

**AN ASSESSMENT OF ROAD TRANSPORT INFRASTRUCTURE
DEVELOPMENT IN KADUNA STATE, NIGERIA**

BY

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DECLARATION

I, Hamza, Yakubu declare that this Dissertation has been written by me and it is a record of my research work. It has not been presented in any previous award elsewhere. The sources of information have been duly acknowledged and referenced.

.....

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Date

CERTIFICATION

This Dissertation titled “*An assessment of road transport infrastructure development in Kaduna state, Nigeria*” meets the regulations governing the award of the degree of Masters in Science in Transport Management of Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This research work is dedicated to the loving memory of my brother, late Lt. Col. Dikko Yakubu, who was the source of inspiration to me in the development of my career.

ACKNOWLEDGEMENTS

I give thanks to Almighty Allah for his grace, mercy and provision and love that he granted me during the course of this program which are too numerous to mention. I am also highly grateful to my supervisors PROF. Ibrahim Jaro Musa and DR. U.F Isa of blessed memory, for their support, direction, amendments, leadership, counsel, perseverance, painstaking efforts, insistence, and clarifications, as well as valuable criticism that brought out the quality in this work. I am highly elated and my prayer is that you continue to progress in your present career and future endeavours. I also commend the efforts of all lecturers Dr A K Usman, Dr Abdulhamid, Mall Shehu Abbas, Mall Mukthar, Dr Yakubu Obadeki, Dr R O Yusuf, among others, who imparted knowledge directly and indirectly in me while this program lasted, I thank you all for your patience and love.

I am eternally grateful to my family especially my mum Hajia Fatima Mohd, my uncle Alhaji Ahmed Mohammed and Alhaji Abubakar Mohd (Kawu), and my father in-law Alhaji Ubale Dankawu Rano, my wife Dr Maryam Ubale Dankawu for their support and contribution throughout my life and this programme. My daughters Aisha, Khadijah, Zainab and Fatima as well as my brother Dr Mukthar Adamu, I thank you for your support and role played.

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ABSTRACT

Road transportation is an essential component in the development and growth of any society whilst involved in the movement of people and freight from one point to another. This study attempts an assessment of the state, types and functionality as well as distributions of road transport infrastructure development in Kaduna state, Nigeria. Data were obtained from both primary and secondary sources. Information was gathered from road users, road workers and traffic law enforcement agents using stratified sampling technique. In all, 380 respondents were successfully interviewed. The result on the analysis of the state of road transport infrastructure in Kaduna state reveals that 10% representing 38 of the respondents say roads infrastructure are of Excellent state, while, 23.3% representing 86 respondents attest that are of Good condition. While the remaining 15.7 representing 60 respondents are of the opinion that the state of road transport infrastructure were very poor. Also, result reveals on the analysis of the respondents on their perception on the types of road transport infrastructure in Kaduna state discloses that 87.4% as represented by 332 respondents attest to the presence of culverts while 12.6% of them says it is absent. Similarly, 83.2% of the respondents' reported that there is presence of bridges while 16.8% of them attest to the absence of it. Also, on the issue of zebra crossing, 20.8 percent of them says it is present while a significant 79.2% says it is not available. The responses on the functionality of road transport infrastructures in Kaduna state reveals that 165 of the respondents indicates that the roundabout [intersections] are highly functional while 117 of them says it is fairly functional and 98 respondents indicates the absence of it. On the issue of the functionality of culverts as a critical road transport infrastructure 151 respondents affirms its high functionality while a sizeable number of them within 89 and 48 respondents indicates that it is not functioning and not present respectively. Similarly, 113 respondents attest to the high functionality of road Kerbs, 64 indicates its fairness, while 29 and 174 attested to its non-functionality and non-availability respectively. Also on the distribution of road transport infrastructure by zones, standard z score analytical technique was adopted and the result reveal that disparity exist in terms of road infrastructure within the zones. The study therefore recommends that government of Kaduna state should make efforts to quantify and rehabilitate and balance the existing road transport infrastructure while reintroducing tolling system on strategic road infrastructures to raise additional funds for maintenance. Also, the government should diversify its objectives on provision of road transport infrastructures through partnership arrangements with private sectors on the public private partnership (PPP) however putting action into plan for the future in providing alternative means of transport to reduce burden on the existing road transport infrastructures.

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ACRONYMS

ARDL -- Autho regressive distributed leg model

AU -- African Union

BPE-- Bureau of Public Enterprise

CBN – Central Bank of Nigeria

ECOWAS—Economic community of West African states

FERMA-- Federal road management Agency

FCDA—Federal capital development authority.

FCT—Federal capital territory

FRSC—Federal road safety commission.

FMW-- Federal Ministry of Works

GMM -- Generalized method of moment

NEEDS—National economic empowerment development strategy

NPC—National planning commission

PTF -- Petroleum Trust Fund

PPP—Public private partnership

SEEDS—State economic empowerment development strategy

SPSS – Statistical Package for Social Sciences

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The spatial differences of phenomena on the earth's surface indicate that the different part of the earth provides various products that the people needs. Goods and services can only be obtain by moving to the point of demand and supply and this can only be possible through transport (Ogbuozobe, 1997). Transportation is the movement of goods and services from a point of origin to a desired destination. Transport industries exist to provide for the movement of people and goods and for the provision and distribution of services; and transport thereby fulfils one of the most important functions and is one of the most pervasive activities in any society or economy. (Brain and Richard. 2000). In support of this, Taube (2013), insist that "It is hardly any human society or human settlement that can efficiently and effectively function without adequate, reliable and affordable transport system". However, the efficiency and effectiveness of any transport system depend on its infrastructure and services (Ocholi, 2013).

Infrastructure can be described as a fundamental basis or requirement of all activities of an organized society in both social and economic dimension. It is the basic physical and organizational structure needed for the operation of a society and the economy.

Infrastructure can be classify into social and economic types (World Investment Research, 2008). Infrastructure is an umbrella term for many activities usually referred to as "social overhead capital" by development economist. Precisely, infrastructure refers to a network of transport, communication and public (social) services-all functioning as a system or as a

set of interrelated and mutually beneficial services provided for the improvement of general well-being of the population (Ogbuozobe 1997).

Transport infrastructures are critical substructure whose development has direct bearing on the overall growth on the nation. Infrastructures are the major tools of economic and strategic development. Oni and Okanlawon (2008) denotes transport infrastructure as the major structure of component part of the transport system offering the provision of transport service and operation.

Road transport system is a very important sub sector of transportation in Nigeria. It is the most prevalent mode of transportation for people, goods, and services from the point of origin to the desired destination with the sole benefit of time and value chain addition. The road transportation system in Nigeria is as old as creation. During the 1900s under the British colonial rule, the road designed was to aid the transportation of goods from village to hinterlands to the coastal region for exportation of raw materials for their industries in U.K (Sheriff, 2009). However, during evolving economic development after independence in 1960 saw the need for road system expansion with the main purpose of facilitating access to the cities and large towns (Encyclopedia of nation, 2008). Nigeria has the largest road network in West Africa and the second largest south of the Sahara with approximately 200,000km of surfaced roads as estimated (Filani, 1999). Currently road system is about 208,200km with 28,980 km paved and 179,220km unpaved (Federal Ministry of Works Bulletin, 2012).

The major road transport infrastructure in Nigeria consist of 32,000km of Federal highways including seven major bridges across the Niger and Benue rivers, the Lagos ring

road, the third mainland axial bridge, 30,500km of state roads; and 130,000km of local roads (Buhari, 2000). The author detailed further that as at June 1996 only 50% of the federal roads and 20% of the state roads were in good condition. While, an estimate 5% of the local rural roads were freely motorable. The rehabilitation program carried out by the Petroleum Trust Fund (PTF) in year 1996 to 1999 covered selected portions of the federal highway totaling about 12,000km along with township roads in about 18 selected cities. Meanwhile over-use and lack of maintenance are further eroding the quality of the rest of the federal highway network. A nationwide road survey conducted by the Central Bank of Nigeria (CBN) on the state of highways in the country in December 2002 reveals that the road network as of December 2002, was estimated at 194,000km. It shown that most of the roads were in a bad condition, especially those in the southeastern and northwestern part of the country. The pattern is generally the same for the roads in other part of the country. Some of the roads, constructed over 30 years ago, had not been rehabilitated even once, resulting in major cracks (longitudinal and transverse), depression, broken down bridges and numerous potholes that makes roads transport slow and unsafe (CBN, 2002).

The survey also shows that the state of Nigeria roads has remained poor for a number of reasons. Such reasons include faulty designs, lack of drainage and very thin coatings, which was easily washed away, excessive use of the road network, given the underdeveloped nature of waterways and railways, which could serve as alternative means of transport, absence of an articulated road program and inadequate funding for road maintenance (Odugbemi, 2010). The importance attached to the road sector reflects in government resources allocation to it in the last decades. The road sub sector which accounted for 54% of the federal government total public sector planned capital investment

in transport in the 1962-1968 first national development plan, received more than 70% of the allocation during the third (1975-1988) and fourth (1981-1985) development plan period. Similarly, from 1986-till date, different development plan period has witness annual incremental allocation of resources. The question is then how has these translated into good road network in Nigeria judging from the observable and eye-catching evidence and facts (Adeyemo, 1989).

The presence of an adequate, reliable and efficient transport system is a critical factor in local economic development. A well-developed transportation infrastructure provide adequate access to local communities, which in turn is a necessary condition for the efficient operation of manufacturing, retail, labour and housing market (Olubemehin, 2012). This can only be made if the Road Infrastructure is in good standing to support movement of people, goods and services. Therefore this study intends to assess road transport infrastructure development in Kaduna state with specific interest in the state, types, functionality and distribution of such road transport infrastructure vis – a-- vis the Kerbs, Culverts, Camber (cross slope), Traffic Lights, Road Signs, Road Marking, Media, Shoulder, Zebra, Round about (intersections), Bridges, Overhead Bridge and Pedestrian Bridges.

1.2 Statement of the Research Problem

The studies on infrastructure, particularly, the move to measure quantitative relationship between growth in transport infrastructure and total economic growth using micro economic model started with Antle (1983) when he estimated a Cobb Douglas production function for 47 developing countries and nineteen (19) developed countries. In

support of this findings, Mera (1973); Retner (1983); Biehi (1986); Aschuer (1989); H.S Binswanger, S Khandker and M. Rosenzweig (1989); Easterly and Rebelo (1993); and Buffes and Shah (1993) found transport infrastructure as an effective factor of production. Also, Aschuer (1989) investigated the role of infrastructure in development process based on the United States; he argued that nonmilitary public investment is far more important in increasing aggregate productivity than military spending. He conclude that core infrastructure such as street light, highways, Airport among others. contribute more to productivity than other form of infrastructure, and that the slowdown of United State productivity was related to decrease in public infrastructure investment.

Caldron (2009) provided a comprehensive assessment of impact of infrastructural development on growth in African countries based on econometrics estimates for a sample of 136 countries from 1960 to 2005. He studied the impact on per capita growth of faster accumulation in infrastructure stock and enhancement in the quality of infrastructure services for 39 African countries in 3 key infrastructure sectors; telecommunication, electricity, and transportation (i.e. road). Using an econometrics technique suitable for dynamic panel model and likely endogenous regressors, the author found that infrastructure stock and services quality boost economic growth. The findings shows that growth is positively affected by the volume of infrastructure.

Boopen (2006) analyzed the contribution of transport capital and growth for a sample of a sub-Saharan Africa (SSA) and a sample of small island developing states (SIDS). Using both cross sectional and panel data analysis. In both cases, the analysis concluded that transport capital has been a contributor to the economic progress of these countries. Analysis further revealed that in the SSA case, the productivity of transport

capital stock is superior as compared to the overall capital while it is not the case for the SIDS, where transport capital is seen to have the average productivity level of overall capital stock. Pravakar, *et al.*, (2010) investigated the role of infrastructure in promoting economic growth in China for the period of 1975-2007 using GMM (Generalized method of moment) and ARDL (Auto regressive distributed lag model) technique , the result reveals that road infrastructure investment have played an important role in economic growth of China.

