Nigeria
GIS	-	Geographic Information System
GPS	-	Global Positioning System
IES	-	Institute of Educational Sciences
ICT	-	Information and Communication Technology
LEA	-	Local Education Authority
NNR	-	Nearest Neighbour Ratio
NPE	-	National Policy on Education
UBE	-	Universal Basic Education
UNESCO	-	United Nations Educational, Scientific and Cultural Organisation
UNDP	-	United Nations Development Programme
UNICEF	-	United Nations Children's Fund
UTM	-	Universal Traverse Mercator
WGS	-	World Geodetic System

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Education is the process of acquiring new values and skills for the purpose of effective functioning in the society. According to Dickson (1985) education involves a pedagogical process, which if properly carried out should lead to the maturing of the person who has received it, to the extent that he is in a position to think and act meaningfully. Adepoju (2007) opined that education is a tool for the acquisition of skills, relevant knowledge and habits for surviving in the changing world. The place of education in national development cannot be overstressed. Its importance is stressed in the opening statement of the National Policy on Education (2004) where it is mentioned that "education in Nigeria is an instrument 'par excellence' for effecting national development" In other words, education is not just a medium of knowledge and skill acquisition rather is also a tool for nation building.

Primary education is the first level of education. Apart from home as the first agent of socialization, primary school is the first place that introduces formal education or literacy to children (David and Olabanji, 2008). In other words, primary education is a foundation upon which all other levels of education are built. According to Akinbote (2007), primary education in particular is the level of education that develops in the individual the capacity to read, write and calculate. It helps to eradicate illiteracy, which is one of the strongest predictors of poverty (Bruns, Mingat and Rakotamalala, 2003). Thus, Primary education is the only level of education that is available everywhere in both the developed and the developing countries as well as in urban and rural areas (Akinbote, Oduolowu and Lawal, 2001). This explains why primary education is the largest sub-sector of any education system and offers the unique opportunity to

contribute to the transformation of societies through the education of young ones (UNESCO, 2001).

The quality of education delivered by teachers and the academic achievement of pupils of any school is dependent on several factors of which school facilities is paramount. According to Adeboyeje (2000) and Emetarom (2004), school facilities are the physical and spatial enablers of teaching and learning which will increase the production of results. School facilities serve as pillars of support for effective teaching and learning. Akpan and Njoku (2013) defined school facilities as those things that enable the teacher to efficiently discharge his/her responsibilities and help the learners to learn effectively. These include classrooms, chalkboard, laboratories, workshops, and libraries, different kinds of furniture, and related facilities. Oyesola (2000) in Asiyai (2012) sees school facilities to include permanent and semi-permanent structures such as machinery, laboratory equipment, the blackboard, teacher's tools and other equipment as well as consumables. Ayeni and Adelabu (2012) have observed that school facilities contribute to a conducive learning environment while Anike and Tari (2011) opined that school facilities have significant impacts on the quality of learning.

Asiyai (2012) asserted that in Nigeria, public school enrolment has continued to increase without a corresponding increase in facilities for effective teaching and learning. The intention to have a standard primary education system in Nigeria through its national policy has failed a series of attempts. This effect could be as a result of frequent change in government administration or financial crisis affecting proper maintenance of existing facilities and building of new infrastructure which affects the implementation of the National policy on Education (Onyukwu, 2011). Good quality and standard of school depend largely on the provision, adequacy, utilization and management of educational facilities (Asiyai, 2012).

Asiabaka (2007) cited in Asiabaka and Mbakwew (2008) lamented the unhealthy nature of government primary school buildings in all the 27 local government councils of Imo State. The author observed that some of the classrooms were old and dilapidated. In addition overcrowded classrooms, unsightly and unhygienic toilets, inadequate laboratories and workshops, inadequate learning materials, preponderance of unqualified teachers, poor educated and ill-motivated teachers in the schools were detected. In most parts of Nigeria several primary and secondary schools are half completed or dilapidated, overcrowded, and with insufficient desks (Ajayi, 2001). The pupils start learning in already deprived and disadvantaged school environment. Consequently majority of the products of our primary schools are neither sufficiently literate nor numerate to be useful to themselves and the society (Yoloye, 1998). This is similar to what is experienced in public primary schools in Funtua Local Government Area of Katsina State.

School facilities management involves keeping records of the facilities, supervising the facilities, planning for the facilities, motivating students and teachers to participate in facility maintenance and evaluating the available facilities (Hinum, 1999). According to Reach (2012), when data become large it becomes difficult to manage, however a database allows researcher to manage, maintain, and use an incredible variety of information easily. Database can be expanded and manipulated as the data increase, integrating all school data and converting it to a digital format will make it easy and efficient to present condition analyses or simulation on future school building planning. In addition to this, creating the database that can be linked to features in GIS is very significant, since the features without detail attributes cannot be used for further analyses (Makino and Watanabe, 2002). GIS contribute to the development of a robust and efficient school infrastructure management by suggesting optimum location and

organization of the facility needed hence the need to apply GIS in the analysis of primary school facilities in Funtua local government area.

1.2 Statement of the Research Problem

Education in Nigeria is beset with myriads of problems. These include; poor funding and thus poor educational infrastructure, inadequate classrooms, teaching aids (projectors, computers, laboratories and libraries), paucity of quality teachers and poor learning environment (Odia and Omofonmwan, 2007). It is not rare to see schools without library, fence, toilet, internet access, and elementary science laboratory and to see classes of 100 pupils per teacher or student sitting under trees outside the school building because of lack of classrooms and classrooms without desks. However the number of schools, facilities and teachers provided for basic education in Nigeria by the compulsory free Universal Basic Education (UBE) education act law of 2004 did not address the poor quality of primary education system in the country.

Igbuzor (2006) aptly captured in the National Empowerment Development Strategy that the delivery of education in Nigeria has suffered years of neglect, compounded by inadequate attention to policy frameworks within the sector; and that Nigeria's literacy rate is currently 57%; and that 49% of the teaching force is unqualified. Similarly, Owuamanam (2005) noted that the inadequacy of infrastructural facilities and lack of maintenance of available facilities were major problems facing Nigerian educational system. The school facilities are grossly inadequate to match the student's population and the available facilities were poorly maintained.

Eddie (2000) lamented that lack of facilities is the major problem in Nigeria's educational system, and these facilities are major determinants of academic achievements in the school system (Hallack, 1990). Anukam (2006) and Mbakwem and Asiabaka (2007) stated that the cumulative effect of poor facilities would lead to poor

academic performances of students, poor motivation and low morale of teachers, which result in low quality work output. The education system has failed to inculcate the spirit of self- reliance in the recipients due to lack or none utilization of equipment in schools (Ajayi, 1995).

Asiabaka and Mbakwem (2008) assessed the facility needs of government primary schools in Imo State, Nigeria. The results showed that all the 135 primary schools visited have football fields which also serve as playground; only one school had facilities for handball while other recreational facilities such as volleyball, basketball, table tennis, swimming pool, and lawn tennis were not available in any of the schools. The study further revealed that none of the schools had computer or communication facilities; only two schools had functional libraries and toilet facilities.

Alaba (2010) studied the quality of primary education in south western part of Nigeria. The results showed that teacher-pupil ratio was 1:30, most of the schools do not have elementary science laboratory and the classrooms were not in good condition for teaching and learning. It also revealed gender imbalance that there were more female teachers (66%) than male (31%). Abbas (2012) undertook a study on database management and mapping of secondary education infrasturcture in Sabon-Gari and Zaria Local Government Areas Kaduna State, Nigeria. The results revealed that 36% of the schools had library, computer, chemistry, physics, and biology laboratories while the remaining 64% of the schools did not have all the facilities. The results also showed that most of the secondary schools are concentrated in Sabon-Gari while Kuregu and Ungwan Abashi had no secondary schools.

Aliyu, Sule, and Youngu (2012) applied of GIS to assess the effectiveness of MDG target for primary education in FCT. The authors found out that 60% of the schools did not have access to internet, 21% had no library while 63% lacked

elementary science laboratory. The study further revealed that seven out of the 19 public schools were overpopulated, as they exceed the maximum number of pupils/students set at 45 per class room by the Local Education Authority (LEA) and the Universal Basic Education (UBE) for the schools.

Incidentally, all the above studies were undertaken outside the study area. Moreover, despite increased interest in the use of GIS in school management information system, no empirical research has been conducted using the GIS technology to analyze instructional facilities in primary schools in Funtua Educational zone. This is the research gap this work sought to fill. The study therefore provided answers to the following questions:

i. Where are the public primary schools located in Funtua Educational zone?

ii. What is the pattern of distribution of the public schools in the area?

iii. What are the facilities available in each of the public primary schools in Funtua Educational zone?

1.3 Aim and Objectives of the Study

The aim of this study was to analyze the facilities in public primary schools in Funtua Educational zone using GIS. To achieve the set aim of this research, the specific objectives are to:

i. identify and map the public primary schools in Funtua Educational zone.

ii. examine the pattern of distribution of public primary schools in Funtua Educational zone.

iii. identify the available facilities in the primary schools by querying the database.

1.4 Scope of the Study

The spatial scope of this study covered all the five educational zones of the Local Government Educational Authority namely Central, East, North, South, and West

in Funtua Local Government Area of Katsina State. The study analyzed the public primary school facilities in the study area. This was done by identifying and mapping the public primary schools, examine the pattern of distribution, and identifying the instructional facilities which include Classrooms, Staff rooms, Elementary laboratories, Libraries, Meteorological station, and Playground available in public primary schools. The temporal scope was limited to facilities available in the schools as at 2015.

1.5 Significance of the Study

No doubt educational development depends on a large number of factors; but the role of school infrastructural facilities in successful educational programme has been outstanding. Perhaps, because of their strategic importance, the quality and quantity of school infrastructural facilities receive much attention in any effort to raise the educational level of a given area (Akpan and Njoku, 2013). Similarly, Ogunsaju (1980) and Asiabaka (2008) maintain that the quality of education that children receive bears direct relevance to the availability or lack of physical facilities and overall atmosphere in which learning takes place, and that these facilities play pivotal role in the actualization of educational goals and objectives by satisfying the physical and emotional needs of staff and students of the school. The inadequacy and uneven distribution of facilities may be ascribed to poor forecast of facilities needs of schools due to poor planning strategies arising from inadequate and poor statistics (Edun, 2005).

Therefore, to be able to take sound decision on the management of primary education in Nigeria, there is need to ensure availability of accurate data on the system (FGN/UNESCO/UNDP, 2003). According to Durosaro (2004) lack of accurate and timely data has long been the bane of policy formulation and management of our primary education system in Nigeria. To obtain accurate data on enrolment, teachers, non-teaching staff and even facilities appears to be a difficult task for the school

managers. The school managers and teachers appear to lack adequate cognitive development in the areas of data collection, analysis and storage. A GIS database can provide a comprehensive framework and organization of spatial and non-spatial data.

A GIS database for primary schools in Funtua Local Government Area can provide adequate information about the schools, their facilities and the conditions of these facilities which can help the organizations, agencies and stake holders in making decisions. The Education Inspectors can use the information from the database for monitoring and it will ensure effective information management system for the primary schools in the Local Government Area. Moreover, it can assist parents in identification and selection of primary schools for their children, as against giving consideration only to the location of schools but also the facilities in the school especially when the parent just relocated to the study area.

CHAPTER TWO

CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

2.1 Introduction

This chapter provided insight, as evidenced by a review of pertinent literature, into the content of the concept of primary education, the quality of primary education, school facilities and pupil performance as well as achievement. The chapter concluded the use of GIS in school facility management.