Loto (2006) also found that infrastructure when measured in physical sense, impact positively on economic growth. In addition, (Nwakaze and Mulikat, 2010) estimated the contribution of transportation investments, congestion and traffic related accidents to economic growth in Nigeria from 1975-2006. They used the extended Cobb Douglas production function model, they found that transport investment positively contribute to economic growth while traffic contribute negatively. The estimated model used was the error correction mechanism with the real gross domestic product as dependent variable, the explanatory variables include physical capital, labour force, total road network, automobile density, and traffic related accidents.

Ogun (2010) investigated the impact of infrastructural development on poverty reduction in Nigeria. Specifically, the relative effect of physical and social infrastructure on living standard or poverty indicators were examine, with a view to providing empirical evidence on the implication of increase urban poor. The paper employed secondary data for the period of 1970-2005. The Structure vector autoregressive (SVAR) techniques was adopted in the analysis. The study unequivocally discovered that infrastructural development led to poverty reduction, which leads to economic growth. Result also shows

that though infrastructure in general reduces poverty and increase economic growth, social infrastructure explains a higher proportion of the forecast error in poverty indicators relative to physical infrastructure. This suggest that massive investment in Transport Infrastructure in cities would drastically reduce poverty and increase growth in the urban areas. Indeed, socio-economic development can be facilitated and accelerated by the presence of Transport infrastructure. If these facilities and services are not in place, development will be very difficult and in fact, can be compared to a very scarce commodity that can only be secured at a very high price and cost (Adeyemo, 1989).

The importance of road transport infrastructure have long been recognize as crucial to promoting growth and development. This is obvious considering its wide range of influence and increase productivity, generation of income and improved quality of life. However, this role depends largely on the extent to which road infrastructure are adequately provided, distributed over space and maintained (Adefila and Bulus, 2014).

To the best knowledge of the researcher, only few studies attempted an assessment of few Road Transport infrastructure in Kaduna state, and almost all, used secondary source of data all through. This research, in contrast, assessed the state, types, functionality as well as distribution by zones of thirteen (13) Road Transport Infrastructure in Kaduna state and used both primary and secondary source of data.

Federal highways in Kaduna state have been plagued by a number of Road Infrastructure problems with major ones beings faulty designs, inadequate drainage system, uneven distribution by zones and poor maintenance culture, which have significantly reduce the ability of the roads to perform its function, there are potholes, washing away of

pavements, fallen bridges, old age among others. These problems have made it difficult, expensive and more odious to move products and services from point of production to that of consumption, farm produce from rural to urban centers, which often lead to loss of man-hour and high cost of goods and services. It is against this background that this study intend to access road transport infrastructure development in Kaduna state.

The following questions will guide this research on road transport infrastructure development in Kaduna state and are set as follows:

- i. What is the state of Road Transport Infrastructure in Kaduna state?
- ii. What are the types of Road Transport Infrastructure in Kaduna state?
- iii. Are Road Transport Infrastructure functional in Kaduna state?
- iv. How are the Road transport Infrastructure distributed among senatorial zones in Kaduna State?

1.3 Aim and Objectives

The aim of this study is to assess road transportation infrastructure development in Kaduna state. This aim will be achieved through the following objectives which are to;

- i. Highlight the state of Road Transport Infrastructure in Kaduna state.
- ii. Characterize the types of Road Transport Infrastructure in Kaduna state.
- iii. Assess the functional standard of Road Transport Infrastructure in Kaduna state
- iv. Determine the distribution of Road Transport Infrastructure by senatorial zones in Kaduna State

1.4 Justification of the Study

Road Transportation Infrastructure remain the main mode of Transportation among other mode in Kaduna state. The importance of road maintenance in achieving efficient road transport delivery cannot be overemphasized as the consequences of neglect are enormous and costly.

While many attempt have been made, or put in place by different Transportation expert in the country, in order to reduce the chaotic and unpleasant state or condition of road Transport infrastructure, yet, all these attempt have little impact toward reducing the problem associated with our road furniture's.

To the best knowledge of the researcher, only few studies attempted an assessment of Road Transport infrastructure in Kaduna state, and the existing few, attempted to assess few Road Transport Infrastructure, say four or five.

This research will assess the state, types, functionality as well as distribution of thirteen (13) Road Transport Infrastructure in Kaduna state. Therefore, this research become imperative as it will assess and identify the problems associated with the roads under study and make positive recommendations to government for necessary actions.

1.5 Scope and Limitation of the Study

The five (5) major highways in Kaduna State that are of interest in the study, cut-across the three geo-political zones, namely, Zone one (1) that comprise of Soba, Sabon

Gari, Lere, Kubau, Ikara, Makarfi, Kudan and Zaria Local governments. Zone two (2) which comprises Birnin Gwari, Giwa, Chikun, Igabi, Kajuru, Kaduna north and Kaduna south local governments. Zone three (3) consists of Sanga, Jaba, Jama'a, Kachia, Kagarko, Kauru, Kaura and Zangon Kataf local governments. The five major highways are;

1. Kaduna-Zaria highway, which is 75 Km, with National highway identification code (A2) and cut across Kaduna, Katabu, Jaji, to Zaria,
2. Kaduna-Lere highway, which is 340 Km, with National identification number (A235), and cut across Kujama, Kasuwan Magani, Kufana, Idon, Unguwan patachi, Kachia, Zonkwa, Samarun Kataf, Manchok, Kaura, Mangu, to Lere.
3. Kaduna-Birnin Gwari highway, which is 123 Km, with National highway identification code (A125), and cut across Buruku, Kufara Kan Hauwa, Kwanan mutuwa to Birnin Gwari.
4. Kaduna-Kagarko highway, which is 164 Km, with National highway identification code (A124) and cut across Rijana, Jere to Kagarko.
5. Zaria-Kauru highway, which is 109 Km, with National highway identification code (A236) and cut across Rahama, Soba, Dutsen wai, Pambegua, to Kauru. (See fig 1).

Consequently, 811 km representing 28.8% of total length of Federal Road in Kaduna state which is 2,820km (Federal Bureau of Statistics) has been picked and assessed. The chosen highways are shown in (figure 1) below

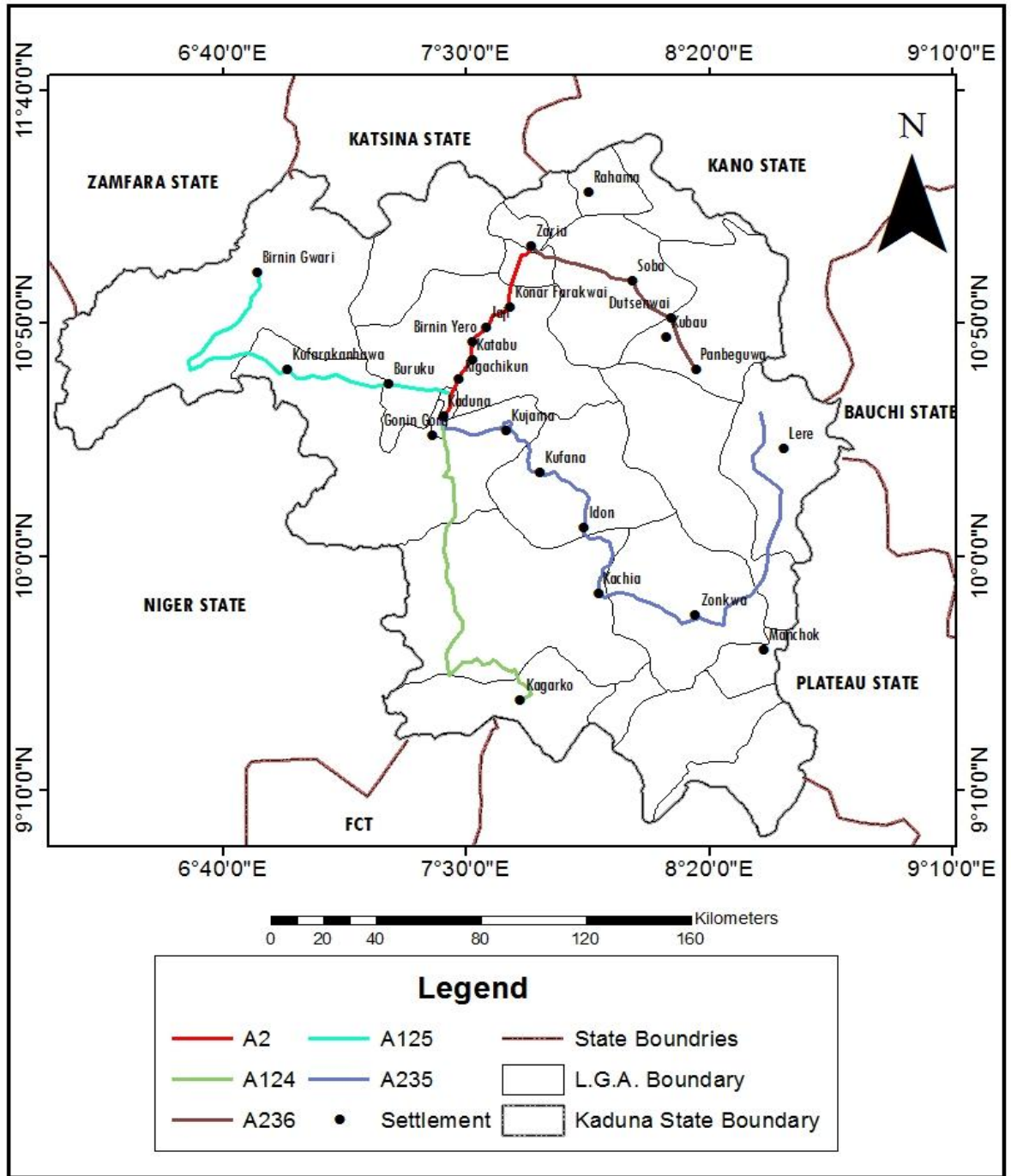


Fig. 1: Map of Kaduna State showing the study area

Source: (Modified From Administrative Map of Kaduna State)

The study focused on assessing thirteen (13) Road Infrastructure on five (5) major highways in Kaduna state with the intension of assessing some major road infrastructure like; Kerbs, Culverts, Camber, Traffic light, Road signs, Road marking, Median, Shoulder, Zebra, Round-about, Bridges, Overhead bridges, and Pedestrian bridges. It not intended to assess the structural and designing technicality of the highway or assess the method and accuracy of construction. It simply assess/analyzed the state, types and functionality and the distribution by zones of the selected Road Transport Infrastructure in Kaduna State. Opinions of respondents and relevant stakeholders in the study areas was rely upon. . In terms of time scope, the study covered period of 2015 and 2016, between a duration of eight to twelve months (8-12 months).

CHAPTER TWO

CONCEPTUAL, THEORETICAL FRAMEWORK, AND LITERATURE REVIEW.

2.1 CONCEPTUAL FRAMEWORK

Infrastructure can be described as the fundamental basis or requirement of all the activities of an organized society in both social and economic dimension (Gungul, 2012). It is the basic physical and organization structure needed for the operation of a society and the economy. Infrastructure can be classified into social and economic types (WIR, 2008). Social infrastructure is made of basic facilities and ways of providing health services, quality education, job creation, social welfare and community development. Social infrastructure is regarded as the obligation of the government to the people in terms of social genuine delivery (WIR, 2008). The aim of providing infrastructure is to improve the living standard of the people.

Economic infrastructure involves the internal facilities that support production and business activities. The business dictionary defined economic infrastructure as internal facilities of the country that make business activities possible. These facilities are communication, transportation (rail, road, water and air), energy supply system (electricity and gas), distribution networks, financial institution and markets (www.businessdictionary.com). Amongst the economic infrastructure, are those referred to as critical infrastructure such as road, rail, energy etc. According to Rae (1968) the core industries facing infrastructure development problems in Nigeria are power, rail and road. They are tagged as critical in the development strategies of the nation. Without neglecting other infrastructure, they are challenging points for major economic activities in Nigeria. Transport infrastructure are critical infrastructure that their developments has direct bearing

on the overall growth of the nation. These infrastructures are the major tools of economic and strategic development. Oni and Okanlawon (2008) observed transport infrastructure as the major structure of components part of the transport system offering the provision of transport service and operation. Transport Infrastructure sector in Nigeria has suffered problems such as bad road, congested ports, inadequate fleet of vehicles, few and crowded trains and poor maintenance because of neglect from government. In this study, the particular area of interest is road transportation infrastructure. State, types, functionality and distribution of such road transport infrastructure vis – a-- vis the Kerbs, Culverts, Camber (cross slope), Traffic Lights, Road Signs, Road Marking, Media, Shoulder, Zebra, Round about (intersections), Bridges, Overhead Bridge and Pedestrian Bridges.

- 1 Kerbs [Curbs]; A kerb is a vertical or sloping along edge of a pavement or shoulder forming part of the gutter. Strengthening or protecting the edge and clearly defining the edge of the vehicle operators. Its functions are:
 - i) To facilitate and control drainage.
 - ii) To strengthen and protect the pavement edge.
 - iii) To delineate the pavement edge.

iv) To present a more finished appearance. To assist in the orderly development of the road



Plate 2.1 Kerb, Along Kaduna-Zaria Road

Source: Authors field Survey (2016)

2 Culvert:

A culvert is a structure that allows water to flow under a road, railroad, trail, or similar obstruction from one side to the other side. Typically embedded so as to be surrounded by soil, a culvert may be made from a pipe, reinforced concrete or other material.



Plate 2.2 Culvert: Kaduna

Source: Authors field survey (2016)

3 Camber:

Camber also known cross slope, it facilitates drainage of the pavement laterally. The pavement can have a crown or high point in the middle with slopes downward toward both edges. This type favored on two-lane roads and wider individual road. On divided roads, the individual carriageway may be centrally crowned separated or unidirectional slope may be provided across the entire carriageway width. The amount of camber to be provided depends upon the smoothness of the surface and the intensity of the rainfall.



Plate 2.3 Camber, Kaduna-Kauru Road (A236)

Source: Authors Field Survey (2016)

4 Traffic lights

Traffic light is a set of automatically operated colored lights, typically red, amber, and green, for controlling traffic at road junctions, pedestrian crossings, and roundabouts.

The use of a traffic light is to control conflicting streams of vehicular and pedestrian traffic in the town and cities.

Traffic signals when properly designed, located and operated have one or more of the following advantages:

- i) They can increase traffic handling of the intersection.
- ii) They can provide an orderly movement of the traffic.
- iii) They can be used to interrupt heavy traffic at intervals to permit other traffic vehicular or pedestrian to cross.
- iv) Traffic lights dispense with police control and can thus be economical.
- v) If properly designed and set, they can assign right of way impartially to traffic, unlike manual controls which can stop and interrupt traffic streams at the personal whim of the traffic controller.



Plate 2.4 Traffic Light: Kaduna Town. Source: Authors Field Survey (2016)

5 **Road signs:** are signs that serve as guidance to both vehicular and pedestrians and they perform a number of functions.

- i. They give timely warning of hazardous situations when they are not self-evident.

- ii. They are of great help in regulating traffic by imparting messages to the drivers about the need to stop, give way and limit their speed.

Road signs are divided into three (3) categories:

- i) **Warning signs:** they are used when it is deemed necessary to warn traffic of existing or potentially hazardous condition on or adjacent to highway or street. Some example of warning sign are: dangerous descent, narrow road ahead, dangerous dip, staggered intersections, roundabout, men at work, zigzag road, narrow bridge, school, cattle crossing, pedestrian crossing etc. These are usually design in an equilateral triangle with one point upward. These signs have a red boarder and symbols indicated there in are in black color against a white background.
- ii) **Mandatory Sign:** they are part of warning signs and are intended to convey definite positive instruction when it is desired that motorist take some positive action. The two most important mandatory signs are: Stop and give away signs. Some of the examples of mandatory signs are: one-way sign, straight prohibited-no entry, cycle prohibited, horn-prohibited, length limit, load limit, width limit, No parking, and speed limit etc. Mandatory signs are usually design in circle shape in white colour with red background.
- iii) **Information Signs:** are intended to guide the motorist along street and highways, to inform him at intersecting router to direct him to cities, town, villages or other important destination, to identify nearby rivers and streams, parks, forest and historical sites and generally to give him such information as will help him along his way in the most simple, direct, manner possible. Some of the examples of information signs are: Petrol pump, Hospital, First aid, light refreshment, rest house, parking this side, parking both sides, cycle

stand, taxi stand etc. it is usually design in rectangular plates with yellow background and the lettering and border are in black.

6 Road marking

Road marking are used as means of controlling and guiding traffic. They are highly important on road and intersections as they promote road safety and bring about smooth and homogeneous flow of traffic along guided path of travel. They also serve to supplement the message conveyed by road signs and signals. In some cases they are used alone to convey certain information and mandatory and warning that cannot otherwise be effectively made known to the road users.

Road markings are basically of two types: carriageway markings and object marking

As the name implies, the former type of marking are those that are applied to the carriageway itself. The latter type covers markings on objects such as abutment, piers, kerbs, traffic island, culvert, headwall etc.

Carriageway Markings are of the following categories:

- i. Centre line.
- ii. Traffic lane line,
- iii. No overtaking zone marking.
- iv. Pavement edge lines,
- v. carriage way width reduction transition markings,
- vi. Obstructions approach marking,
- vii. stop line marking,
- viii. Pedestrian crossing,
- ix. Cyclist crossing

- x. route direction arrow
- xi. Marking of approach to intersections,
- xii. parking space limit,
- xiii. Bus stop. etc.

Object marking are of the following categories:

Object within the carriageway, kerbs marking for visibility, kerbs marking for parking restrictions, object adjacent to the carriageway etc. The material commonly used for pavement and object marking is paint and commonly used colour is white and yellow.



Plate 2.5 Road Marking: Kaduna Town.

Source: Authors Field Survey (2016)

7 Median or central reservation is the longitudinal space separating dual carriageway. The function of the central reservation are:-

- i. To separate the opposing stream of traffic.

- ii. To minimize head light glare...
- iii. To include space for safe operation of turning vehicles at intersection, at grade e.g. right turning pocket
- iv. To provide a stopping area in case of emergency.



Plate 2.6 Median: Kaduna Town.

Source: Authors Field Survey (2016)

Shoulders: a shoulder is the portion of the roadway contiguous with the travelled way and is intended for the accommodation of stopped vehicles, emergency use and lateral support of base and the surface courses.



Plate 2.7 Shoulder: Along Zaria-Kauru Road (A236). Source: Authors Field Survey (2016)

- 8 Zebra crossing: this consists of sufficient width of cross-walk painted with black and white longitudinal strips so as to be conspicuous to the drivers as well as the pedestrians. As soon as pedestrian steps on the stripped cross-walk he has the right of way and all vehicles are required to stop legally. Apart from the striped zebra markings in black and white, the crossing consist of making zigzag area (about 19m on both sides) to increase drivers visibility of the crossing , black and white beacons post, yellow flashing globe and studs marking the limit of crossing.



Plate 2.8 Zebra Crossing: Kaduna.

Source: Authors Field Survey (2016)

- 9 Roundabout: A roundabout is a type of circular intersection or junction in which road traffic flows almost continuously in one direction around a central island after first giving way to the circulating traffic. Roundabout may also refer to: Carousel, a fairground ride also known as a roundabout.



Plate 2.9 Round About: Kaduna Town.

Source: Authors Field Survey (2016)

10 A bridge is a structure built to span physical obstacles without closing the way underneath such as a body of water, valley, or road, for the purpose of providing passage over the obstacle. There are many different designs that all serve unique purposes and apply to different situations. Designs of bridges vary depending on the function of the bridge, the nature of the terrain where the bridge is constructed and anchored, the material used to make it, and the funds available to build it.



Plate 2.10 Bridge: Kaduna-Kagarko Road (A124) Source: Authors Field Survey (2016).

11 Pedestrian bridge is also called a footbridge, pedestrian overpass, or pedestrian overcrossing: is a bridge designed for pedestrians and in some cases cyclists, animal traffic, and horse riders, instead of vehicular traffic.



Plate 2.11 Pedestrian Bridge: sultan Bello mosque Kaduna source: authors survey (2016)

12. An overhead bridge or overpass bridge (called a flyover in the United Kingdom and most Commonwealth countries) is a bridge, road, railway or similar structure that crosses over another road or railway. An overpass and underpass together form a grade separation.



Plate 2.12 Overhead Bridge: Kawo, Kaduna.

Source: Authors Field work (2016)

2.2 Theoretical framework of transport infrastructure development

Discussion on transport infrastructure development requires some level of theoretical explanation that have been establish in the context of overall development (economic and social). This is necessary because opinion differs among scholars and decision makers on how transport infrastructure development serves as foundation for the overall development of a nation. These divergent views are; Road Transport Infrastructure is panacea to poverty reduction and economic development. Ogun (2010) “Argued that the

urge to increase public investment in urban areas stem from the view that they are key determinants of long-term sustainable growth and the capacity of the poor to benefit from the growth process”.

Infrastructure support economic development, the adequacy of infrastructure help to determine a country success or failure in diversifying production, coping with population growth, reducing poverty, improving environmental condition etc. Socio-economic development can be facilitated and accelerated by the presence of infrastructure developments. In another perspective, the relationship between infrastructure and economic development is further established by the correlation between a nation’s Gross Domestic Product (GDP) and her level of urbanization as demonstrated by World Bank studies (Yunusa, 2011). Nigeria as a country operates federal system of government consisting of three tiers (federal, state and local); each having constitutional responsibilities for infrastructural provision. Unfortunately, constitutional provision does not make the 36 states and Federal Capital Territory (FCT) federating state in the country truly independent, while the local governments exists at the mercy of the state government. Presently, there is no policy document or instrument anywhere that bounds local councils to specific annual improvement in budgetary allocations to infrastructural development (Ogun, 2010). In the last couple of years, implementation at this level has been very poor. These scenarios have negative implications for infrastructural development.

The responsibilities of transport development cut across the three tiers of government in the country. Assessment of transport sub-sector shows that the country has fallen well behind international benchmarks. The condition of much of the nation infrastructure has suffered from many years of under-development and lack of

maintenance. For instance, the Lagos – Ibadan expressway (a Federal Road) was opened to the public in 1981 and over 30 years after, it is just being prepared for the first major maintenance works (Mustapha, 2009). This is the situation of many national highways across the country.

Nigeria has a total road network (length) of about 200,000km, comprising 32,123km federal roads, 32,300km state road, and 129,577km local government roads (CBN Report, 2010). According to (CBN) at 2005 prices, the road network is estimated to have a replacement value of ~~N~~4,567 trillion. It has been estimated that over the next 10 years, ~~N~~300 billion will be required to bring the national road into a satisfactory condition (Mobolaji, 2012). Current neglect of these roads implies a loss of network value of ~~N~~80 billion per year and additional operating cost of ~~N~~35 billion per year (CBN, 2009). The situation is economically unhealthy and cannot support the country's drive for economic transformation. The public transport infrastructure in Nigeria lacks investment and adequate maintenance, what this mean is stunted development for many years. Indeed, there has been a failure of planning to integrate different transport modes. This has resulted in over dependence on the road modes with about 98% of goods being transported by road (Olagunju, 2011).