2.2 Conceptual Framework

2.2.1 The Concept of Primary Education

According to Salami and Nweke (2012), education has been described as the bedrock of every society and tool for nation building. It is the vital instrument for social and economic mobility at the personal level and an instrument for transformation of society at the national level. Similarly, Kazeem and Ige (2010) posited that education in Nigeria is nationally conceptualized not simply as the medium for cultural transmission but the main vehicle for accelerating individual, community and national development. It is a mechanism through which the society generates the knowledge and skills required for its survival and sustenance. It is considered as an instrument for national development (FGN, 2004: section 1 sub-section 4a). Formal education is of various levels in which the curriculum is designed in a spiral form; wherein, a level is meant to be a prerequisite to the next level. This is done such that learning can really move from known to unknown and simple to complex. When a given level of formal education suffers, its effects are always enormous at other levels after it (Salami and Nweke, 2012).

Primary education as the second level of Basic Education in Nigeria (FGN, 2004), is the level of education that develops in the individual the capacity to read,

write and calculate. In other words, it helps to eradicate illiteracy, which is one of the strongest predictors of poverty (Bruns, Mingat and Rakotamalala, 2003). Thus, Primary education is the only level of education that is available everywhere in both the developed and the developing countries as well as in urban and rural areas (Akinbote, Oduolowu and Lawal, 2001). This explains why primary education is the largest sub-sector of any education system and offers the unique opportunity to contribute to the transformation of societies through the education of the young ones (UNESCO, 2001).

The early stage of a child is crucial to the emotional, behavioural, physical and mental development. Primary school education is responsible for the overall development of the child at the early stages of life. Considering the fact that education is a preparation of life for secondary school education and University at large, primary school education serve as a foundation to any other educational level (Saidu and Shuaibu, 2000). The importance of primary education can therefore be seen in the sense that all beneficiaries of the other levels of education by necessity have to pass through this level (Oni, 2008). What this means is that primary education defined as the education given in an institution for children aged 6-11 years plus constitutes the bedrock upon, which the entire education system is built. Indeed, the success and failure of the entire education system are determined by it and it is at the heart of the concept of basic education also defined as universalization of access of education (Oni, 2008).

2.2.2 Universal Basic Education

The Universal Basic Education (UBE) is a laudable educational programme that can only be successfully implemented with the availability of adequate and quality school facilities. The UBE programme is an all embracing programme that tends to articulate the formal system of education as well as the non-formal for the total development of human potentials. All along, education has been recognized as the only

vital instrument for national development. Education is an all-round symbol for the nation's development and transformation in the aspect of economic, social and the political activities of the nation.

For the UBE programme to be implemented therefore, school facilities which serve as the tools of a workman in the hand of a teacher must be adequately provided. It is of utmost importance that the availability of school facilities will duly contribute to the successful implementation of the UBE programme. These facilities must not only be provided, they must also be in good condition to enhance learning. This implies sound maintenance culture. This is supported by the view of Castalia (1987:183) who says that "school building becomes important because of the extent that it helps in improving teaching-learning effectiveness".

The basic facilities needed for the implementation of the UBE programme are still inadequately provided by the government. For example, in some communities, the school buildings are dilapidated, some de-roofed for years, and others in a state of total neglect. Some of the UBE schools are yet to receive government attention. The absence of classrooms for effective teaching and learning presupposes the absence of other facilities such as libraries, instructional materials such as textbooks, audio-visual aids and so on. Majority of the UBE schools have not been equipped with computer, which will afford the learner the opportunities for developing manipulative skills that will enable the child to function effectively in the society within the limits of the child's capacity. Even where there are school buildings, majority of them have no libraries to inculcate in the young learners, the habit of reading. Those that have libraries have no books meant for this level of education (Alike and Tari, 2011).

2.2.3 The Concept of Quality Education

According to Asim and Okon, (2005) the concept of quality education is relative subjective and variable while Okebukola (2005) Maintained that quality education as fitness of purpose and Fadipe (2005) views quality as appropriateness of resources available to education. However, Akpan and Esirah (2005) maintain that the concept of quality varies from that of providing special services to conforming to standards or fitness for purpose. Quality is the base line standard in education which can be measured on a scale of reference. It is an expression of standard or the means by which a certain set standard in education can be achieved. The concept of quality in education is multidimensional and embraces all functions and activities in the academic sphere (Maduewesi, 2005). It involves quality of students, instructors/facilitators instruction, facilities and equipment, academic programmes, curricula and assessment of students' performance. The quality according to Cavanaugh (2002) may include quantitative elements such as completion rates, student performance, and student evaluations of the learning experience or outcome product.

2.2.3.1 Quality of Teachers

According to Federal Republic of Nigeria, (2004) stated that 'no education system may rise above the quality of its teacher. Incidentally, many teachers are lacking in good quality which can enhance meaningful teaching. Teacher qualifications is said to have direct impact on the quality of the teacher as well as the learners. Conversely, teachers of high quality could impart right and good skills, knowledge and attitude. The quality of teachers therefore, constitutes a major factor of quality education in teaching and learning aspect (Anike and Tari, 2011).

Adegoke (2003) was of the view that in curriculum planning and implementation, attention is expected to be paid to the four pillars of learning which

were advocated “learning to know”, “learning to do”, “learning to be”, and “learning to live together”. When these aspects are adequately considered in the curriculum, the educational system will be functional and its recipients will be self-reliant. Even students ‘with poor skill and knowledge acquisition in the four areas, there is virtually no subject on the secondary school curriculum where there are no topics which teachers find difficulty to teach (Okebukola, 2005). Though, this problem may be due to poor teacher preparation or poor teaching-learning environment, the problem may be inherent in the curriculum itself but also teachers are to be considered while planning a school curriculum contents for the students.

2.2.3.2 Primary School Facilities

School facilities can be defined as those things that enable the teacher to do his/her work very well and helping the learners to learn effectively. The chalkboard for example, facilitates the imparting of information on the learner. School facilities also include school building, classrooms, assembly halls, laboratories, workshops, libraries etc. They also include teaching aids, chairs, tables, devices such as modern educational hardware and software in the form of magnetic tapes, films, and transparent stripes. School facilities are all the things that are needed for effective teaching – learning process to take place. They are designed to enhance the process of teaching. The absence of school facilities implies the non-existence of any set up that may be referred to as school.

Castaldi in Peretemode (2001) concludes that educational facilities are those things of education which enables a skillful teacher to achieve a level of instructional effectiveness that far exceeds what is possible when they are not provided”. The successful implementation of any educational programme depends mostly on the quality of available school facilities that are to be provided for such programme.

Similarly, Adaralegbe (as cited in Abraham, 2003) who posits that the type of atmosphere required for effective learning is that consisting of better school buildings, more and better teaching facilities.

Adesina (as cited in Abraham, 2003) posits that the quality of education that our children get bears direct relevance to the availability or the lack of physical facilities and overall atmosphere where the learning takes place. Also in the words of Castaldi (1984) are these wise saying "Excellent school facilities and dedicated teachers are basic ingredients of good educational programme". The desire for education attainment is on the high side, the consumers of education therefore expect the attainment of standard and quality education that will give them a sense of belonging, fulfillment and satisfaction.

According to Anike and Tari (2011) school facilities are divided into the following types:

i. Instructional Facilities: These are facilities that are specifically meant for direct teaching and learning. It includes classrooms, classroom seats, laboratories, libraries, experimental equipment, chalkboard, audio-visual learning equipment, zoological gardens and experimental agricultural farms. These facilities bear directly on the teaching – learning process and are therefore considered of prime priority among other school facilities.

ii. Recreational Facilities: These are spaces, lawns, fields, pitches and equipment for sports, games and general recreation. Games and Sports apart from developing specific skills also develop a good learning socio-psychological as well as mental environment through relaxation. The importance and level of resources committed to the development and provision of recreational facilities

must not exceed their values in facilitating the overall goal of the educational institution.

iii. Residential Facilities: These include hostels and hostel facilities, refectory and refectory facilities, staff quarters and other associated facilities meant to provide residential convenience for staff and students.

iv. General-Purpose Facilities: These are facilities that can easily be converted to uses other than those for which they are being used. Such facilities in most cases are made of space facilities. There are basically two types of open space facilities namely: The developed and the undeveloped spaces. Developed Open Space are spaces used as sporting pitches, fields, lawn ,school farms, access roads, parking lots and so on. Their uses can easily be modified as occasion demands. The Undeveloped Open Spaces are all the land area within the legal authority of the institution which is yet to be developed into specific uses.

2.2.4 School Facility Management

Anike and Tari (2011) posited that school facilities management is a systematic process of rationalizing the provision, use and maintenance of these facilities within an educational institution to ensure their optimal utilization and achievement of educational objectives both in the immediate and in the future given the available resources. In other words, it is a process that involves rationally:

i. Determining which facilities are required to achieve school goals;

ii. Providing such facilities most advantageously in terms of resource use;

iii. Monitoring to ensure optimal use of educational facilities so provided;

iv. Maintaining the facilities regularly to ensure their longevity;

v. Reviewing the provision of these facilities to ensure that it continues to meet both the changing educational needs in the advantageous manner.

2.3 Literature Review

2.3.1 School Facilities and Student's Academic Performance

Facilities can be defined as buildings, properties and major infrastructure which include physical and material assets (IES, 2006). Facilities in schools are material resources that enhance teaching and learning thereby making the process and progress meaningful and purposeful. Facilities in schools can be defined as the entire school plant which school administrators, teachers and students harness, allocate and utilize for the smooth learning and efficient management of any educational institution, for the main objective of bringing about effective and purposeful teaching and learning experiences (Asiyai, 2012). According to Emetarom (2004) facilities in schools are the physical and spatial enablers of teaching and learning which will increase the production of results. School facilities serve as pillars of support for effective teaching and learning, furniture and recreational facilities, among others. They constitute vital inputs which are capable of achieving good results when combined with other resources in adequate quality and quantity. Teaching facilities include all of the infrastructure and material resources that are used to support the delivery of quality education. Infrastructure refers to basic physical and organizational structures needed for the successful running of the institution (Bakare, 2009).

Studies have also shown that the condition of facilities in schools have a strong effect on quality academic performance of students. Asiyai, (2012) found that students who were taught in modernized buildings scored consistently higher across a range of standardized tests. Adeboyeje (2000) reported that schools with well-coordinated planning and quality control, maintenance practices recorded better students' result performance. Quality and Conducive school with physically decorated environment will enhance students 'school attendance, involvement in academic activities and academic

performance will yield positively. However, poor supply, poor maintenance and management will yield poor quality of teaching and learning in all schools. Facilities are regular features in primary schools.

2.3.2 Primary Education in Nigeria

After attaining independence in 1960, Nigerian government made efforts to reshape the education system in line with the yearnings of the time. Sunal and Ose (1994) observed that Nigeria's government after independence favoured a public school system that would promote a national identity over ethnic and religious differences. Successive government used public education to promote national unity and build human resources for the exploration of the country's natural resources. The Nigerian educational sector at all levels is plagued by a myriad of problems which has now become a growing-concern after years of un-arrested deterioration with the primary sub-sector been the worse hit.

The current policy on education in Nigeria has its root in the curriculum conference of 1969, which was sponsored by the Federal Government through the Nigerian Educational Research Council. Adepoju (2007) noted that one of the most important gains of this conference was the birth of the 6-3-3-4 system of education which was defined in the National Policy on Education (NPE) of 1977. In addition, Awoniyi (2007) observed that by 1997, a draft policy on education was discussed by the Federal Government and, in 1981; it was approved for implementation and revised in 1995 and 1998. What attracted the nation to the 6-3-3-4 system of education was the fact that it was rooted in science and technology which are tools for economic and technological growth and development as against the former system of 6-5-4 (Tsadu, 1998; Adepoju, 2007). Starting with the colonial period, Nigeria, having been colonized

by Britain adopted the British form of education, which consists of pre-school, primary, secondary and higher education (Fabunmi, 2005).

The provision of primary education has always been in the hands of the government and private individuals. There are two types of these school systems in Nigeria: public and private schools. The public is provided by the government while the private is provided by private individuals, organizations and institutions. According to FGN (2004) children start attending primary schools when they are around 6 years old and spend 5 or 6 years to graduate at the age 11 or 12 years. Those that finish earlier are the children that attended private schools where most of them started before age 6 and graduate after the fifth year. When they finish the six years programme, they are awarded the First School Leaving Certificate, which, in combination with the common entrance examination results, fulfill the formal requirements for secondary school education.