2.3 Assessment of Transport Infrastructure Development

2.3.1 Global trend in transport infrastructure development

The globalization of activities, which is thriving increasingly on the platform of transportation (trade), and the improvement in the living standard continue to place more demand for all mode of transport in both developed and developing world (Mobolaji, 2012). Advancement in technology has resulted in improvement in safety and speed of

travel; also, it has helped to reduce some of its harmful effect (Ikya, 1998). This improvement is traceable to continuing growth in demand and supply of transport. In addition, the use of containerization has increased the efficiency of transport goods.

Countries across the globe has witnessed increased in the number of journey with resultant congestion particularly in urban centers, as existing transport infrastructure reaches their design limit and land use and other budgetary constraints limit further increase (Mustapha, 2009). These attributes also has contributed to the transport infrastructure development in both developed and developing countries. The over reliance on petroleum product as source of energy which has continued to be scarce commodity has also instigated another alternative energy like (solar power, electric power energy source). The developed worlds are now looking for an alternative source of energy because of the environmental effects of the present source. There is a clear correlation between the quality of a country's infrastructure (i.e. it development) and its growth potential (Jacobs, 2010). The role of government in owning and operating significant parts of the transport infrastructure has also been changing in recent years. Although the public sector has largely had exclusive responsibility for providing, improving and maintaining a country's road infrastructure, there has been an increasing move towards involving the private sector as this also has some measure of impact on transport infrastructure development. The private sector role is also been increased through public - private partnership in sector such as road. Table 2.1 below shows the comparative ranking of Nigeria transport infrastructures with two other country.

Table 2.1: Second pillar rankings from the global competitiveness report 2011-2012 of transport infrastructure ranking.

	Nigeria	South Africa	Ghana
Quality of overall infrastructure	110	46	74
Quality of roads	116	40	73
Quality of railroad infrastructure	108	37	111
Quality of port infrastructure	118	49	86
Quality of air transport infrastructure	84	25	91
Available seat kilometers	55	21	82
Quality of electricity supply	132	101	103
Telephone	116	91	114

Source: WIR (2013)

2.3.2 Comparative Benchmarking of Transport Infrastructure Development

The transportation system agencies have historically focused on major building and expansion of roads, bridges and other transportation infrastructure (Ocholi, 2013). However, in recent time the emphasis has drastically shifted from development of new infrastructure to intelligently maintaining the existing one. In recent years, budget tightening and increasing demands had led to emphasis on the assessment of the existing infrastructures and ascertaining its serviceability and optimization (Ibid).

Sheriff (2009) states that transport infrastructure and system development as understood and practiced by developed countries is to fundamentally support the overall development of a nation in terms of socio-economic and commercial activities. The

development plan is done with all the relevant indices put into consideration. Transport infrastructure development policy planning and implementation is of essence in developed country. Developing countries such as Nigeria has a fragmented type of transport infrastructure and system development, it lacks effective integrations, optimal performance, poor maintenance and appropriate investment through suitable balance between public and private provision of transport infrastructure and by implication the economic returns is perpetually low (Ocholi, 2013).

The government existing policies and investment plans such as the transport initiative of vision 2020, the national economic empowerment development strategy (NEEDS) document that contains an implementation framework for the three tier of government including action points for the state, local government, ministries, department and agencies (MDAS). The draft national transport policy document and its policy objectives and strategies for attainment of an adequate, effective and efficient transport system and the master plan integrated transport infrastructure have not been properly implemented to address the development of transport sector. (Sheriff, 2009). Below is a table of comparative benchmarking of transport development across different countries.

Table 2.2: International benchmark for transport infrastructure development

Data	South Africa	China	USA	Canada	Russia	India	Germany	Japan	Korea	Nigeria
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Population (person)	2,100	125,146	28,532	3,108	14,475	103,236	8,233	12,703	4,734	14,000
Area (km ²)	122	960	962.9	997.1	1,707.5	328.7	35.7	37.7	9.9	92.38
Operating Square of Highway (km)	22,477	77,000	160,000	39,400	86,075	621,729	36,652	20,165	3,123	3,505
Km/10,000 Person	10.7	0.61	5.6	12.7	5.9	0.6	4.5	1.6	0.7	0.25
Density Km/10,000 (km ²)	184.2	80.2	166.2	39.5	50.4	190.9	1,026.7	534.9	315.5	37.94
GDP (US\$ Billion)		1,200	7,576	585	300	500	2,353	4,600	400	

Source: World Investment Report, 2004

2.4 Nigeria Roads Classification

Nigeria has an extensive landscape with a lot of resource endowment spread over the country, which places a demand for movement between places. This has significantly shaped the existing transport infrastructure as well as the development of transport itself. Nigeria today has an extensive road infrastructure and government has continually placed priority to road transport infrastructure development in appreciation of its development facilitating roles in the movement of people and goods. This can be seen in the resource allocation to the succeeding development/rolling plans. Road transport is by far the most important element in the country transportation network carrying about 95% of all the nations' goods and passenger (Olagunju, 2011). Also about 70% of public sector investment in the transport sector have on the average been on highway as shown in the table 2.3 and 2.4, federal government transport sector allocation 1962 – 2012 and modal distribution of public sector planned capital investment in transport (percentage).

Table 2.3: Federal government transport sector allocation 1968 – 2012 rolling plan period

Plan	Plan Period	Road	Rail	Water		Air	Others	% Shares of Transport	Allocation in Million
				Sea	Inland				
First National Development Plan	1962-1968	54.0	14.0	7.0		25.0	N/A	21.3	1,525.2
Second National Development Plan	1970-1974	58.8	17.2	13.0		11.0	N/A	23.7	3.2
Third National Development Plan	1975-1980	72.4	10.6	9.0		8.0	N/A	22.2	60.10
Fourth National Development Plan	1981-1985	70.0	15.0	9.0		6.0	N/A	15.2	72.5
Fifth National Development Plan Development Initiative:/Structural Adjustment Programme (SAP)	1986-1989	72.6	3.8	5.9	3.8	5.6	8.4	11.6	N/A
First National Rolling Plan	1990-	70.14	14.03	7.24		8.60	N/A	1.87	2,210,000

	1992								
Second National Rolling Plan	1992- 1993	52.42	12.95	19.4	15.22	N/A	1.88	2,695,428	
Third National Rolling Plan	1993- 1994	59.65	6.23	15.91	18.21	X	1.88	8,379,446	
	1994- 1995	56.67	1.33	22.92	19.09	X	1.99	6,017,250	
	1996- 1997	40.23	42.16	15.98	1.62	X	1.11	28,491,420	
	1998- 1999	3.03	32.93		26.19	X	X	4.29	52,310,162
The New Democratic Dispensation, the Obasanjo Era National Economic Direction	2000- 2003	X	X	X	X	X	X	5.91	145,266,400
National Economic Empowerment Development Strategy (NEEDS 1&2)	2004- 2007	X	X	X	X	X	X	3.06	15,046,000+

Obasanjo Second Era									
Seven Point Agenda National Development Plan: New Medium Term National Plan, Yar'aduas/Jonathan Era	2008	X	X	X	X	X	X	X	\$623.9 93.585
Vision 2020 as Development Planning Initiative: Long Term Development Plan	2009	X	X	X	X	X	X	X	13.190 \$754.6
Nigerian Version of United Nation Millennium Development Goals MDGs	2010	X	X	X	X	X	X	X	126.12.10
	2011	X	X	X	X	X	X	X	840.8
	2012	X	X	X	X	X	X	X	54.83

Source: Extracted from Statistical Bulletin (NBS, 1999-2005)

**Table 2.4: Modal distribution of public sector planned capital investment in transport
(in Percentage)**

Plan Period	Road	Rail	Air	Water		Total
1962-1968	54	14	7	25		100.0
1970-1974	59	17	11	13		100.0
1975-1980	72	11	8	9		100.0
1981-1985	70	15	6	9		100.0
1986-1989	72.6	3.8	5.6	59	3.8	100.0
1990-1992	70.14	14.03	8.60	7.24		100.0
1992-1993	52.42	12.95	15.22	19.41		100.0
1993-1994	59.65	6.23	18.21	15.91		100.0
1994-1995	56.67	1.33	19.01	22.92		100.0
1996-1997	40.23	42.16	162	15.98		100.0
1998-1999	32.03	32.93	26.19	8.86		100.0
2004 till Date	X	X	X	X		X

Source: Percentage calculated from various national development plans (NBS, 2010)

2.4.1 Trunk A, B, C, F Roads in Nigeria

The Nigerian road network from the colonial days to the present day have been classify into four categories namely: A, B, C and F. The estimated total road length in 1946 was 11,427km of Trunk A, Trunk B roads and feeder road. By 1985, road length had increased to 114,800km and as at January, 1996 the road length equaled 193,200km (FMW, 2013), presently the road length in kilometer is in excess of 200,000km out of which

34,000km (17.0%) can be classified under federal or Trunk A roads. The rest were share amongst the Trunk B, C, and F category respectively.

TRUNK A ROADS:

It forms the skeleton of the national road grid that cut across regional boundaries in the country and even extended to the international borders of neighboring West African countries. These categories of roads are under federal government ownership. They are designed, constructed, maintained and financed by the federal government through the federal ministry of works. The Federal roads maintenance agency (FERMA) is in charge of carrying out maintenance of this class of roads. Its total length is about 34,000 (17.3%) of the total road network in Nigeria (FMW, 2013).

TRUNK B ROADS:

They are the second category of main road in Nigeria. They link the major cities within state with the state capitals. These roads are designed, developed, financed and maintained by various state governments through their ministry of works, transport and infrastructure. The primary objectives of Trunk B roads are to enhance the socio-economic development of the various states in the country. It has total length of about 30,000 (15.7%) of the total road network in Nigeria.

TRUNK C ROADS:

They are local feeders' roads constructed and maintained by the works department of local government authorities in Nigeria. This class of road are primarily not concrete, asphalted and are affected by seasonal weather changes. The road link villages and communities in the remote part of each local government region. It's about 136,000km and constitute about 67% of the total road network in Nigeria.

TRUNK F ROADS:

They are road that formerly belong to Trunk B and C categories but later taken over by the federal government for direct finance, redesigned, constructed and maintained.

2.4.2 Federal highways in Nigeria (Trunk Road)

The federal highway act declare the following as federal highway (Trunk roads) which are published in federal gazette. The comprehensive classification of these roads in Nigeria is as reflected / presented below

2.4.2.1 Major North-Southernly Road

A.1-1: The road is over 30 years, about 12km starting from the junction of Malu Road (Oval Interchange) with A-1 and continuing through Malu Road to Kirikiri terminating at the maximum security prison.

A.1-2: The road is over 30 years, about 10km, starting from the junction of Broad Street with Marina and continuing over Eko Bridge to the junction with A.1 at Western Avenue (Oval Interchange).

A.151: The road is over 40 years, about 10km, starting from Iddo railway terminus Iddo Flyover-Ijora causeway and continuing to the junction with A.1 (Neck Interchange).

A.152: The road is over 30 years, about seven kilometer north of Yaba roundabout junction with Trunk road A.1 (Maryland) thence to Ikeja Bye-pass – Ikeja Airport.

A.121: The road is over 45 years old, about 368km, starting from Trunk Road A.1 North of Shagamu and continuing thence to Ijebu-Ode-Ore-Benin City.

A.122: The road over 45 years, about 300km, starting from Ibadan-Ife-Ilesha-Akure to its junction with trunk road A.121 approximately ten miles north of Benin (Oluku Junction).

A.123: The road, 45 years, about 319km starting from Ilorin-Egbe-Kabba terminating at Lokoja.

A.124: The road is over 40 years, about 198km, starting from Bokani Junction-Enagi-Bida-Agaie-Lapai-Izom, Abuja. terminating at Kaduna

A.125: The road is over 45 years, about 397km, starting from Kontagora through Teginamando terminate at Kaduna.

A.126: The road is over 40 years, about 480km, starting from Sokoto and thence to Gusau-Funtua to its junction with Trunk Road A.2 at approximately five miles North of Zaria.

A.232: The road is over 45 years, about 287km, starting from Benin City-Agbor-Asaba-Onitsha-Awka to the Junction with Trunk Road, A.3 at Oji River.

A.233: The road is over 45 years, about 392km, starting from Lokoja and across the River Niger to Shintaku-Ayangba-Ankpa thence to Otukpo Junction with Trunk Road A.3.

A.234: The road is over 35 years, about 128km, starting from Abuja through Keffi and terminating at Akwanga on Trunk Road A.3.

A.235: The road is over 40 years, about 225km, starting from Kaduna and thence to Kachia-Kafanchan and terminating at Gimi on Trunk Road A.3.

A.236: The road is over 35 years, about 278km, starting from Zaria on Trunk Road A.2 to Pambegua thence to Jos junction with Trunk Road A.3.

A.237: The road is over 40 years, about 430km, starting from Kano to Wudil –Foggo and termination at a Junction with Trunk Road A.3 at Kari.

A.342: The road is over 40 years, about 146km, starting from Aba thence to Ikot Ekpene-Uyo-Oron and terminating at Calabar.

A.343: The road is over 40 years, about 345km, branching from Trunk Road A.3 at Nine Mile Corner and thence to Enugu-Abakaliki-Ijahe Junction with Trunk Road A4.

A.344: The road is over 35 years, about 147km, starting from Aliade Junction with Trunk Road A.3 thence to Gboko terminating at Katsina Ala.

A.345: The road is over 40 years, about 435km, starting from Bauchi and thence to Gombe-Numan to Ngrurore Junction with Trunk Road A4.

A.4-1: The road is over 45 years, about 68km, from Calabar-Itu (projected)

A.4-2: The road is over 40 years, about 235km, starting from Calabar-Ekang-Ajasso-Yahe.

A.4-3: The road is over 40 years, about 186km, starting from Takum-Bissaula.

A.4-4: The road is over 40 years, about 138km, starting from Jimeta-Yola.

A.4-5: The road is over 35 years, about 74km, starting from Jiberu-Sorau.

A.4-6: The road is over 40 years, about 56km, starting from junction with A4-Mubi.

A.4-7: The road is over 40 years, about 79km, starting from Bama-Dar-Al-Jimeli (towards Morua in the Federal Republic of Cameroons).

A.5-A: The road is over 45 years, about 67km, starting at the frontier with the Republic of Dahomey and terminating at Sango Otta on A.5.

2.4.2.2 East – Westernly Routes:

F.100: The dual carriage is over 40 years, about 143km, starting from the Apapa Road Flyover, south of Iganmu, and continuing westwards to Badagry up to the frontier with the Republic of Benin.

F.101: The dual carriage is over 45 years, about 124km, starting from Ikorodu on Trunk A.1 Road, continuing thence to Agbowa-Epe-Sunmaga and terminating near Oso on A.121.

F.102: The road is over 45 years, about 203km, starting from Shagamu on the A.1 Road, continuing thence to Owode-Abeokuta and terminating at Meko on the Frontier with the Republic of Benin.

F.103: The road is over 45 years, about 248km, starting from Effurun, continuing thence to Ughelli-Uwherum-Patani-Mbiama-Ahoada-Rumukoroshe-Nchia-Opobo-Eket-Ikot Ubo and terminating at Oron (including Ekot Ferry on Qua Iboe River).

F.104: The road is over 35 years, about 136km, starting from Aba-Azumini-Etinam-Ndiya and terminating Uyo on the F.103 road.

F.105: The road is over 35 years, about 127km, starting from Obelle on the frontier with the Republic of Benin continuing thence at Oja Odan-Ilaro and terminating at Owode on F.102.

F.106: The road is over 35 years, about 98km, starting from Owerri-Nguru and terminating on Trunk Road A.3.

F.107: The road is over 35 years, about 68km, starting from Umuahia-Bende and terminating at Ohafia on F.234.

F.108: The road is over 35 years, about 56km, starting from Arochukwu-Ikot Okpora-Orira on Trunk Road A4.

F.109: The road is over 35 years, about 78km, starting from Amukpe on Trunk Road A.2, continuing via Eku-Abraka-Obiaruku and terminating at Umutu.

F.110: The road is over 40 years, about 78km, starting from the Port of Koko and terminating at a point on Trunk Road A.2 just south of Ologbo.

F.111: The road is over 40 years, about 68km, starting from Ihiala on Trunk Road A.6 through Orlu and terminating at Umuduru on Trunk Road A.3.

F.112: The road is over 35 years, about 123km, starting from Onitsha through Nnewi-Okigwi and terminating at Afikpo.

F.113: The road is over 40 years, about 248km, starting from Ozalla on F.233, continuing thence to Agbani-Okposi-Abba Omega-Itigi-Ediba and terminating at Ugep on Trunk Road A.4 (including the Itigidi/Ediba Ferry on the Cross River).

F.114: The road is over 35 years, about 131km, starting from Igbogor on A.121, continuing through Okomo-Okeluse-Ute and terminating at Sobe in A.122.

F.115: The road is over 30 years, about 140km, starting from Ifon on A.122, continuing thence to Uzebba-Sabon Gida Ora-Ozalla and terminating at Ekpoma on Trunk Road A.2.

F.116: The road is over 35 years, about 241km, starting from Irrua on Trunk Road A.2, continuing thence to Uromi-Ubiaja-Illushi-Adani and terminating at Nsukka (including the Illushin Ferry on the River Niger).

F.117: The road is over 40 years, about 365km, starting from Ilesha on A.122, continuing thence to Ado-Ekiti-Ikare-Ishua-Ibillo-Auchi-Agenebode-Idah-Nsukka Eha Amufu and terminating at Nkalagu on A.343 (including the Agenebode/Idah and the Idah Adoru Ferries both on the River Niger).

F.118: The road is over 40 years, about 236km, starting from Wasimi (Republic of Benin Border) continuing thence to Iseyin-Oyo-Iwo and terminating at Gbongan on A.122.

F.119: The road is over 35 years, about 267km, starting from Omuo continuing thence to Kabba-Okene-Ajaokuta-Itobe and terminating at Ayangba on 1.233.

F.120: The road is over 30 years, about 104km, starting from Gakem on Trunk Road A.4 continuing thence to Obudu and terminating at Obudu Ranch.

F.121: The road is over 35 years, about 168km, starting from Makurdi on Trunk Road A.3, continuing thence to Abinsi-Yandev-Gburuku and terminating at Zaki Biam on Trunk Road A.4 (including the Gburuku/Katsina Ala Ferry).

F.122: The road is over 40 years, about 358km, starting from Rafin Kada, continue thence to Sabon Gida-Ivaissa-Gembu and terminating at Bang on the frontier with the Federal Republic of Cameroun (including the Donga Ferry on the River Donga).

F.123: The road is over 30 years, about 67km, starting from Bali and terminating at Jamtari on Trunk Road A.5.

F.124: The road is over 40 years, about 423km, starting from share on Trunk Road A.1, continuing thence to Ndeji-Pategi-Eggan-Baro- Abaji-Nassarawa-Lafia and terminating at Shendam on F.125 (including the Eggan/Baro Ferry).

F.125: The road is over 35 years, about 256km, starting from Wamba on Trunk Road A.3, continuing thence to Shendam-Langtang - Wase Bashar and terminating at Bambur on F.250.

F.126: The road is over 40 years, about 237km, starting from Zungeru, continuing thence to Minna terminating at Izom on A.124.

F.127: The road is over 35 years, about 79km, starting from Kafanchan on A.235 and terminating at Vom on Trunk Road A.3.

F.128: The road is over 35 years, about 687km, starting from the Republic of Benin Border, continuing thence to Rofi-a-Bin Yauri-Rijau - Dan Gulbi - Chafe - Dayi - Gwarzo - Kano - Gumel – Malam, Madori - Hadejia - Birniwa – Nguru – Gashua – Geidam - Damasak and terminating at Bisagana on the Lake Chad (including Rofia-Bin Yauri Ferry on the River Niger).

F.129: The road is over 30 years, about 158km, starting from Gombe, continuing thence to Hinna-Gondi and terminating at Biu on Trunk Road A.4.

F.130: The road is over 30 years, about 279km, starting from a point on the A.237 South of Kwanan Huguma, continuing thence to Ka-Huguma-Dutse-Azare and terminating at Zindiwa on F.131.

F.131: The road is over 35 years, about 276 km, starting from Wudil on A.237, continuing thence to Gaya-Gamayin-Katagum-Udobo and terminating at Potiskum on Trunk Road A.3.

F.132: The road is over 30 years, about 124km, starting from Kalgo on F.203, continuing thence to Jega-Daki Takwas-Anka and terminating at Majinchi on A.126.

F.133: The road is over 40 years, about 347km, starting from the frontier with the Republic of Benin and continuing thence to Bwi-Argungu terminating at Jaredi on Trunk Road A.1.

F.134: The road is over 30 years, about 129km, starting from Gubio on F.256, continuing thence to Gajiram and terminating at Dikwa on Trunk Road A.3.

F.135: The road is over 30 years, about 105km, starting from Kukawa, continuing thence to Kauwa on F.258 and terminating at Baga on the edge of Lake Chad.

F.136: The road starting from Dutsinma on F.219 continue thence to Tareshi and terminating at Kankiya on Trunk Road A.9.

F.137: The road is over 30 years, about 196km, starting from Kaura Namoda, continuing thence to Danja and terminating at Jibiya on Trunk Road A.9.

F.138: The road is over 30 years, about 120km, starting from Sokoto, continuing thence to Goronyo and terminating at Sabo Birni on F.218.

F.139: The road is over 35 years, about 186km, starting from Ankpa on A.233, continuing thence to Abakpa and terminating at Boju Ega on.

F.238: The road is over 35 years, about 452km, starting from Iyahe on A. 343, continuing thence to Oturkpo-Loko-Nassarawa-Keffi and terminating at Kachia on A.234 (including the Loko Ferry on the River Benue).

2.4.2.3 North-Southerly Routes:

F.200: The road is over 35 years, about 243km, starting from a point near Morogbo, about nineteen Kilometers East of Badagry on F.100, continuing thence to Ilaro-Abeokuta Iseyin-Ago Are and terminating at Kishi on Trunk Road A.7.

F.201: The road is over 35 years, about 253km, starting from Kaiama on Trunk Road A.7, continuing thence to Wawa-New Bussa and terminating at Yelwa on Trunk Road A.1.

F.202: The road is over 35 years, about 247km, starting from Ago Are, continuing thence to Shaki-Ilesha-Okuta and terminating at Kosubosu on Trunk Road A.7.

F.203: The road is over 35 years, about 372km, starting from Kamba on the frontier with the Republic of Benin, continuing thence to Kalgo-Birnin Kebbi and terminating at Argungu on F.132.

F.204: The road is over 35 years, about 132km, starting from Itokin on F.101, continuing thence to Ibefun-Ijebu Ode and terminating at Idi Ayunre on Trunk Road A.1.

F.205: The road is over 35 years, about 257km, starting from Ijebu Ode on A.121, continuing thence to Ijebu Igbo-Ile Ife-Shekona-Oshogbo-Offa and terminating at Ajasse on A.123.

F.206: The road is over 35 years, about 262km, starting from Ilesha on A.122, continuing thence to Oshogbo-Ogbomosho and terminating at Igbetti on Trunk Road A.7.

F.207: The road is over 35 years, about 107km, starting from Ondo on F.209, continuing thence to Oke Igbo and terminating at Ile-Ife A.122.