Copple and Bredekamp (2009) posited that the private ones are considered better than the public by the people because they are of the opinion that; the teaching and learning activities are monitored; facilities are provided than the public schools; the learning outcomes in private schools are most of the cases, better than that of public schools. Actually, private schools are profit-oriented schools and in other to maximize their profits, most of them employ untrained teachers that will earn less, most materials claimed to have been provided are either not working, not adequate or the teacher cannot make effective use of them and rote learning, memorization and drilling method of teaching are used in other to have better results. Most of the practices in private primary schools are developmentally inappropriate. Since Nigerian government proclaims free basic education for the citizenry, public primary schools are not profit-

oriented schools; hence, many could afford it. But facilities are not provided; qualified teachers are employed but they are not monitored and motivated.

The responsibility for the management of primary education involves the Federal, State, and Local Government of the Federation. The Federal Government's role in the implementation of the Universal Basic Education (UBE) is to ensure quality control and maintenance of uniform standards and general coordination of programme implementation. The State Governments have constitutional and legislative responsibility to manage the UBE and get a 2% of the Federal Consolidated Revenue as grants in support of UBE (Federal Ministry of Education, 2007). Finance has been a major factor in the Nigerian education system especially at the primary level. The World Bank (2006) has estimated that an additional 251,000 classrooms need to be constructed at a cost of $3billion. In 2006, it was estimated that 4,222 new primary classrooms were constructed (Federal Ministry of Education-FME, 2006).

Lockheed and Verspoor (1991) in a study of developing countries have identified various input and process determinants of educational output. These include orderly school environment, academic emphasis in the form of clearly defined learning outcomes and standards, curriculum, particularly the "implemented curriculum", time for learning, effective use of school time, qualified teachers, and healthy children. The World Education Forum (2000) defined quality of education in terms of recognized and measurable learning outcomes especially in literacy, numeracy and essential life skills.

2.3.3 State of Public Primary School Facilities in Nigeria

In Nigeria, public school enrolment has continued to increase without a corresponding increase in facilities for effective teaching and learning. As a result of underfunding of education in Nigeria, the government has been encouraging proper maintenance of available school facilities. Onyukwu (2011) stated that the intention to

have a standard primary education system in Nigeria through its national policy has failed a series of attempts. This effect could be as a result of frequent change in government administration or financial crisis affecting proper maintenance of existing facilities and building of new infrastructures which affects the implementation of the National policy on Education.

According to Igbuzor (2006) the delivery of education in Nigeria has suffered years of neglect, compounded by inadequate attention to policy frameworks within the sector. The national literacy rate is currently about 57%, and about 49% of the teaching force is unqualified. There are acute shortages of infrastructure and facilities at all levels. Similarly Owuamanam (2005) noted that the inadequacy of infrastructural facilities and lack of maintenance for available facilities were major problems facing Nigerian educational system.

Many scholars, researchers, administrators and educational planners have confirmed that school facilities in Nigerian schools are inadequate and few available ones are being over utilized due to the astronomical increase in school enrolment (Asiyai, 2012). Adesina (as cited in Asiyai, 2012) stressed that the quality and quantity of educational facilities available within an educational system positively correlates with the quality and standard of the educational system. Ajayi (1999) reported that most of the Nigerian primary schools are dilapidated due to inadequate funding while most tertiary institutions are living in their past glories. Ikoya and Onoyase (2008) reported that only 26% of secondary schools across the country have school infrastructures in adequate quality and quantity. Asiyai (2012) indicated that facilities in Delta State public secondary schools are generally in a poor state of disrepair. The study revealed that in Delta North, only 27.72% of the classrooms were in repairable state while 72.00% were in disrepair. While Delta Central, the classrooms have 33.91% repairable

state and 66.08% in state of disrepair. Laboratory and workshops recorded 21.36%, 30.45% and 11.33% for repairable state in Delta North, Delta Central, and Delta South respectively while state of disrepair recorded 78.64%, 69.56% and 88.67% respectively. The library recorded 21.81%, 19.56% and 18.67% repairable state for Delta North, Delta Central and Delta South respectively while state of disrepair recorded 78.18%, 80.43%, 81.33% respectively.

2.3.4 Geographic Information System (GIS) and School Facility Management

Bhunia, Shit and Duary (2012) asserted that among the facilities needed to facilitate effective education development and learning in an educational institution includes the toilet, library, boundary wall, computer, playground, classrooms, offices and other buildings structure as a result requires a comprehensive mapping of the obtainable infrastructure to scrutiny the gap in educational infrastructure. GIS school mapping has much been used in the last two decades for educational planning (Majuire, Goodchild and Rhind, 1991). GIS database provides comprehensive framework and organization of spatial and non-spatial data to efficiently help decision makers and planners. It apparently provides a mapping tool for the relationships between the distribution of schools and the school age population within the populated areas (Hite, 2006). It is an efficient tool in managing and planning the accessibility to the educational schools (Al-Rasheed and El-Gamily, 2013). GIS now supports various basic and advanced spatial analytic approaches in public facilities planning especially in school facility management. GIS technology integrates common database operations such as query and statistical analysis with the unique visualization and geographic analysis benefits offered by maps (Haywood, Cornelius and Carver, 1998). It can be used even more to generate maps showing the locations of educational facilities, but

also with extensive use of GIS technology to create a database for school facility management.

Bhunia, Shit and Duary (2012) analyzed school infrastructure at primary and upper primary levels in Midnapore West Bangal, India. The layers considered in the study were infrastructure accessibility, type, number, and condition of classroom. *Moran's I* statistics was used to estimate the spatial distribution of elementary infrastructure across the district. All these themes and their individual features were then assigned weights according to their relative importance in educational development and corresponding normalized weights were obtained based on the Saaty's analytical hierarchy process. The thematic layers were finally integrated in GIS software based on multi-criteria approach to yield educational development infrastructure index. *Moran's I* statistics shows that girl's toilet, electric and boundary wall facility within the district were clustered in pattern at primary level while at the upper primary level, only electric and computer facilities shows the clustered distribution across the district.

Al-Rasheed and El-Gamily (2013), assessed GIS as an efficient tool for educational services and infrastructural management in Kuwait. GIS was used to create inventory and maps, Ministry of Education facilities and unoccupied land reservations were analyze with a goal of improved planning and decision making. The spatial analysis presented 72% of kindergarten schools, 71% of primary schools, 48% of intermediate schools for girls, 43% of intermediate schools for boys, 54% of secondary schools for girls, and 55% of secondary schools for boys were lacking the minimum standard of the Ministry of Education. The authors further stated that such critical results will enable the decision makers to prioritize the immediate action of relocating the schools or widen the services and accessibility.

Olubadewo, Abdulkarim and Ahmed (2013), use GIS as an Educational Decision Support System (EDSS) for primary schools in Fagge Local Government area of Kano State, Nigeria. The research was achieved by acquiring the topographic maps of Fagge LGA, the names and number of the schools, and geographical coordinates of the schools with Global Positioning System (GPS). The analyses carried out with ArcGIS 9.3 and SPSS showed that the distribution of primary schools in the area is more concentrated in areas around the Fagge A, B and D than areas around Kurna, while the buffer zones showed that schools around Sabon Gari and Fagge are closer to the roads and Markets. The database showed there are 222 classrooms, 12,693 pupils and 558 teachers in the area. The tool of analysis (Nearest Neighbour) was used to analyze the pattern of the distribution and the result indicated a value of 2.58 which is dispersed and the correlations indicated the R value of 0.837 and the result shows a perfect significant relationship between the number of teacher and pupils.

Abbas (2012), develop a GIS database for private and public secondary schools in Sabon-Gari and Zaria Local Governments, Kaduna State, Nigeria for effective and efficient planning and management. The creation of GIS database for the schools was achieved through identification of private and public secondary schools, mapping the secondary schools in the study area, with some basic facilities, generating the attribute data of the public and private secondary schools. Query operations were performed on the database created and the results show that 36% of schools had library, computer, chemistry, physics, and biology laboratories; out of 55 schools, 25 schools which represent about 45% of the total number of schools had examination hall with capacity $\geq$250; 73.21% of the schools in the study area that had the total number of classes > 12; the buffer of 2km was performed which shows that most of the schools were within a distance of 2km from residential areas.

Aliyu, Sule, and Youngu (2012), assessed the effectiveness of the MDG Target in Amac Metropolis-Abuja, Nigeria using GIS. The research was achieved by acquiring both spatial and attributes data of every primary and secondary school in Garki and Wuse districts. The spatially referenced database was created using Microsoft Access 2007 and ArcGIS 9.2 software. The database was queried and the results show that 60% of the schools didn't have access to Internet; 21% had no library; 63% of schools were also found to lack Elementary Science Laboratory as stipulated in the National Policy on Education; also observed that, the closest distance between public schools to Area 1 and Wuse Central bus-stops, are 0.769m and 1.15m.

CHAPTER THREE

THE STUDY AREA AND METHODOLOGY

3.1 Introduction

This chapter covered the location and size, climate, and demography of the study area. Also it includes the types of data required, the sources of data, method and procedure for data collection and processing, and analysis of data.

3.2 The Study Area

3.2.1 Location and Size

Funtua is located between Latitudes 11º 14' N - 11º 42' N of the Equator and Longitudes 7º 08' E - 7º 28' E of the Prime Meridian. Funtua is a Local Government Area in Katsina State, Nigeria. It is bordered by Faskari LGA to the North, Bakori LGA to the North-East, Danja LGA to the East, Giwa LGA (Kaduna State) to the South, and Dandume LGA to the West (Mshellia, 2010). See Figure 3.1. It covers a total area of about 448km^2 and the headquarters is Funtua Local Government Area (Onamade, 2014).

3.2.2 Climate

The climate of the zone is tropical continental, having an annual rainfall of 1024mm and an annual average temperature of 24.5°C. Rainfall starts from May and ends November, and usually concentrated in the months of July, August and September. However cloud cover is very low and insulation is therefore, high. Average daily sunshine hours are about 7.4 hours (Onamade, 2014). The climate of Funtua is characterized by a relatively long dry season and somewhat smaller duration wet season with a cool dry harmattan season in between these two major seasons (Mshellia, 2010).

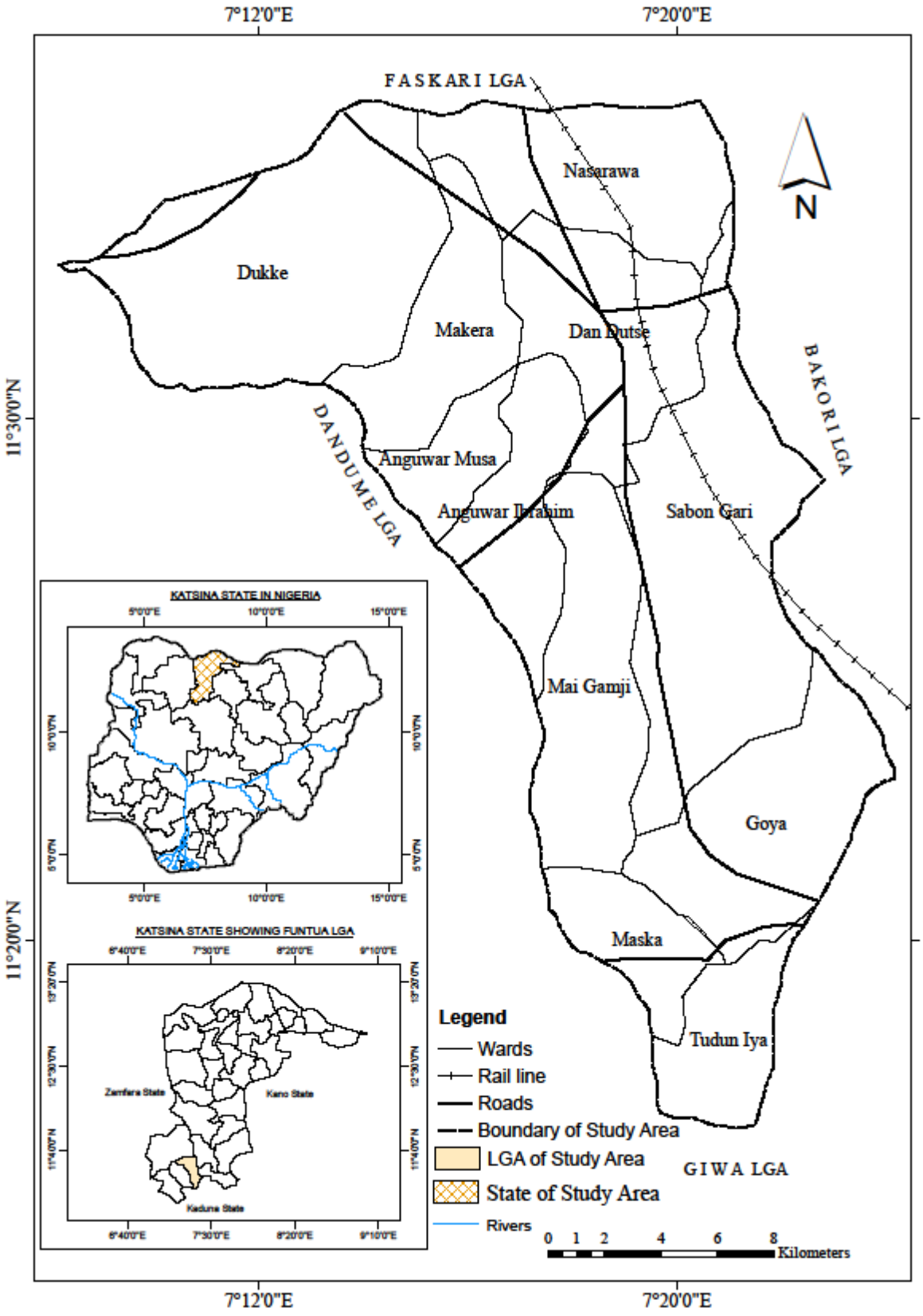


Figure 3.1: Funtua Educational zone Showing Administrative Wards
Source: Lands Department, Katsina State.

Rainfall is experienced in Funtua when the warm moist tropical maritime air mass, and the hot and dry tropical continental air mass interact. The mean monthly dry season temperature is above 30ºC but significantly drop in the harmattan periods which stretch from November to February when the dry North East trade winds prevail. During this period, the ambient air mass is very dry and cold, dusty during the day and chilly at night. During this period, night temperature can drop as low as between 18ºC and 21ºC resulting in a relatively high diurnal range of temperature. Also in the rainy season months of July to September, temperatures of about 22ºC - 28ºC prevail (Onamade, 2014).

3.2.3 Population and People

Funtua Local Government Area (LGA) has a total population of 225,571 with Males and female population of 118,703 and 106,868 respectively (NPC, 2009). The inhabitants of the Local Government Area (LGA) are predominantly Hausa and Fulani by tribe. The Local Government Area is made up of eleven wards. The major districts in Funtua include: Dikke, Maigamji, Maska, Tuduniya, Gardawa, Ung-hamida, Gwaigwaye, Dan-fili, Goya, Yan-randa, Ung-fadi, Ung-nunu, Gwauruwa, Rafin-dinya, Kaliyawa, Zamfarawa, Bakin-dutse, Ung-kankura, Ung-kwando, Cibauna, Lasanawa, Dukawa, Ung-biri, Kofar Yamma, Sabongari, Danlayi, Ung-tofa (Funtua, 2016).

3.2.4 Educational Facilities

Among the educational institutions in Funtua, Nursery and Primary schools has a sizeable number of private and public nursery and primary schools scattered all over Funtua Town. Prominent among these are Aya primary School and Focus International School (Multi Systems Consultants, 2009).

There are a number of both public and private secondary schools in Funtua, with each school having both junior and senior wings. The schools include Government

College Funtua, Government Secondary School Makera, Government Day Secondary School Funtua, and among the private schools are Hauwa Community and Comprehensive Secondary School (Multi Systems Consultants, 2009).

There are tertiary institutions in Funtua which accommodate Students from all over the country, one is the Ahmadu Bello University School of Basic and Remedial Studies (SBRS) which accommodates Students from all (nineteen) 19 northern states of Nigeria, College of Administration Funtua, School of Health Technology known as Muslim Community School of Health Technology, Funtua which is a communal non-governmental and charity based institution. Another Diploma awarding institution is Abdullahi Aminchi College of Advanced Studies Funtua which is registered to award Degree and Diploma certificates it is affiliated to ABU Zaria, Imam Saidu College of Education, which awards NCE (Funtua, 2016).

There is a school of vocational studies at Funtua named Business Apprenticeship Training Center (BATC) being run by the state Ministry of Commerce and Tourism (Multi Systems Consultants, 2009).

3.2.5 Socio-Economic Activities

Funtua is the second largest city after the Katsina Town with the district head, who is referred to as Sarkin Maska. The major occupation of the inhabitants of Funtua L.G.A is farming. The crops grown include cotton, maize, millets, soya-beans and groundnut. Animal husbandry is also practiced by the inhabitants; the animals kept include cattle, sheep, donkey, horses and goats. It has been an industrial and commercial centre since colonial days, Cotton cultivation gave rise to the growth of indigenous textile industries as presently it houses most of industries in the state which include: Funtua Textiles Limited, Jargaba Agric Processing Company that majored in oil mills, animal feeds etc, Northern Diaries, Funtua Burnt Bricks, Funtua Fertilizer

Blending Company, West African Cotton Company, Lumus Cotton Ginnery, Integrated Flour Mills, Funtua Bottling Company, Salama Rice Mills. Currently Funtua hosts the 132kv/33kv Transmission Station serving 9 Local Government areas out of the 11 Area Councils that make up of Funtua Senatorial District, and is among the host where 6 dry ports will be established in the country (Funtua, 2016).

3.3 Methodology

This covered types of data required, sources of data, method and procedure for data collection and processing, and analysis of data.

3.3.1 Reconnaissance Survey

A reconnaissance survey of the study area was carried out to enable the researcher familiarize with the area and available facilities. In the course of the survey, the researcher found out from the local government education authority that there are a total of 77 public primary schools in the study area.

3.3.2 Types of Data

The types of data used were:-

i. Administrative map of Funtua Local Government Area at scale 1:500,000.

ii. Geographical coordinates of the public primary schools in the LGA.

iii. Names, addresses, and year of establishment of the public primary schools.

iv. Available facilities and instructional materials (i.e. library, staff room, elementary laboratories, computer rooms, Meteorological station, number of classrooms, and playground in each of the schools).

3.3.3 Sources of Data

Sources of data for this study included both primary and secondary sources.

3.3.3.1 Primary Sources of Data

- Absolute location of public primary schools within the study area was acquired using Garmin 60CSx handheld GPS receiver, these geographic locations was used to create map showing the various locations of the public primary schools.
- Survey – 77 copies of a questionnaire were administered to the head teacher in each of the public primary schools within the study area to acquire data on year of establishment, number of streams, number of female and male teachers, number of female and male students in each classroom, and the available facilities such as libraries, laboratories, computer rooms, staff rooms, Meteorological stations, number of classrooms, and playground for creation of database.

3.3.3.2 Secondary Sources of Data

Secondary source of data included

- Administrative map of Funtua Local Government Area at scale 1:500,000 were acquired from Lands department, Katsina State, which was used for creating a base map that shows the distribution of wards.
- A documented list of all the name, address, and year of establishment of public primary schools in Funtua Educational zone distributed according to the five educational zones of the Local Government Education Authority namely Central, East, North, South, and West were obtained from the LEA Secretary.
- Materials from journals, magazines, books, internet, unpublished thesis and dissertations were also got for literature review.

3.3.4 Data Processing

This study used ArcGIS (10.1) software for data processing and analysis. Thus, all datasets were transformed into ArcGIS format (shape files). Administrative map of Funtua Educational zone was scanned and georeferenced to UTM Zone 32 N using the Georeferencing toolbar in ArcMap and prior to digitization, a shape file was created for all features of interest such as; location of schools were represented as points, roads and rail lines were represented with lines, and Administrative boundaries with polygons. Digitizing of the georeferenced image was accomplished using the editor toolbar in ArcMap with appropriate shape files. Geographical location of public primary schools were acquired using GPS and transformed into plain text file format in Microsoft excel and was imported in to the ArcGIS environment as way points which appeared as points layer on the map showing the attributes tables of the public primary schools. Other non-spatial data about the school facilities were organized into attribute layers.

3.3.5 Method of Data Analysis

3.3.5.1 To identify and map the public primary schools in Funtua Educational zone.

A list of documented public primary schools was acquired from the Education Secretary Funtua L.G.A. The names and addresses of all public primary schools on the list were identified. Handheld GPS receiver was used to acquire the geographical locations of all the public primary schools, these were copied in tabular form using Microsoft excel. Using add XY tool the locations of all primary schools were imported into ArcMap environment. The school coordinates were overlaid on the digitized and georeferenced administrative map of Funtua Educational zone. This shows the distribution of schools in the area.

3.3.5.2 To examine the pattern of distribution of public primary schools in Funtua Educational zone.

The pattern of distribution of Public primary schools in Funtua Educational zone was determined using Average Nearest Neighbour statistical tool. The tool measures the distance between each feature and its nearest Neighbour's location. It then averaged all these nearest Neighbour distances. If the Average Nearest Neighbour Ratio is less than 1, then the pattern exhibits clustering. If the Average Nearest Neighbour Ratio is greater than 1, the trend is towards dispersion. The Nearest Neighbour Ratio (NNR) is given by;

$$NNR = \frac{Observed\ Mean\ distance}{Expected\ Mean\ distance}$$

3.3.5.3 To identify the available facilities in the schools by querying the database.

Based on the attributes derived from the administration of questionnaire, a database was created using Microsoft Access and ArcGIS 10.1 software. In developing the database, three tables were created namely; Facility, Student, and Staff. The data for each school was entered into its attribute table. The table created in Microsoft Access was exported as dBASE file format which was compatible with ArcGIS. The tables were imported into ArcGIS 10.1 environment for analysis. A table showing name, address, and coordinates of all the primary schools in Funtua was created to show the location of primary schools. Then the attribute data on the facilities and their conditions acquired from the questionnaire was converted to text format. Query operations was performed such as; all primary schools with basic facilities to include classrooms, desks, computer laboratories, and libraries, all schools with functioning toilets and waste disposals. The query builder was used to reveal various primary schools facilities and their conditions in the study area. The query builder tool is accessed by clicking on selection on the menu bar and pointing to 'Select By Attributes' and clicking. A dialog

box appears. The query expression is built either by typing it in or clicking on the required fields, operators and values in the dialog box.

3.3.6 Method of Presentation

Symbolization was used to represent features on the map. Points (round shaped) were used to represent the locations of public primary schools and Name of each school was placed on its location. However to avoid conflict and overlapping of school name, codes were assigned to represent those school names. Linear features such as Administrative boundaries, major roads, and rail lines were represented in black colored lines.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter summarizes and presents results based on the data collected during the field survey. The results of the data analyzed were described, presented and discussed. The results were based on the data collected on public primary schools in Funtua Educational zone.

4.2 Distribution of Public Primary Schools in Funtua Educational Zone

Table 4.1 shows the distribution of primary schools in the study area according to the five (5) Educational zones.