F.208: The road is over 35 years, about 103km, starting from Ita Nla on F.209, continuing thence to Ile-Oluji and terminating at Ipetu A.122.

F.209: The road is over 35 years, about 289km, starting from Okitipupa, continuing thence to Ore-Ondo- Ita Nla-Akure - Ado-Ekiti and terminating at Omu Aran on A.123.

F.210: The road is over 35 years, about 97km, starting from Wawa on F.201 continuing thence to Luma and terminating at Rofia on F.128.

F.211: The road is over 35 years, about 154km, starting from Mokwa on Trunk Road A.1, continuing thence to Eban and terminating at New Bussa on F.201.

F.212: The road is over 35 years, about 87km, starting from Wara on the edge of the Kainji Lake, continuing thence to Auna and terminating at Ibeto on Trunk Road A1.

F.213: The road is over 35 years, about 76km, starting from a point on F.132 South of Gummi, continuing thence to Gummi and terminating at Jabo on Trunk Road A.1.

F.214: The road is over 35 years, about 178km, starting from Kontagora on A.125, continuing thence to Rijau-Zuru and terminating at Daki Takwas on F.132.

F.215 The road is over 40 years, about 247km, starting from Owo on A.122, continuing thence to Ikare-Omuo-Egbe-Pategi-Bida-Zungeru and terminating at Teginia on A.125 (including the Ferry at Pategi on the River Niger).

F.216: The road is over 35 years, about 268km, starting from Sabon Birnin Gwari on A.125, continuing thence to Birnin Gwari-Funtua-Malumfashi-Dayi and terminating at Yashi on Trunk Road A.9.

F.217: The road is over 35 years, about 186km, starting from Birnin Gwari on F.216, continuing thence to Dan Gulbi and terminating at Anka.

F.218: The road is over 35 years, about 264km, starting from Gusau on A.126, continuing thence to Kanya-Kaura Namoda-Shinkafi and terminating at S. Birni on the frontier with the Republic of Niger.

F.219: The road is over 35 years, about 227km, starting from Malumfashi on F.216, continuing thence to Kankara-Dutsinma-Katsina-Daura and terminating at Zango on the frontier with the Republic of Niger.

F.220: The road is over 35 years, about 148km, starting on A.122 South of Ipele, continuing thence to Ipele-Ishua and terminating at Kabba on A.123.

F.221: The road is over 35 years, about 376km, starting from Aiyetoro on A.123, continuing thence to Akutukpa-Eggan and terminating at Agai on A.124.

F.222: The road is over 35 years, about 168km, starting from Ogherefe-Sapoba-Agbor and terminating at Uromi on P.116.

F.223: The road is over 40 years, about 184km, starting from Ugheli on F.103, continuing thence to Ozoro-Kwale-Ogwashi Uki and terminating at Asaba on A.232.

F.224: The road is over 35 years, about 127km, starting from K. Wale, continuing thence to Umutu and terminating at Agbor on A.232.

F.225: The road is over 35 years, about 124km, starting from Onitsha on Trunk Road A.6, continuing thence to Aguleri and terminating at Adani on F.116.

F.226: The road is over 35 years, about 124km, starting from Ifite Ukpo east of Onitsha on A.232, continuing thence to Awkuzu and terminating at Aguleri on F.225.

F.227: The road is over 35 years, about 96km, starting from Brass, continuing thence to Nembe- Yenegoa-Yenegue and terminating at Mbiama on F.103.

F.228: The road is over 35 years, about 97km, starting from Buguma, continuing thence to Degema-Ahoada-Ebocja and terminating at Uli on Trunk Road A.6.

F.229: The road is over 46 years, about 228km, starting from Port Harcourt, continuing thence to Igrita-Elele-Owerri Orlu and terminating at Awka on A.232.

F.230: The road is over 40 years, about 69km, starting from Bonny, continuing thence to Bomu and terminating at Chara on F.103.

F.231: The road is over 35 years, about 78km, starting from Igrita on F.229, continuing thence to Chokeche-Ibodo and terminating at Okpalla on Trunk Road A.6.

F.232: The road is over 40 years, about 127km, starting from Opobo, continuing thence to Abak-Ikot Ekpene and terminating at Umuahia on Trunk Road A.3.

F.232: The road is over 35 years, about 123km, starting from Awgu on Trunk Road A.3, continuing thence to Ozalla and terminating at Enugu on A.343.

F.234: The road is over 35 years, about 249km, starting from Uyo, continuing thence to Itu-Arochukwu-Ohafia-Afikpo-Abba Omega and terminating at Abakaliki on A.343 (including the Itu Ferry on Eniong Creek).

F.235: The road is over 40 years, about 46km, starting from Okurikang on A4-1, continuing thence to Akpap and terminating at Creek Town.

F.236: The road is over 40 years, about 196km, starting near Cross River Mills on Trunk Road AA, continuing thence to Obubra and terminating at a point on the A.343 just east of Abakaliki (including the ferry at Obubra on the Cross River)

F.237: The road is over 35 years, about 147km, starting from Ikom on Trunk Road A and terminating at Obudu on F.120.

F.238: The road is over 35 years, about 387km, starting from Iyahe on A.343, continuing thence to Oturkpo-Loko-Nasarawa-Keffi and terminating at Kachia on A.235 (including the Loko Ferry on the River Benue).

F.239: The road is over 35 years, about 264km, starting near Yahe on A.343, continuing thence to Ogoja-Shangev Tiev and terminating at Aliade on A.344.

F.240: The road is over 35 years, about 144km, starting from Akwanga on Trunk Road A.3, continuing thence to Nunku and terminating at a point on Trunk Road A.3 just North of Fadan Ayu.

F.241: The road is over 35 years, about 254km, starting from Wamba on Trunk Road A.3, continuing thence to Panyan-Pankshin and terminating at a point north-west of Dawaki on F.247.

F.242: The road is over 35 years, about 287km, starting from Takum on A.12, continuing thence to Rafla Kada-Wukari-Ibi-Shendam-Panyam and terminating at Bukuru on Trunk Road A.3.

F.243: The road is over 35 years, about 128km, starting from Rahama on A.236, continuing thence to Yaryasd-Tudun Wada and terminating at Kafin Maiyaki on Trunk Road A.2.

F.244: The road is over 40 years, about 287km, starting from Kunya on Trunk Road A.2, continuing thence to Babura and terminating at the frontier with the Niger Republic.

F.245: The road is over 35 years, about 203km, starting from Fustam Mata on A.236, continuing thence to Ningi and terminating at Samamiya on A.237.

F.246: The road is over 35 years, about 126km, starting from Gubi on Trunk Road A.3, continuing thence to Miya and terminating at Ningi.

F.247: The road is over 35 years, about 127km, starting from Langtang on F.125, continuing thence to Dawaki-Boi-Tafawa Balewa and terminating at Bauchi on Trunk Road A.3.

F.248: The road is over 30 years, about 124km, starting from Shira on A.237, continuing thence to Azare on F.130.

F.249: The road is over 35 years, about 286km, starting on A.237 South of Misau, continuing thence to Misau-Azare Gammayim and terminating at Hadejia on F.128.

F.250: The road is over 35 years, about 256km, starting from Lankoviri on Trunk Road A.4, continuing thence to Lau-Mutum Daya-Filiya and terminating at Billiri West of Kaltungo on A.345.

F.251: The road is over 35 years, about 198km, starting from Gomber on A.345, continuing thence to Bajoga and terminating at Potiskum on Trunk Road A.3.

F.252: The road is over 35 years, about 125km, starting from Ganye on Trunk Road A.8, continuing thence to Mopeo-Yola and terminating at Jimeta on Trunk Road A.4.

F.253: The road is over 35 years, about 196km, starting from Gombbi on Trunk Road A.13, continuing thence to Biu-Damaturu-Dapchi and terminating at Baromari on F.128.

F.254: The road is over 35 years, about 157km, starting from Uba on Trunk Road A.13, continuing thence to Damboa-Boroza and terminating at Beni Sheik on Trunk Road A.3.

F.255: The road is over 35 years, about 254km, starting from Sorau on the frontier with the Republic of Cameroun and terminating at Mubi on A.6.

F.256: The road is over 40 years, about 265km, starting from Maiduguri on Trunk Road A.3, continuing thence to Maiduguri-Gubio and terminating at Damasak on F.128.

F.257: The road is over 40 years, about 168km, starting from Maiduguri on Trunk Road A.3, continuing thence to Gajiram terminating at Monguno on F.258.

F.258: The road is over 35 years, about 98km, starting from Dikwa on Trunk Road A.3, continuing thence to Monguno-Kauwa and terminating at Yo on F.128.

F.259: The road is over 40 years old, about 127km, starting from Bama on Trunk Road AA, continuing thence to Gulumba Gana-Kala and terminating at Gambaru on Trunk Road A.3.

F.260: The road is over 35 years, about 129km, starting from Pulka on Trunk Road A.13 and terminating at Kerawa on the frontier with the Republic of Cameroun.

F.261: The road is over 40 years, about 43km, starting from Rumukoroshe on Trunk Road A.3 and terminating at Chokoche on F.231.

2.4.2.4 Spurs and Links

F.101-1: The road is over 35 years, about 54km, road starting from Sunmage on F.101 and terminating at Lafiagi on the River Niger.

F.128-1: The road is over 35 years, about 134km, starting from Gumel on F.128 and terminating at Maigatari on the frontier with the Republic of Niger.

F.252-1: The road is over 35 years, about 106km, starting from Yola on F.252 and terminating at Gurin on the frontier with the Republic of Cameroun.

F.255-1: The road is over 35 years, about 132km, starting from Mubi on AA-6 and terminating at Bakula on the Cameroun border.

A.3-1: The dual carriageway is over 35 years, about 224km, starting from Enugu to Port Harcourt.

A.8: The road is over 35 years, about 167km starting from Mayo Balewa junction with Trunk Road A.13 to Ganye to Jamtari to Mayo Selbe to Gembo on the Mambilla Plateau 41

A.10: The road is over 35 years, about 67km, starting from junction with A.1 and terminating at Tegna.

A.11: The road is over 35 years, about 58km, starting from the junction with A.2 near Rigachikun and terminating at Pambegua.

A.12: The road is over 35 years, about 257km, starting at the junction with A.4 and A.344 at Katsina Ala to Sabon Gida thence to Bali and terminating at Jalingo the junction with A.4.

A.13: The road is over 35 years, about 87km, starting from the junction with A.4 Garinkunini continuing to Mayo-Belwa to Namtari to Jimeta to Jiberu to Gombi to Gwoza and terminating at Bama.

A.14: The road is over 35 years, about 86km, starting from at the junction with A.1 near Ilorin continuing to Oloru and terminating at Bode Sadu.

A.121-1: The dual carriageway is over 40 years, about 356km, starting from the junction with E.I, by passing Shagamu to Benin City.

A.232 -1: The dual carriageway is over 40 years, about 125km, from Enugu to Onitsha.

A.345: The road is over 45 years, about 234km, starting from Bauchi and continuing to Gombe to Numan and terminating at the junction with A.13 near Namatari.

E.1: The expressway is over 40 years, about 137km, starting from Ojota interchange in Lagos to Ibadan and continuing along the Ibadan Eastern Bye-pass terminating at Ojo, the junction with A.1.

+F.113: The road is over 40 years, about 234km, starting from Udi-Ozalla on F.233, continuing thence to Agbani-Okposi-Abba Omega-Itigidi-Ediba and terminating at Ugep on Trunk Road AA (including the Itigidi/Ediba Ferry on the cross River).

F.262: The old Marina Street is over 45 years, about 12km, starting from Broad Street and continuing southward to terminate at King George V Road.

F.263: The Ahmadu Bello Way - a dual carriageway is over 45 years, about 9km, starting from King George V Road and continuing southerly to terminate at the Bar Beach Road.