Table 4.1: Public Primary Schools in Funtua Educational zone

ZONE	Number of Schools	Females		Males		TOTAL	
		Freq	%	Freq	%	Freq	%
Funtua Central	16	11780	49.5%	12002	50.5%	23782	48.3%
Funtua East	16	2490	44.1%	3151	55.9%	5641	11.3%
Funtua North	13	2404	43.6%	3105	56.4%	5509	11.1%
Funtua South	18	3770	46.6%	4315	53.4%	8085	16.3%
Funtua West	14	2964	45.6%	3537	54.4%	6501	13.0%
TOTAL	**77**	**23408**	**47.3%**	**26110**	**52.7%**	**49518**	**100%**

Source: Author's Field Survey, 2015.

Table 4.1 shows that South zone had the highest concentration of public primary schools in the study area and this could be as a result of high number of administrative wards in the Zone. It also shows that Northern zone had the lowest concentration of public primary schools in the study area and this could be attributed to the lower number of administrative wards in the zone. This is similar to the findings of Olubadewo, Abdulkarim and Ahmed (2013) that the distribution of primary schools in Fagge LGA, Kano State is more concentrated in areas around the Fagge A, B and D

than areas around Kurna. The distribution of the public primary schools is further shown in Figure 4.1. The list of primary schools, their names, and geographical locations is also shown in Appendix 1.

Table 4.1 shows that the enrolment of pupils in central zone is higher even though south zone has more schools in the study area and the enrolment of males is greater than that of females in all the educational zones. As the Table further shows, females have a maximum value of 49.5% in Central zone and a minimum value of 43.6% in Northern zone. While males have a maximum value of 56.4% in Northern zone and a minimum value of 50.5% in Central zone respectively. This agrees with Egwu (2009), that of 24,422,918 enrolment figure, the males were 13,302,262 (55%) while 11,120,649 (45%) was for the females, indicating gender imbalance.

4.3 Distribution Pattern of the Schools

The Average Nearest Neighbour Distance tool was used to measure the pattern of distribution of Public Primary Schools in the study area. The Names of schools and their nearest distances (Elucidal) are shown in appendix II.

Table 4.2: Average Nearest Neighbour Summary of Primary Schools in Funtua Educational zone

Observed Mean Distance	1366.69 metres
Expected Mean Distance	1324.32 metres
Nearest Neighbour Ratio	1.03
Z-Score	0.54
p-value	0.59

Source: Author's Field Survey, 2015

From Table 4.2, the result (1.03) shows that the pattern of distribution of public primary schools in Funtua educational zone is dispersed since the Nearest Neighbour ratio is greater than 1 and the Z-Score index (0.54) is within the critical values (-1.65 to +1.65) the pattern does not appear to be significantly different than dispersed. Another

study has shown a different pattern (Olubadewo, Abdulkarim and Ahmed, 2013), where the distribution in Fagge LGA showed a value of (2.58) which is dispersed.

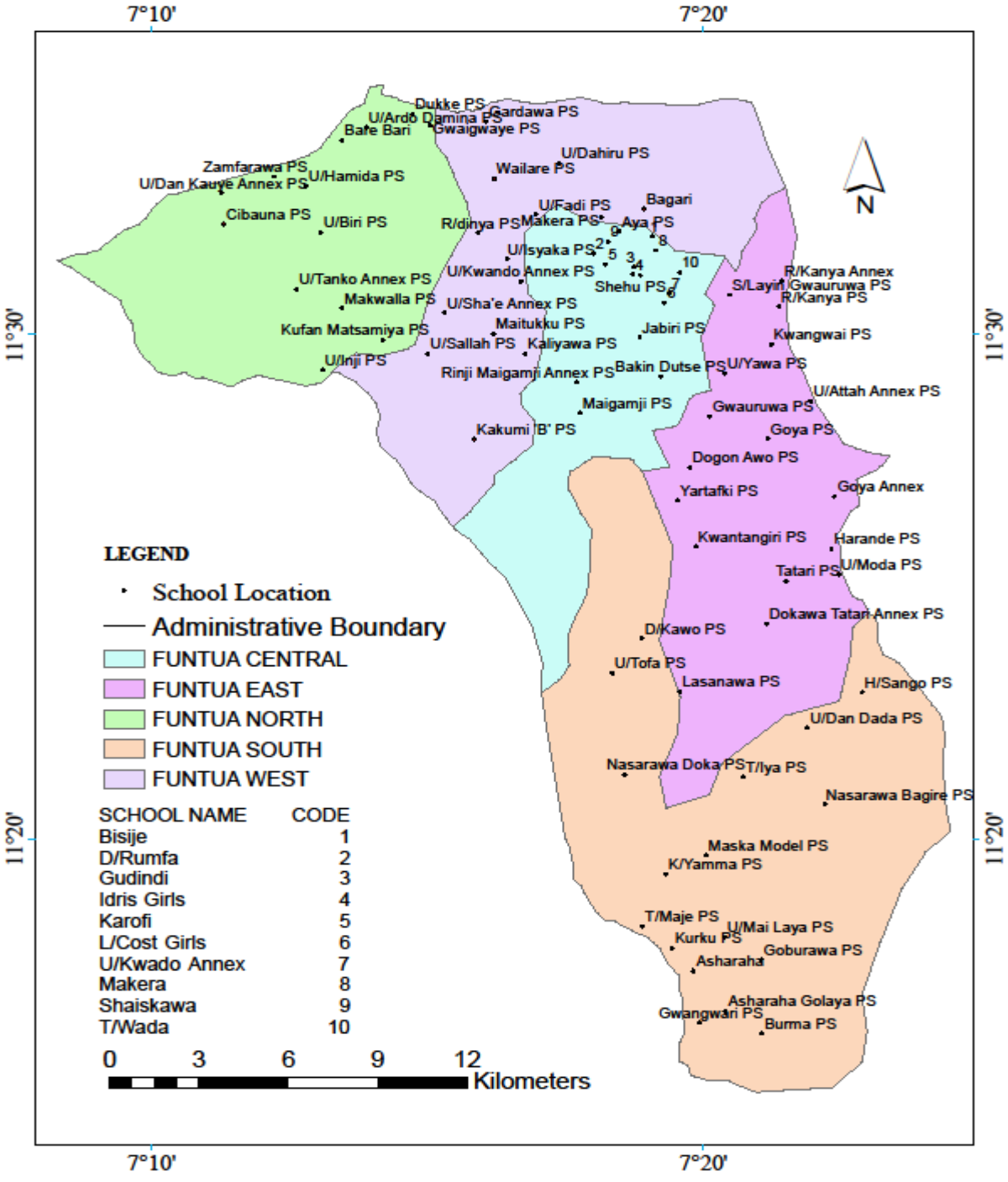


Figure 4.1: Distribution of Public Primary Schools in Funtua Educational Zone
Source: Author's GIS Analysis

4.4 Available Facilities in Public Primary Schools

Queries of some basic facilities from the database were done and the results are shown in Tables 4.3 to 4.4 and Figure 4.2 to 4.6. The results show that public primary schools in the central zone were better equipped with school facilities when compared with schools in other zones and because central zone is the headquarters of the Funtua LGA.

4.4.1 Primary Schools with Teaching and Learning Materials

Teaching and learning aids play a significant role toward teaching and learning. Table 4.3 revealed primary schools with teaching and learning materials.

Table 4.3: Primary Schools with Teaching and Learning Materials

Zone	Number of Schools	Classroom		Staff room		Computer room		Library		Playground	
	Freq	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Funtua Central	16	11	37	24	36	4	67	2	50	16	21
Funtua East	16	6	20	13	20	0	0	1	25	16	21
Funtua North	13	4	13	8	12	0	0	0	0	13	17
Funtua South	18	6	20	12	18	0	0	1	25	18	23
Funtua West	14	3	10	9	14	2	33	0	0	14	18
TOTAL	**77**	**30**	**100**	**66**	**100**	**6**	**100**	**4**	**100**	**77**	**100**

Source: Author's Field Survey, 2015

Table 4.3 show that 30% of primary school in the study area had six or more classes while about 61% of the remaining did not had up to six classes. The Table also showed that 11 out of 16 primary schools in Central zone had six or more classrooms while 3 out of 14 primary schools in western zone had six or more classrooms. This indicates that classrooms are inadequate and could result to overcrowding of pupils. The result is further shown in Figure 4.3. The results are similar to the study of Abbas (2012), which revealed that 41 schools which represent 73.21% of the total number of

schools in the study area had more than 12 classes, while about 25% had less than 12 classes.

Also Table 4.3 indicates that only 14% of primary schools in the study area did not had Staff room while the remaining 86% had. Central zone had the highest (36%) number of Staff room while northern zone had the lowest (12%). This indicates that most of the school are with staff rooms. The distribution of Schools with Staff rooms is shown in Figure 4.4. The Table revealed that only 6 which represent 8% of the schools in the study area had Computer rooms while 92% of schools are in need of computer rooms. The result is further shown in Figure 4.5. And Table 4.3 revealed that Central zone had 25% primary schools with computer room while none of the primary schools in North, East and Southern zones lacked the facility.

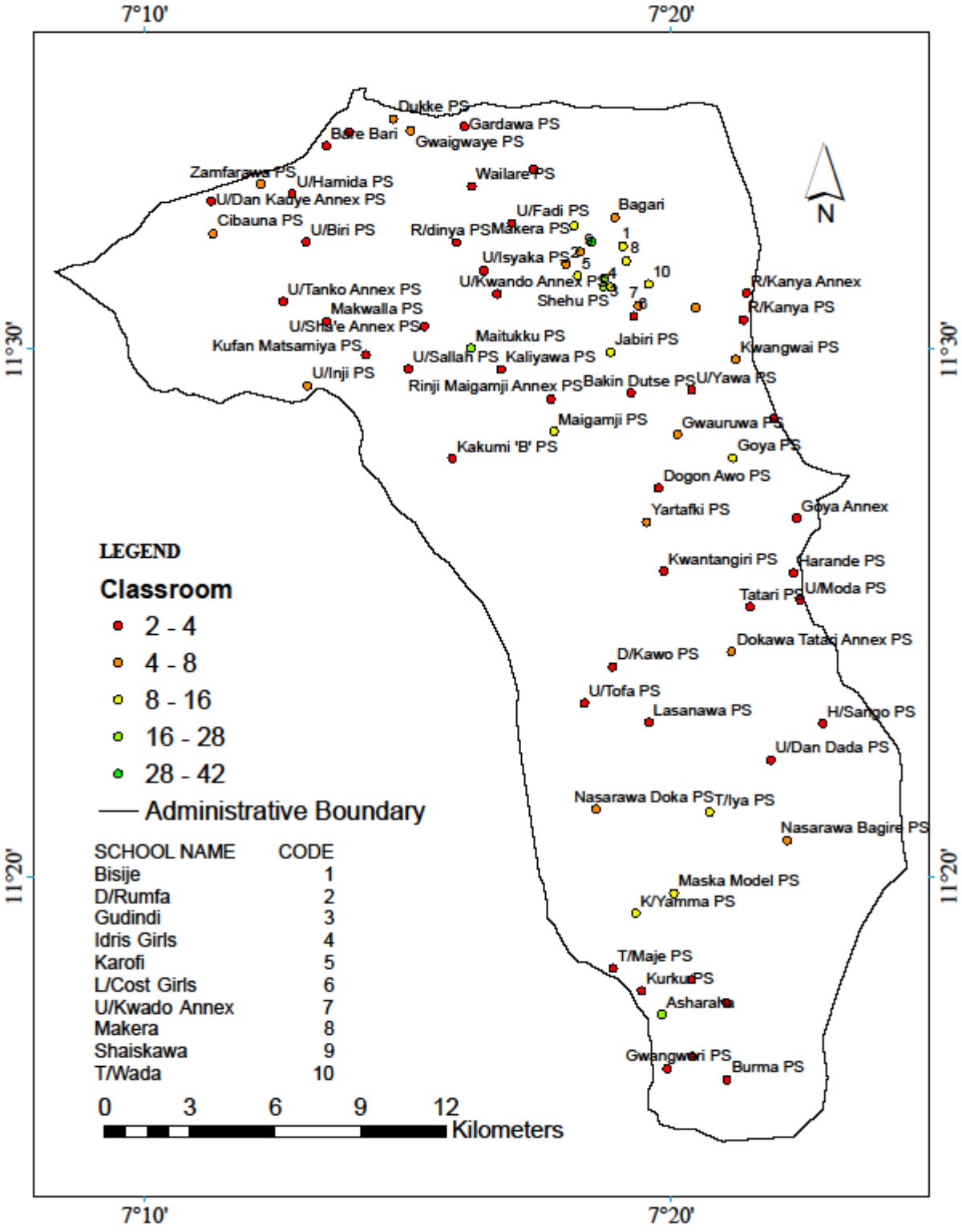


Figure 4.2: Distribution of Schools with Classroom in Funtua Educational Zone
Source: Author's GIS Analysis

Table 4.3 and Figure 4.6 further revealed that only 4 (5%) of public primary schools in the study area had library facility, this indicates that 73 (95%) of the schools in the study area need library facility. It also shows that central zone had the highest number of schools with library facility while North and Western zones had none. This is similar to the situation captured by Aliyu, Sule and Youngu (2012), that 4 out of the 19 schools in AMAC, Abuja do not have a library complex, representing 21.05% are in need of a library.

Table 4.3 and Figure 4.7 shows that all 77 primary schools in the study area had an open space which serves as playground facility. The results are similar to the study of Asiabaka and Mbakwem (2008) which stated that all the 135 primary schools visited had playground facility.

4.5 Academic Qualification of Teachers in Funtua Educational Zone

The primary school years are very important in a child's intellectual development. Therefore, all primary school teachers should be adequately prepared to teach the school children with diverse interests, and capabilities (Akinbote, 2007).

Table 4.4: Academic Qualification of Teachers in Funtua Educational Zone

Zone	QUALIFICATION								TOTAL	
	Degree		Diploma		NCE		Grade II			
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Funtua Central	41	65	59	40	234	50	31	42	365	48
Funtua East	6	10	23	15	55	12	15	20	99	13
Funtua North	3	5	18	12	43	9	8	11	72	9
Funtua South	11	17	24	16	78	16	6	8	119	16
Funtua West	2	3	25	17	62	13	14	19	103	14
TOTAL	**63**	**100**	**149**	**100**	**472**	**100**	**74**	**100**	**758**	**100**

Source: Author's Field Survey, 2015

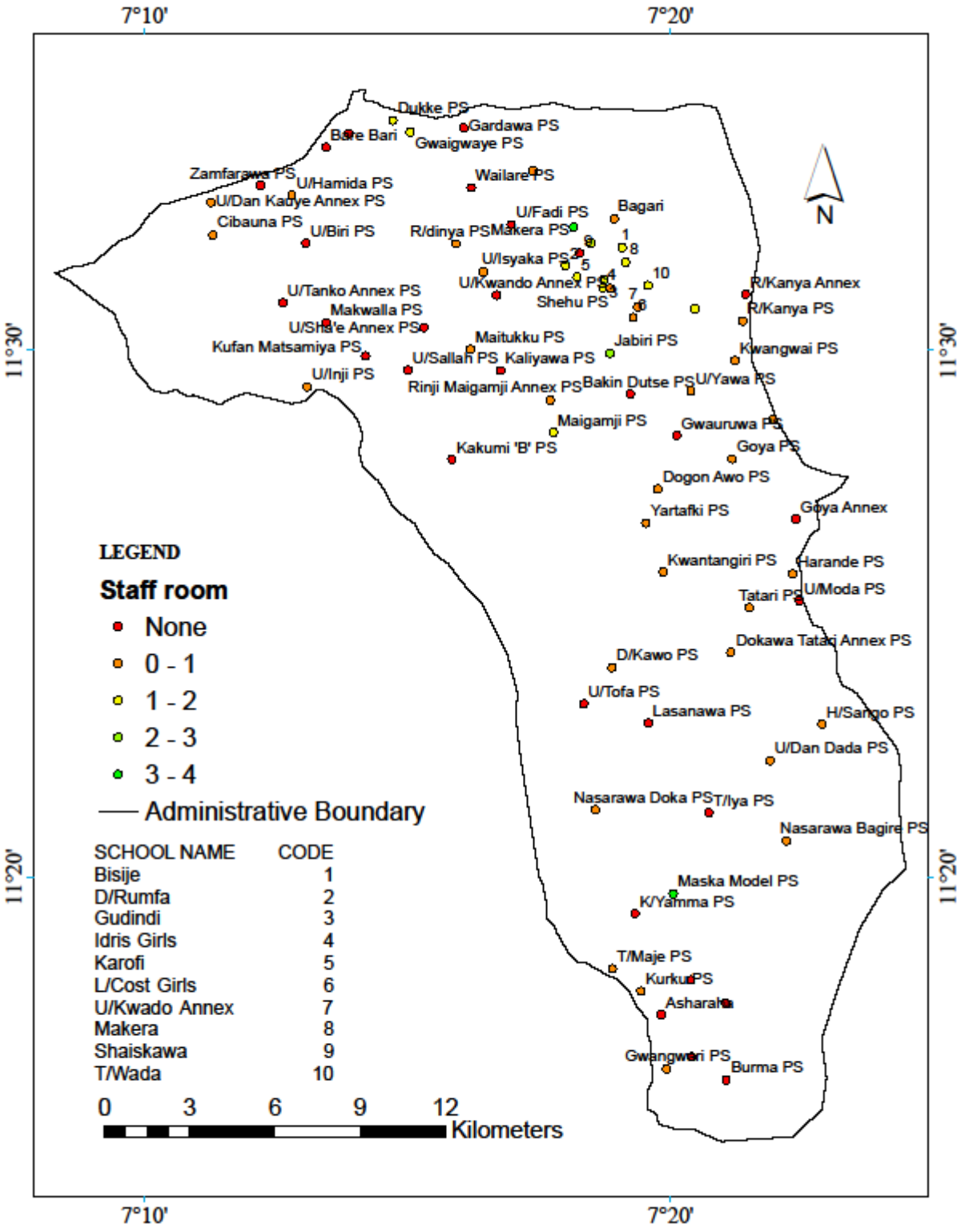


Figure 4.3: Distribution of Schools with Staff room in Funtua Educational Zone
Source: Author's GIS Analysis

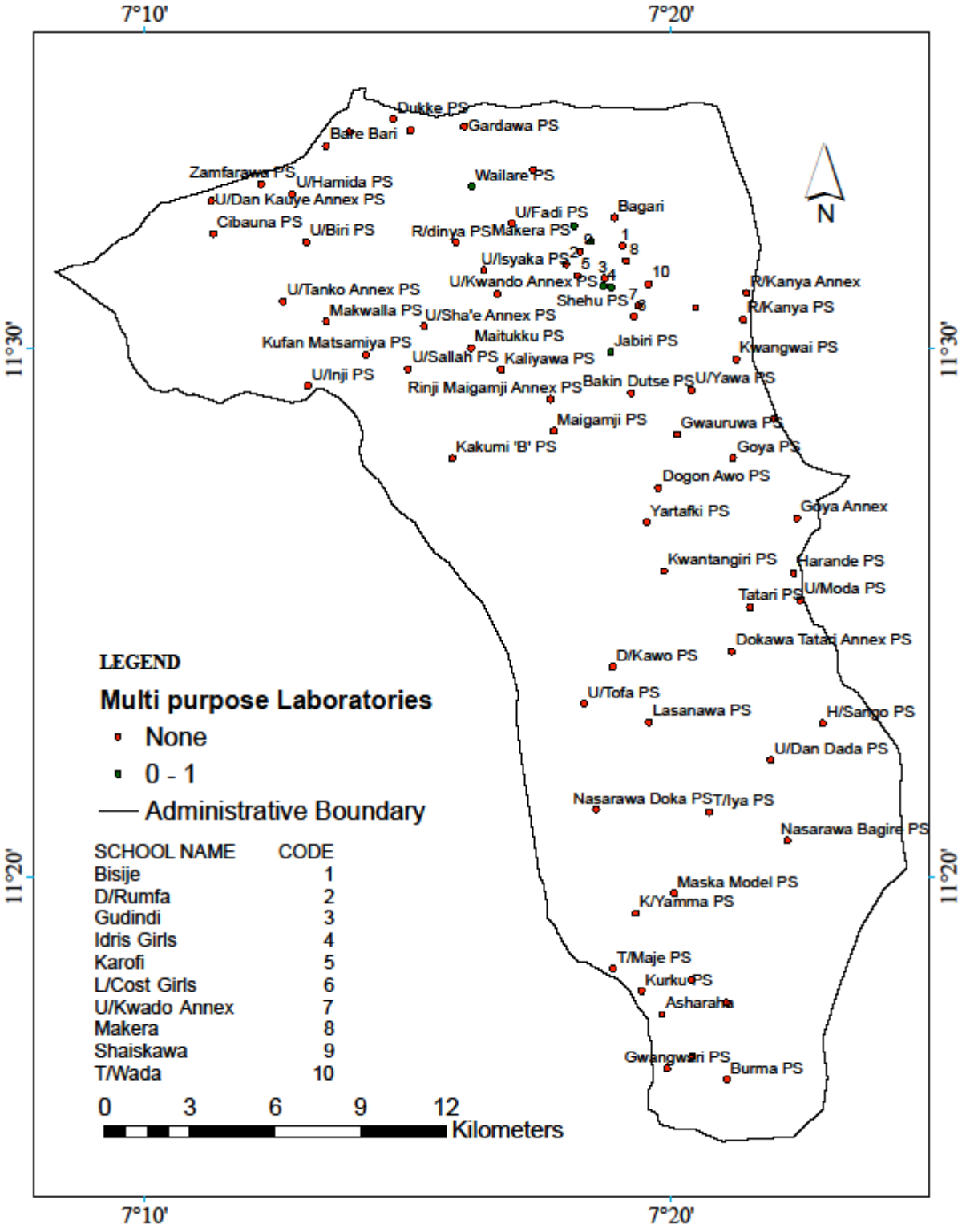


Figure 4.4: Distribution of Schools with Laboratories, Computer rooms, and Meteorological Stations in Funtua Educational Zone