F.264: The Lagos Island Inner Ring Road complex is over 45 years, about 45km, starting from the southern end of Eko Bridge and continuing along the New Marina Shoreline Road, and the parallel-elevated structure and thence to the Cloverleaf interchange at MacGregor Canal from there to the Cloverleaf interchange at Idumagbo. The road thereafter continues along the Adeniji foreshore to terminate at the north end of the New Marina shoreline road.

F.265: The outer loop dual carriageway is over 45 years, about 9km, starting from Wharf Road, on Creek Road at Apapa and continuing through Tin Can Island, Isolo, Oshodi to Oworonshoki thence to Third Mainland Bridge to the North foreshore line in Ikoyi and thereafter continuing along Kingsway Road and terminating at the South end of Falomo bridge.

F.266: Herbert Macaulay Street is over 45 years, about 54km, starting from the Murtala Mohammed Way at Oyingbo and continuing north to terminate at Ikorodu Road.

F.267: The Road enclosing the Tafawa Balewa Square complex is over 45 years, about 4km.

F.268: The Dockyard Road is over 45 years, about 9km, starting from Malu Road and continuing through the Naval Base to Lagos ports complex.

F.269: The International Airport Road - a dual carriageway starting from outer loop at Isolo and terminating at the Murtala Mohammed International Airport is over 35 years about 15km.

F.270: The Access Road starting from the Junction on A.1 near Ikorodu and continuing to the New Ikorodu Lighter terminal is over 30 years, about 15km.

F.271: The dual carriageway is over 30 years, about 8km, starting with the flyover at Obalende and terminating at the Federal Secretariat, Ikoyi.

F.272: The dual carriageway starting with flyover at Obalende and terminating at the State House, Ribadu road is over 30 years, about 5km.

The preview above shows the fact that Nigeria has the largest road network in West Africa and the second largest south of the Sahara. However, the roads are poorly maintained, and often cited as a cause of the country's high rate of road traffic crashes (Umar, 2013). The statistics in table 2.5 below speaks volume of the consequence of poor road infrastructure in Nigeria. In 2004, Nigeria Federal Road Maintenance Agency (FERMA) began to patch 34.000km federal road and in 2005, FERMA initiated a more substantial rehabilitation (FMW, 2013). In Nigeria, the rainy season and poor equipment pose challenge to road maintenance (Library of Congress, 2009).

Table 2.5: Trend in road traffic accident in Nigeria 1980 – 2012

Year	Total Accidents Recorded	No. of Persons Killed	No. of Persons Injured	Severity/Fatality
1980	32,128	8,736	25,484	0.27
1981	33,777	10,202	26,337	0.30
1982	37,094	11,382	28,539	0.31
1983	32,109	10,462	26,866	0.31
1984	28,892	8,830	23,861	0.31
1985	29,978	9,221	23,868	0.31
1986	25,188	8,154	22,176	0.32
1987	28,215	7,912	22,747	0.28
1988	2,175	9,077	24,413	0.42
1989	1,754	8,714	23,687	0.49
1990	21,934	8,154	22,786	0.32
1991	22,546	9,525	24,508	0.42
1992	22,564	9,620	5,759	0.42
1993	21,459	9,454	24,146	0.44
1994	18,204	7,440	17,938	0.40
1995	17,030	6,647	14,561	0.39
1996	16,442	6,364	15,290	0.38

1997	17,488	6,500	10,786	0.37
1998	16,138	6,538	17,341	0.40
1999	15,865	6,795	17,728	0.42
2000	16,606	8,473	20,677	0.51
2001	20,530	9,946	23,249	0.48
2002	14,544	7,407	22,122	0.50
2003	14,364	6,452	18,116	0.44
2004	14,274	5,351	16,897	0.37
2005	9,062	4,518	15,779	0.49
2006	9,114	4,944	17,390	0.54
2007	8,477	4,673	17,794	0.55
2008	11,341	6,661	27,980	0.58
2009	10,854	5,693	22,270	0.52
2010	10,038	4,065	18,095	0.42
2011	8,927	4,372	17,464	0.56
2012	8,024	4,260	17,206	0.53

Source: FRSC, 2013

2.4.2.5 Challenges of road transport infrastructure in Nigeria

The Central Bank of Nigeria Bulletin (2010) shows the state of highways in Nigeria. The survey reported the dilapidatory condition of the roads in all part of the country especially the southeastern and northeastern part of the country. The roads and bridges are broken and cracked with many potholes because they have not been rehabilitation since

construction (CBN, 2010). The importance of transport infrastructure to the overall development of a nation cannot be over- emphasized. The health, agriculture, economic and social development activities are rested solely on adequate infrastructure. Investment activities also largely depend on infrastructure, which is also an important prerequisite for economic and social growth according to World investment report (WIR, 2008). Generally, growth in Nigeria for all dimensions have been grossly affected by the poor delivery of infrastructure as against the demand for the same. Development can best be measured in terms of adequate and effective provision of infrastructure. The major divide between developing and developed countries is the level of infrastructural development that is attained. No doubt, a factor for economic and social development is the provision of good quality infrastructure services (WIR, 2008).

According to Oni and Okanlawon (2008), lack of maintenance, culture and abandoned project affecting the state of infrastructure in Nigeria extends to the road network. According to the bureau of public enterprise infrastructure report (2007), which is the best capture of states of Nigerian road, states that “there are few roads without potholes in Nigeria, Also, most of the major roads are congested as the population increases and business operation advance. In other to ease the traffic congestion in the most populated and industrial areas, the pressure on these road demands for urgent construction of more road and bridges and maintenance of the existing ones. Consequently, contracts are being awarded to execute the road construction projects, but corruption and failure to award contracts to qualified construction companies characterized the whole system. Bad roads and lack of connecting roads and bridges between a destination and another / connecting two linking areas together hinder traffic flows. Road commuters can be held up in traffic

for over two hours for movement that should not take up to five minutes. Business activities are sometimes paralyzed, workers resume late at work due to traffic delay, orders, are un-met or delayed and the rate of output and productivity reduced thereby affecting general economics activities". In addition, rural areas where agricultural enterprises thrive do not have access to adequate road infrastructure (good roads, bridges and vehicles to convey farm product to commercial markets). In area where there is access to few trucks plying the bad roads, drivers charge exorbitant fares for the goods to be conveyed and this has effects on the final price of the farm products. Thus, goods becomes expensive as a result of high cost of transportation.

Filani (1986) states that road transport accounts for more than 90% of the movement of goods and passengers in Nigeria. The slight shift of emphasis in the private, public investment in the transport sector to water and air transport sector to water and air transport in the rolling plans of 1991-1993 and 1994-1995 did not affect the road sub-sector, which still accounts for over half of the total investment (Oni and Okanlawon, 2008). This is a statement of fact but the above discussion shows that the state of road transport infrastructure are better imagined, the challenges posed by the same appear unsummantable. Every author projected the state and challenges without proffering solution. The gap there is knowing the true state of road transport infrastructure, this is the major step require to address the challenges. This study is out to do an exposition of the true state of the infrastructure, which will serve as a reference or benchmark for drawing policy and implementing it for a solution. The nation development, which is hinge principally on its economic development, can best be addresses if the key infrastructure like road is given the necessary attention.

With the increasing level of economic and business operations, advancement of the information and communication technology, the rapid pace of global activities, (economic and trade wise) given infrastructure its rightful place of priority becomes a great benefit to ensure integration into global economic growth and advancement. This will help in building a strong and lucrative environment that is the hallmark of economic development.

2.4.2.6 Road transport development in Nigeria

Anyanwu *et al* (1997) documented that the history of road transport in Nigeria dates back to 1904 when Lord Laggard attempted the construction of a mule road linking Zaria and Zungeru both in the Northern States of Nigeria. The road was later extended from Zaria to Sokoto, Katsina and Maiduguri. However, the road linking Ibadan and Oyo constructed in 1906 is recorded to be the first motorable road ever constructed in Nigeria (Olanrewaju, 1986). At independence in 1960, the Nigerian landscape was dotted with a skeletal network of trunk roads as well as secondary and feeders roads that exhibited the characteristics which reflected the purpose of their construction. They were narrow and winding, being simply meant to facilitate the evacuation of agricultural produce from the interior to the ports for exports in addition to serving as links between scattered human settlements thus permitting ease of administration.

Anyanwu *et al* (1997) strayed further that in 1925, the central government of Nigeria set up a *Road Board*. By 1926, H.E. Walker proposed a skeleton trunk road system to link the major administrative centres in the country. These roads were designed as a frame upon which the network of secondary roads could be built thus enabling the general road system to be considered as a co-coordinated whole-rather as a jigsaw of small

disjointed sections. The total length of roads maintained by the government rose soon from 6,160 km (5,875 miles) into 9,453 km (5,875 miles).

Data from the various publications of the federal office of statistics in Nigeria show that as at 1951, out of the total of 44,414 km of road in Nigeria, 1,782 km were surfaced, though the roads were lacking in standard designs and were single lane with sharp bends and poor drainage system. Total road length increased from 44,414 km in 1951 to 114,768 km in 1980 (Odeleye, 2000). While tarred road increased in length from 1782 km in 1951 to 28632 km in 1980, earth/gravel road increased from 4232 km in 1951 to 86136 km in 1980. The Central Bank of Nigeria (2003) documented that the estimated current total road network in Nigeria is about 200,000 km.

2.4.2.7 Current Road Transport Infrastructure Development Plan and Programme

There are current and ongoing plans and policies/programmes that have been developed toward achieving overall objectives and target for transport infrastructure development in Nigeria. Some of these are the vision 2020, Nigerian economic empowerment and development strategy (NEEDS) 1 and 2, and the State's Economic empowerment and development strategy (SEEDS). Draft national transport policy (2002), master plan for integrated transportation infrastructure (2002).

Government has implemented, or has agreed a policy to implement specific reforms of the key transport sector such as federal road. These reforms have been focused on delivering an institutional framework that will increase efficiency and accountability, create environment that will encourage greater private sector investment and involvement in the provision and maintenance of key transport infrastructure. One of the key features of this reform will be the creation of national transportation commission to provide for the

economic, safety and environmental regulation of all transport sectors and with a specific responsibility to monitor the effective integrated planning across all transport modes.

The most significant institutional change is the creation of infrastructure concession regulatory commissions (ICRS) to encourage public - private partnership (PPP) in infrastructural development and federal road maintenance agency (FERMA) for the maintenance of the federal road network. This body assumed the responsibility for the planning and implementation of maintenance across the network whilst major improvement schemes remained with the federal ministry of works (and subsequently the federal ministry of transport). The government is now proposing to subsume the function of FERMA into a new federal highways authority that would assume exclusive responsibility for the improvement, maintenance and operation of the highway network whilst the ministry would retain the overall policy role. These changes, together with proposals for the creation of a federal road fund, remain, as policy but the necessary enabling legislation have not been sent to the national assembly. The road fund would collect a proposed new fuel levy that would be applied to the maintenance of all roads across the federation and would be administered by a road board.

The ministry has also been developing new forms of contract for greater private sector involvement in the planning and implementation of highway maintenance. This includes output and performance base road contracts (OPRC) as well as concessions. The procurement of the first OPRC contract is underway and a concession was awarded for the Lagos – Ibadan expressway but failed because of the inability of concessionaire (Bi-Courtney Highway Ltd). Five other roads concessions are in procurement stages (BPE, 2011). According to federal capital development authority (FCDA), infrastructure

development programme, roads improvements around Abuja are also being awarded under a contractual financed arrangement where the capital cost are paid over four years period.