Source: Author's GIS Analysis

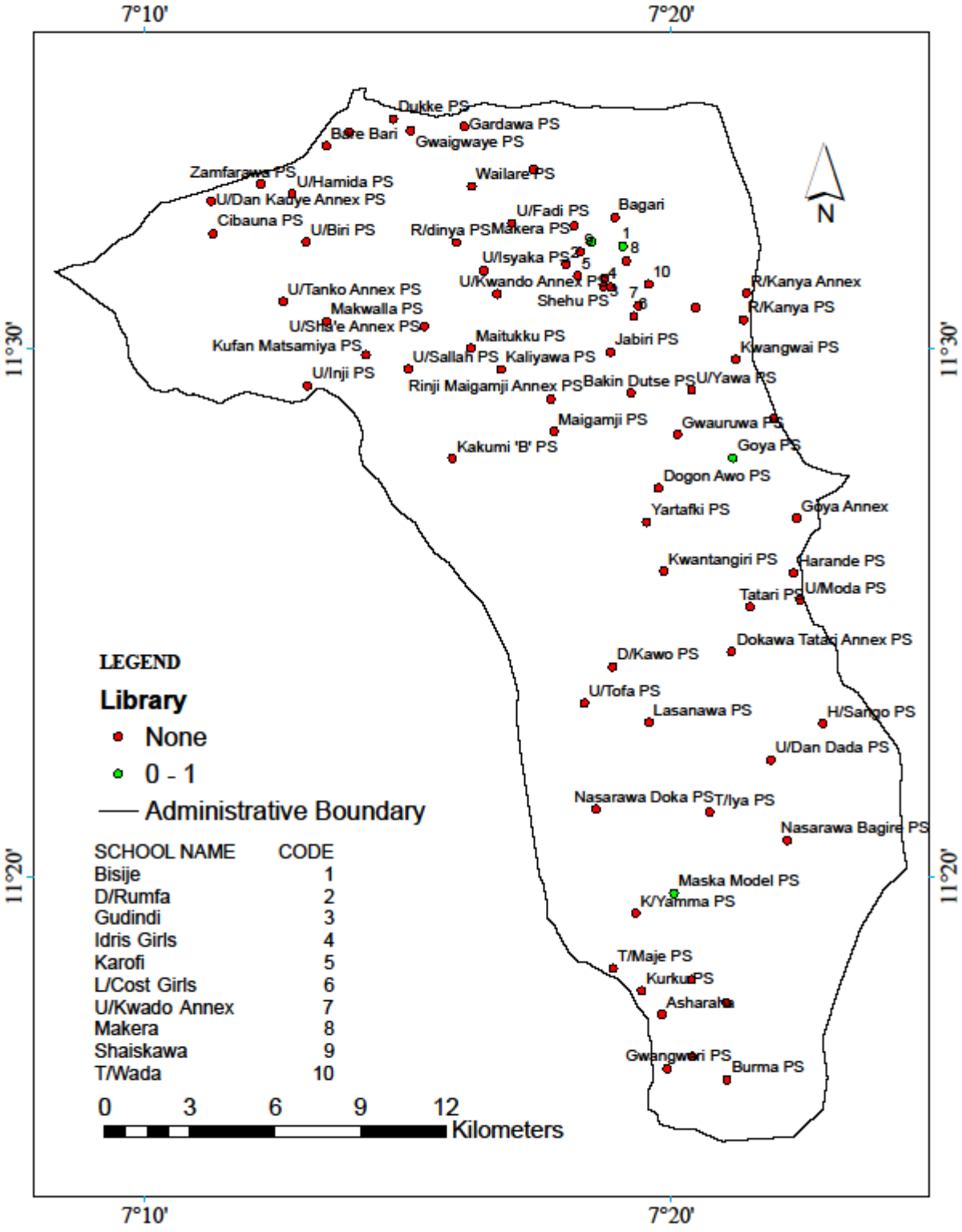


Figure 4.5: Distribution of Schools with Library in Funtua Educational Zone
Source: Author's GIS Analysis

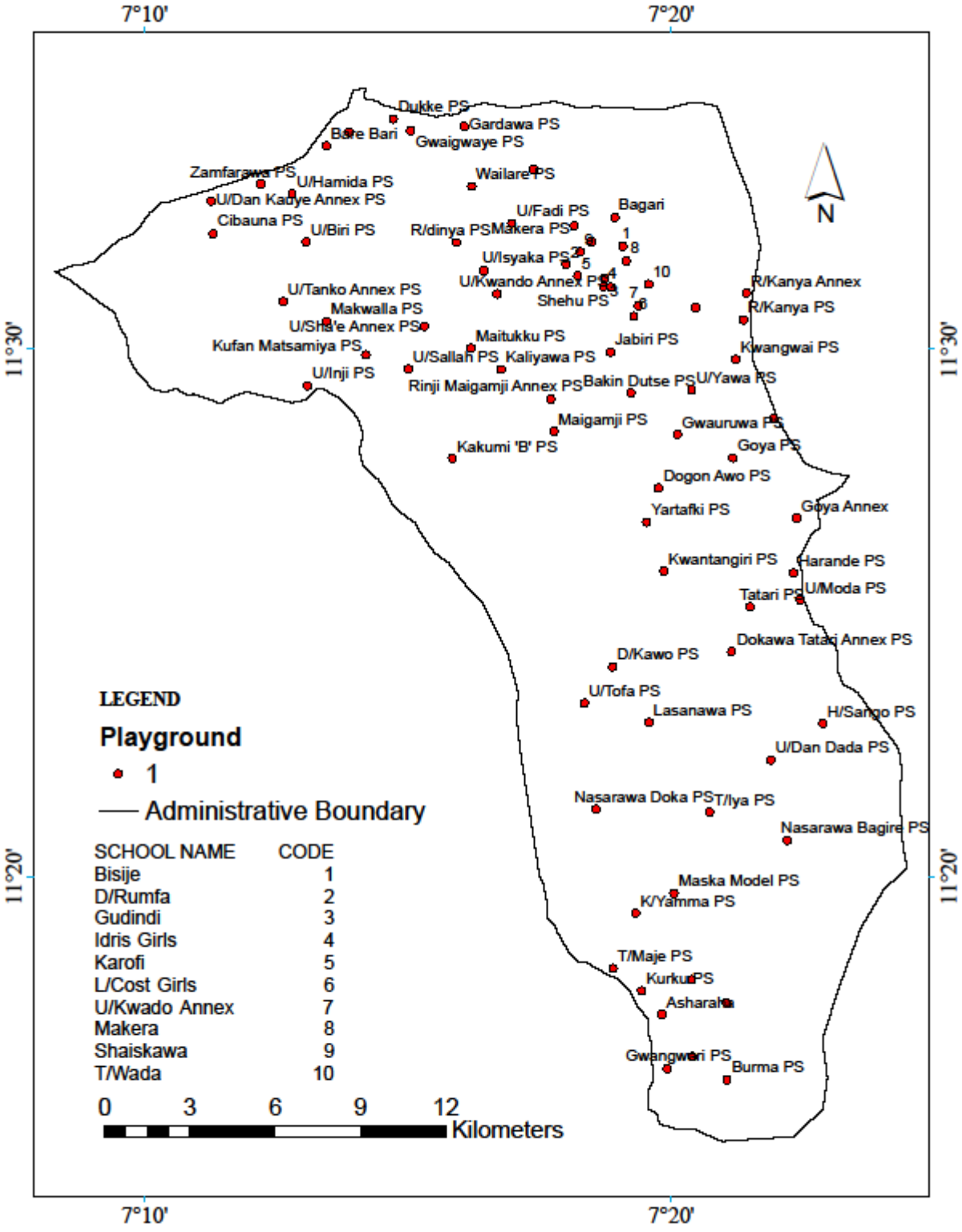


Figure 4.6: Distribution of Schools with Playgrounds in Funtua Educational Zone

Source: Author's GIS Analysis

Table 4.5 shows that there are 758 number of teachers in the study area of which central zone had the highest number of teachers even though southern zone had the highest number of schools in the study area. Only 63 (8%) out of 758 teachers had Bachelor's degree qualification; 149 (20%) had National diploma qualification; 472 (62%) had NCE qualification; 74 (10%) had Grade II qualification and did not meet the NCE minimum requirement of teaching in Nigeria.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the research, its conclusions and some recommendations.

5.2 Summary of the Findings

The aim of the study was to analyse facilities in public primary schools in Funtua Educational zone. The primary data sources were documented list of Funtua public primary schools, GPS survey, questionnaire administration, and personal observation. Data were analyzed descriptively using frequency tables, average nearest neighbour statistical tool and the queries were used to identify the available facilities in schools using ArcGIS 10.1 software. The study made a number of findings which includes:

The distribution of public primary schools shows that there is high concentration of primary schools in southern educational zone even though central zone had higher enrolment. Enrolment of boys is higher than the enrolment of girls in the study area. Nearest neighbour ratio indicated a value of 1.03, however the pattern of distribution of public primary schools in Funtua Educational zone is dispersed.

Query of the available facilities in the study area shows that only 30% of primary school in the study area had six or more classes, only 14% of primary schools lacked Staff rooms, 95% of the primary schools need library facility, 8% had computer room, while all the primary schools had playground, and none of the primary schools had Elementary laboratory and Meteorological Station.

Also revealed that, there was 758 teachers in all the public primary schools of which the central zone had the highest number of teachers even though southern zone

had the highest number of schools in the study area. 8.3% had Bachelor's degree qualification while 91.7% of teachers in the study area do not have Bachelor's degree qualification; 19.7% had National diploma qualification; 62.3% had NCE qualification; 9.8% had Grade II qualification and did not meet the NCE minimum requirement of teaching in Nigeria.

5.3 Conclusion

The study presented 77 public primary schools distributed into 5 educational zones in Funtua Educational zone. The study revealed that South zone had the highest concentration of public primary schools in the study area and this could be as a result of high number of administrative wards in the Zone and the enrolment of pupils in central zone is higher even though south zone has more schools in the study area. The pattern of distribution of primary schools in Funtua Educational zone is dispersed since the Nearest Neighbour ratio is greater than 1. The quality of education depends on quality of teachers, only a few of teachers in the study area did not meet the NCE minimum requirement for teaching in Nigeria.

It concluded that most of the classrooms are overcrowded due to inadequate classes, most of the schools had staff rooms, and even though computer and basic science are part of the primary school curriculum the pupils lack the practical knowledge of these subjects due to inadequate computer room, laboratories, and Meteorological stations in Funtua Educational zone. Based on the outcome of this research, GIS techniques play a vital role in the analysis of facilities in public primary schools. Hence the need of the GIS techniques in acquiring, storing, analysis, examining and managing of schools facilities for better decision making as the case may be.

5.4 Recommendations

Based on the outcome of this research on the analysis of facilities in public primary schools in Funtua Educational zone, the following are recommended:

i. Teachers to should be encouraged to acquire more educational skills which will enable them to improve on their present academic qualification. This will further enhance the quality of primary school education.

ii. The Funtua local education authority, non-governmental organizations, and Parents Teachers Association (P.T.A) should provide adequate facilities in schools in order to improve the quality of teaching and learning.

iii. There is also a need to renovate all the primary schools since most of them are old and dilapidated.

iv. Government should be more committed to the universal basic education programme to enhance the quality of primary education. This would help in solving the problems related to low literacy as regards girl's poor enrolment into schools.

v. The Local Education Authority should create Information and Communication Technology (ICT) Unit that will be saddled with the responsibility of managing the geospatial database and updating it. This implies that the database managers should be adequately experienced.

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Appendix I: Questionnaire for Heads of Primary School

DEPARTMENT OF GEOGRAPHY, AHMADU BELLO UNIVERSITY, ZARIA

Dear Respondent,

I am carrying out a study on "GIS-Based Analysis of Public Primary School Facilities in Funtua Local Government Area Katsina State, Nigeria". It is an academic research leading to the award of Master Degree in GIS in the above named university. Any information given will be confidential and strictly used for academic purpose. Your kind cooperation is highly appreciated.
Thank you.

Ahmed, ABBA

M.Sc./SCI/118/2011-2012

1. School Coordinate:
   Northing…….. Easting……...
2. School Name
   ……
3. School Address
   …….
4. Year of Establishment
   ……
5. Is the school fenced Yes [ ] No [ ]
6. Staff Strength

Staff Category	**Number of Female**	**Number of Male**	**Total**
Teachers with First Degree (B.Ed., B.Sc., etc.)			
Teachers with Diploma			
Teachers with NCE			
Teachers with Gr. II Certificate			
Non-teaching staff (Security, Cleaners, etc.)			
Total			

7. Pupils Data

Class	**Number of Stream**	**Number of Female**	**Number of Male**	**Total**
Primary 1				
Primary 2				
Primary 3				
Primary 4				
Primary 5				
Primary 6				
Total				

8. Facilities Inventory

Facility Type	**Number Required**	**Number Available**	**Number in Use/ Functioning**	**Number that Required Repair/ Replacement**
Classroom				
Desk				
Computer room				
Library				
Laboratory				
Playground				
Meteorological Station				
Total				

9. Mention other facilities available in the school

……
……
……
……
……
……

Appendix II: Names and Geographical Location of Primary Schools in Funtua Educational Zone

SCHOOL NAME	AZIMUTH/GRID		ZONE	NEAR_DIST
	EASTINGS	NORTHINGS		
Aya Primary School	315456	1275449	CENTRAL	514.97
Bakin Dutse Primary School	316812	1270155	CENTRAL	1585.39
Bisije Primary	316599	1275428	CENTRAL	531.09
Dan Rumfa Primary School	314586	1274661	CENTRAL	569.24
Gudindi Primary School	315932	1274156	CENTRAL	270.12
Idris Girls Model Primary School	315885	1273890	CENTRAL	267.71
Jabiri Primary School	316109	1271576	CENTRAL	1493.06
Karofi Primary School	314992	1274262	CENTRAL	569.24
Low Cost Houses Primary School	317087	1273198	CENTRAL	405.23
Low Cost Girls Primary School	316924	1272827	CENTRAL	405.23
Maigamji Primary School	314126	1268828	CENTRAL	1129.92
Rinji Maigamji Annex Primary School	314032	1269954	CENTRAL	1129.92
Sambo Primary School	316671	1274764	CENTRAL	531.09
Shaiskawa Primary School	315082	1275095	CENTRAL	514.97
Shehu Primary School	316148	1273840	CENTRAL	267.71
Tudun Wada Primary School	317425	1273952	CENTRAL	826.29
Dogon Awo Primary School	317169	1266799	EAST	1281.89
Dokawa Tatari Annex Primary School	320234	1261086	EAST	1688.24
Goya Primary School	320310	1267852	EAST	1970.25
Goya Annex	322500	1265739	EAST	1916.84
Gwauruwa Primary School	318180	1271651	EAST	1637.14
Harande Primary School	322823	1263872	EAST	972.77
Kwangwai Primary School	322513	1271481	EAST	1416.43
Kwantangiri Primary School	317907	1263914	EAST	1796.93
Rafin Kanya Primary School	322237	1272681	EAST	929.35
Rafin Kanya Annex	323554	1273450	EAST	929.35
S/Layin Gwauruwa Primary School	319343	1272873	EAST	1678.23
Tatari Primary School	320877	1262647	EAST	1688.24
Unguwar Attah Annex Primary School	321725	1269223	EAST	1970.25
Unguwar Moda Primary School	322843	1262924	EAST	972.77
Unguwar Yawa Primary School	318894	1270244	EAST	1637.14
Yartafki Primary School	317319	1265612	EAST	1281.89
Bare Bari	304859	1280483	NORTH	916.31
Cibauna Primary School	302419	1275804	NORTH	1144.61
Dukke Primary School	309011	1280262	NORTH	705.03
Gwaigwaye Primary School	309251	1279375	NORTH	705.03
Kufan Matsamiya Primary School	308058	1268899	NORTH	1549.25
Makwalla Primary School	306305	1272702	NORTH	1654.91

Unguwar Ardo Damina Nomadic Primary School	307136	1279322	NORTH	916.31
Unguwar Biri Primary School	305629	1275483	NORTH	1754.36
Unguwar Dan Kauye Annex Primary School	301455	1278913	NORTH	1144.61
Unguwar Hamida Primary School	304049	1278648	NORTH	1126.93
Unguwar Inji Primary School	306235	1270420	NORTH	2282.89
Unguwar Tanko Annex Primary School	304813	1273418	NORTH	1654.91
Zamfarawa Primary School	302368	1281316	NORTH	1126.93
Asharaha	317753	1248416	SOUTH	1,082.94
Asharaha Golaya Primary School	318793	1246932	SOUTH	962.65
Nasarawa Bagire Primary School	322118	1254469	SOUTH	2871.54
Burma Primary School	319987	1246120	SOUTH	1443.95
Dan-Kawo Primary School	318078	1260211	SOUTH	1610.21
Goburawa Primary School	319986	1248813	SOUTH	1456.37
Gwangwari Primary School	316809	1246381	SOUTH	962.65
Hayin Sango Primary School	322621	1258521	SOUTH	2219.42
Kofar Yamma Primary School	316862	1251959	SOUTH	1486.27
Kurku Primary School	313855	1247744	SOUTH	1082.94
Lasanawa Primary School	317354	1258629	SOUTH	2296.42
Maska Model Primary School	318181	1252644	SOUTH	1486.27
Nasarawa Doka Primary School	315519	1255598	SOUTH	3543.19
Tudun - Maje Primary School	316069	1250034	SOUTH	1263.61
Tudun Iya Primary School	318924	1256781	SOUTH	2783.73
Unguwar Dan Dada Primary School	321551	1257284	SOUTH	2219.42
Unguwar Mai Laya Primary School	318775	1249622	SOUTH	1456.37
Unguwar Tofa Primary School	315123	1259305	SOUTH	1610.21
Bagari	316271	1276289	WEST	1045.77
Gardawa Primary School	311103	1279494	WEST	1855.82
Kakumi 'B' Primary School	306287	1278733	WEST	3485.17
Kaliyawa Primary School	312330	1271081	WEST	1281.56
Maitukku Primary School	311293	1271834	WEST	1281.56
Makera Primary School	314875	1275990	WEST	793.88
Rafin dinya Primary School	308150	1275512	WEST	1354.32
Unguwar Kwando Annex Primary School	312603	1273714	WEST	935.83
Unguwar Sha'e Annex Primary School	303471	1272476	WEST	1591.62
Unguwar Dahiru Primary School	313475	1277973	WEST	2019.25
Unguwar Fadi Primary School	312728	1276097	WEST	1902.41
Unguwar Isyaka Primary School	311753	1274550	WEST	935.83
Unguwar Sallah Primary School	303677	1271500	WEST	1549.25
Wailare Nomadic Primary School	311346	1277492	WEST	1903.72

Appendix III: Available Facilities in Public Primary Schools

School Name	Zone	Eastings	Northings	Est	Classroom	Desk	Computer	Library	Playground	Meteorological Station	Elementary Lab
Bagari PS	West	316271	1276289	1976	8	40	0	0	1	0	0
Gardawa PS		311103	1279494	1976	2	27	0	0	1	0	0
Kakumi 'B' PS		306287	1278733	2003	4	0	0	0	1	0	0
Kaliyawa PS		312330	1271081	2012	3	37	0	0	1	0	0
Kaliyawa PS		312330	1271081	2012	22	0	0	0	1	0	0
Maitukku PS		311293	1271834	1976	13	0	1	0	1	0	0
Makera PS		314875	1275990	1976	2	10	0	0	1	0	0
Rafindinya PS		308150	1275512	1977	2	0	0	0	1	0	0
Ung Kwando Annex PS		312603	1273714	2008	2	0	0	0	1	0	0
Ung Sha'e Annex PS		303471	1272476	2006	2	4	0	0	1	0	0
Ung Dahiru PS		313475	1277973	1975	4	17	0	0	1	0	0
Ung Fadi PS		312728	1276097	2001	3	3	0	0	1	0	0
Ung Isyaka PS		311753	1274550	2006	2	0	0	0	1	0	0
Ung Sallah PS		303677	1271500	1976	4	30	1	0	1	0	0
Wailare Nomadic PS		311346	1277492	2001	20	0	0	0	1	0	0
Asharaha Golaya PS	South	318793	1246932	2011	4	0	0	0	1	0	0
Nasarawa Bagire PS		322118	1254469	1976	2	40	0	0	1	0	0
Burma PS		319987	1246120	2000	2	0	0	0	1	0	0
Dan-Kawo PS		318078	1260211	1976	10	120	0	0	1	0	0
Goburawa PS		319986	1248813	1976	3	45	0	0	1	0	0
Gwangwari PS		316809	1246381	2000	4	39	0	0	1	0	0
Hayin Sango PS		322621	1258521	2009	13	62	0	1	1	0	0
Kofar Yamma PS		316862	1251959	2001	6	38	0	0	1	0	0
Kurku PS		313855	1247744	2011	2	12	0	0	1	0	0
Lasanawa PS		317354	1258629	1976	12	300	0	0	1	0	0

Maska Model PS		318181	1252644	1960	2	0	0	0	1	0	0
Nasarawa Doka PS		315519	1255598	1976	2	30	0	0	1	0	0
Tudun - Maje PS		316069	1250034	2009	3	30	0	0	1	0	0
Tudun Iya PS		318924	1256781	1976	3	5	0	0	1	0	0
Ung Dan Dada PS		321551	1257284	1977	6	34	0	0	1	0	0
Ung Mai Laya PS		318775	1249622	2002	2	40	0	0	1	0	0
Ung Tofa PS		315123	1259305	1976	3	0	0	0	1	0	0
Bare Bari PS	North	304859	1280483	2005	2	0	0	0	1	0	0
Cibauna PS		302419	1275804	1976	6	58	0	0	1	0	0
Dikke PS		309011	1280262	1974	7	6	0	0	1	0	0
Gwaigwaye PS		309251	1279375	1997	6	66	0	0	1	0	0
Kufan Matsamiya PS		308058	1268899	1976	2	25	0	0	1	0	0
Makwalla PS		306305	1272702	1976	4	54	0	0	1	0	0
Ung Ardo Damina Nomadic PS		307136	1279322	2006	2	30	0	0	1	0	0
Ung Biri PS		305629	1275483	1976	4	32	0	0	1	0	0
Ung Dan Kauye Annex PS		301455	1278913	2009	3	0	0	0	1	0	0
Ung Hamida PS		304049	1278648	1976	4	20	0	0	1	0	0
Ung Inji PS		306235	1270420	2004	2	5	0	0	1	0	0
Ung Tanko Annex PS		304813	1273418	2005	6	0	0	0	1	0	0
Zamfarawa PS		302368	1281316	1976	5	105	0	0	1	0	0
Dogon Awo PS	East	317169	1266799	2005	4	30	0	0	1	0	0
Dukawa Tatari Annex PS		320234	1261086	2009	6	26	0	0	1	0	0
Goya PS		320310	1267852	1970	10	80	0	1	1	0	0
Goya Annex PS		322500	1265739	2010	2	10	0	0	1	0	0
Gwauruwa PS		318180	1271651	1976	6	63	0	0	1	0	0
Harande PS		322823	1263872	1976	3	40	0	0	1	0	0
Kwangwai PS		322513	1271481	2002	2	42	0	0	1	0	0

Kwantangiri PS		317907	1263914	1976	2	0	0	0	1	0	0
Rafin Kanya PS		322237	1272681	1976	6	50	0	0	1	0	0
Rafin Kanya Annex		323554	1273450	2010	3	20	0	0	1	0	0
S/Layin Gwauruwa PS		319343	1272873	1999	2	2	0	0	1	0	0
Tatari PS		320877	1262647	1970	2	5	0	0	1	0	0
Ung Attah Annex PS		321725	1269223	2001	4	0	0	0	1	0	0
Ung Moda PS		322843	1262924	2006	6	74	0	0	1	0	0
Ung Yawa PS		318894	1270244	2006	3	70	0	0	1	0	0
Yartafki PS		317319	1265612	1976	6	130	0	0	1	0	0
Aya PS	Central	315456	1275449	1959	3	40	0	0	1	0	0
Bakin-dutse PS		316812	1270155	2004	16	320	0	1	1	0	0
Bisije PS		316599	1275428	1956	6	0	0	0	1	0	0
Dan Rumfa PS		314586	1274661	1976	26	600	1	0	1	0	0
Gudindi PS		315932	1274156	1973	12	5	3	0	1	0	0
Idris Girls Model PS		315885	1273890	1985	13	2	0	0	1	0	0
Jabiri PS		316109	1271576	1976	6	312	0	0	1	0	0
Karofi PS		314992	1274262	1976	3	75	0	0	1	0	0
Low Cost Houses PS		317087	1273198	2006	14	34	0	0	1	0	0
Low Cost Girls PS		316924	1272827	2011	16	20	0	0	1	0	0
Maigamji PS		314126	1268828	1969	42	339	1	1	1	0	0
Rinji Maigamji Annex PS		314032	1269954	2012	3	0	0	0	1	0	0
Sambo PS		316671	1274764	1959	10	100	0	0	1	0	0
Shaiskawa PS		315082	1275095	1976	12	98	1	0	1	0	0
Shehu PS		316148	1273840	1956	28	220	0	0	1	0	0
Tudun Wada PS		317425	1273952	1976	5	37	0	0	1	0	0