2.5 Issues Associated with Road Transport Infrastructures Development in Nigeria

The key issues with road transport infrastructures development in Nigeria are poor provision and lack of integration between modes. Anyata (2009) observed that this has resulted in over-reliance on roads for freight transport with severe consequences of congestion in many cities because of the absence of public transport system. Nigeria road transport infrastructures development problem is a reflection of the problem in Nigeria economic sector as a whole: inadequate investment over many years, poor maintenance of the existing infrastructure, obsolete plant and equipment, lack of long term planning and effective integration between transport modes, absence of a clear policy and methodology for determining tariffs, inadequate participation by the private sector, lack of clarity in the roles of government, public enterprises, operators and regulators resulting in over-bearing government influence; over centralization in public enterprises; public monopoly in infrastructure provision in some modes; over-staffing and poor management in some public enterprises in the sector (Akinyemi, 2009).

The evident failure of Nigeria road transport infrastructure to meet existing demands and expectations will make the issue of providing for a rapidly expanding and assessment. These challenges can be addressed further with the creation of an effective multi-modal transportation system, private sector involvement, appropriate regulatory framework, financing and human capital (Ibid)

2.5.1 Road Transport Infrastructure Development Strategies and Opportunities in Nigeria

The issues/challenges mentioned earlier are never barriers to tremendous opportunities for strategic and sustainable development of Nigeria road transport systems. The strategic imperatives are; to develop a clear and effective regulatory framework of the sector, strengthening the management and financial capability of the enterprises involved in planning and managing countries transport infrastructure by investing in their human capital, ensure that funding for investment and maintenance is adequate and encourage private financing and investment through appropriate legal, financial and regulatory policies.

Nigeria is a large country of 923,768km² and with an estimated population of over 167 million people (NPC, 2006). She is gifted with abundant petroleum, gas and mineral resources; abundant agricultural and forestry resources are spread across this land. In addition, its territorial waters are high productive with abundant and diverse territorial and marine resources. Transport is a major factor in linking the country together, economically, socially and politically and in the exploitation and distribution of these resources. Other opportunities are buried in the growth potential of its economy, strategic alliances and partnership in transportation, security and defense, its role in economic community of West African country (ECOWAS), African Union (AU) and Africa, transport as a tool for economic leadership. The assessment of road transport infrastructure will help unveil these opportunities and enable strategic planning and development towards achieving the overall objective of adequacy and efficiency as contained in the draft of National Road Transport Policy.

However, for success to be achieved in road transport development serious attention should be given to institutional reforms, clear regulatory and legal framework, adequate funding, greater private sector involvement, greater transparency, audit and effective communication.

CHAPTER THREE

THE STUDY AREA AND METHODOLOGY.

3.1 Location

Kaduna State is located on the southern end of the high plains of northern Nigeria, bounded by parallels $09^{\circ}32'N$ and $11^{\circ}32'N$ north of the equator and longitudes $06^{\circ}15'$ and $8^{\circ}50'$ east of the prime meridian. The state consists of 23 local government areas. The state is bordered to the north by Katsina, Zamfara and Kano States, to the West by Niger State, to the East by Bauchi state and to the South by Plateau and Nasarawa with- Abuja on the Southern part as well. It serves as the major gateway to important traditional, political and commercial states of Kano, Katsina and Sokoto. The urban town Kaduna is naturally divided into Kaduna north and Kaduna south by the River Kaduna; which has its source at Kwal on the Jos Plateau and drains into the Niger River. Fig 3.1

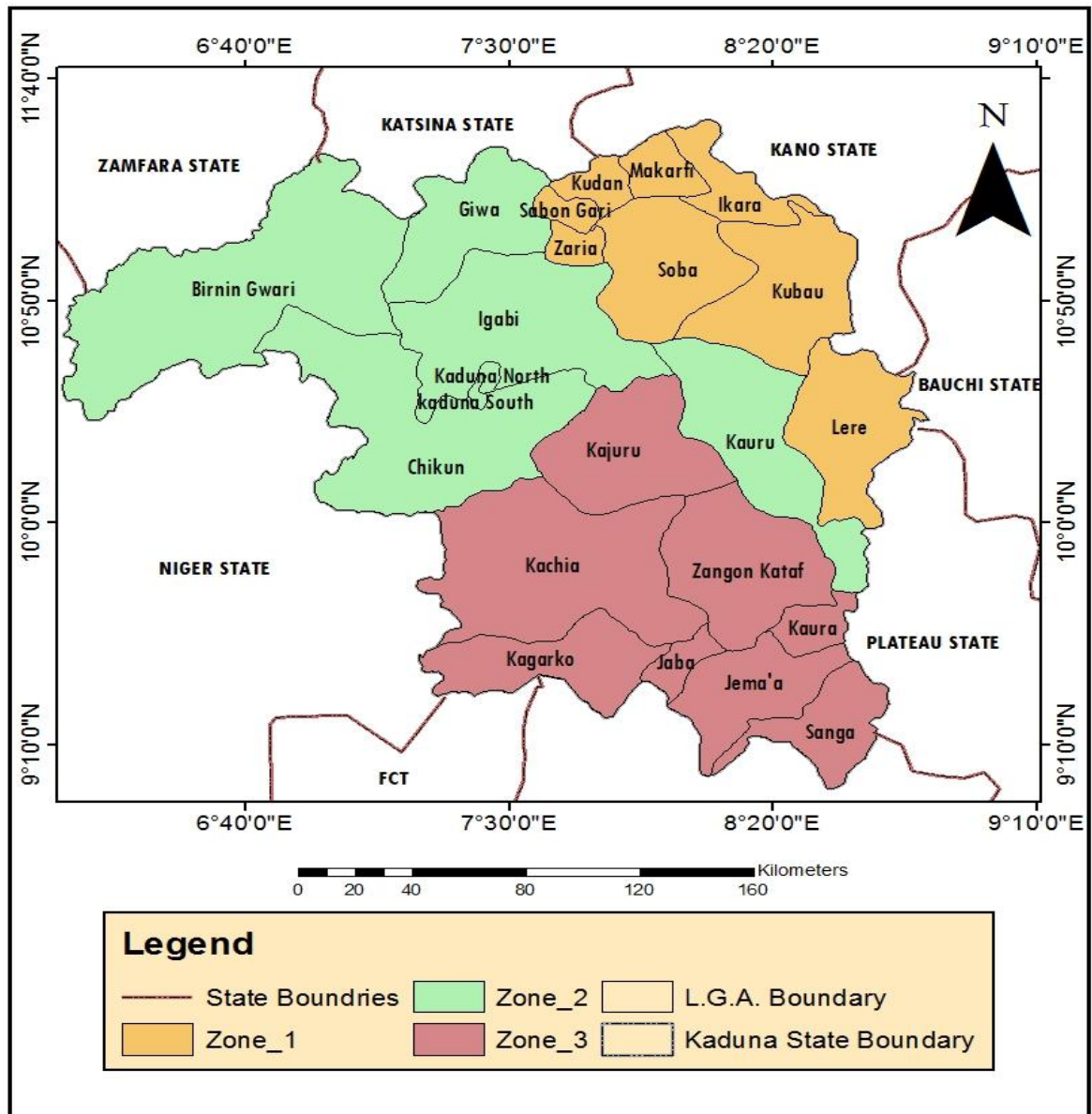


Fig. 3.1: Map of Kaduna State showing three Geo-Political Zones

Source: (Modified From Administrative Map of Kaduna State)

3.1.1 Physical Setting

3.1.2 Relief

Kaduna Plate consists largely of undulating plains with subdued interfluves (Mortimore, 1970), the bedrock geology is predominantly metamorphic rocks of the Nigerian basement complex consisting of biotite, gneisses and older granite. In the south-eastern corner, younger granites and batholiths are evident. Deep chemical weathering and fluvial erosion, influenced by the bioclimatic nature of the environment have developed the characteristic high undulating plains and subdued interfluves, which, in some places, are capped by high-grade lateritic ironstone especially in the Northwest. (Bello and Nish (2008)

However, rocky eremitic irk rite the main local relief (relative relief is less than 15m) hoe and there, with Kufena, Kagoro hills, Dutsen-Wai, kudaru ring complex standing out very prominently. The valleys are shallow but wide stretching serial tens of kilometres into head water areas with gentle sloping valley sides; imperceptibly grading into fiat, moist to marshy elleviated bottomlands or flood plains called "Fadama". Although stream valley incision and dissections of the high plains are evident in several areas especially in the Zaria region, they are due more to anthropogenic influences and climatic factors than regional geologic instability, (www.online Nigeria.com/links/Kaduna adv. asp)

3.1.3 Drainage

The drainage system of Kaduna State focuses on two major rivers, River Kaduna and River Gurara. The Kaduna River flows through the heart of the State. There is the existence of major tributaries such as Galma, Tubo, Karami, Parra and Damari River respectively. Other important rivers include Dinya, Kaushenki, Kubanni and many other smaller rivers. The Kaduna and Gurara River are affected by seasonality. The flow of the rivers is highly irregular, following rainfall events in streams. The drainage is commonly dendritic because there is no structural control on the drainage lines on the deeply weathered plains. The channel pattern of the drainage basins are of two type: those with a large number of unbranched first order tributaries producing high stream frequencies and high drainage densities and others consisting of basins with low frequencies and low drainage densities (Mortimore, 1970).

3.1.4 Climate

Kaduna State experiences a typical tropical continental climate, with distinct seasonal regimes, oscillating between cool to hot: Dry and humid. These two seasons reflect the influences of tropical continental and equatorial maritime air masses, which sweep over the entire country. However, in Kaduna State, the seasonality is pronounced with the cool to hot dry season being longer than the rainy season. Again, the spatial and temporal distribution of the rain varies, decreasing from an average of about 1015mm in Kafanchan-Kagoro areas in the southeast to about 153mm in Ikara- Makarfi districts in the northeast. High evaporation during the dry season, however, creates water shortage problems especially in Igabi, Giwa, Soba, Makarfi and Ikara LGAs. Generally, the soils and vegetation are typical red-brown to red-yellow tropical ferruginous soils and savannah

grassland with scattered trees and woody shrub. The soils in the upland areas are rich in red clay and sand but poor in organic matter. However, soils within the "Fadama" areas are richer in kaolin tic clay and organic matter, very heavy and poorly drained, characteristics of verticals. Fringe Forest ("Kurmi" in Hausa) in some localities, and especially in the Southern LGAs of the state, are presently at the mercy of increasing demand for fuel wood in the fast growing urban centres.

The primate city, Kaduna, is the state capital. The state has a land area of about 46,016

Square kilometres occupying 5 percent of the total land area of the 923, 768 square kilometer of "Nigeria's land mass. The primate city, Kaduna, is the most developed part of the state and the major economic center. The urban Kaduna is some 143.7 kilometres by road to Kane and some 250 kilometres to Abuja, it lies between Zaria and Kafanchan.

3.1.5 Population Structure and Distribution

The 2006 census put the population of Kaduna State at 6,066,562 (National Gazettes, 2006). Although majority live and depend in the rural areas, about a third of the state's population is located in the two major urban centers of Kaduna and Zaria. However, except in the north-western quadrant,-the rural population concentration is moderate, reaching as high as ever 500 persons per sq. km. in Kaduna/Zaria and the neighboring villages; 350 in Jaba. Igabi and Giwa and 200 in Kaura LGAs.

Despite the provisional nature of the census results, observations of movements of large number of able bodied young male labourers from rural villages to towns during the dry season and back.to rural agriculture fields during the wet season, suggest a sizeable

seasonal labour force migration in the state. However, the seasonal labour migration has no effect on agricultural labour demands in rural traditional settings, indeed, some of these seasons migrants come to town to learn specific trade or acquire special training and eventually go back to establish in the rural areas as skilled workers (e.g. masons, technicians, tractor drivers, carpenters, motor mechanics). Another major feature of the state's population structure is the near 1:1 male/female ratio, not just for the state as a whole, but even among all the LGAs. The effects of this may be helpful to the future social and economic development of the rural sector especially in the agro-allied rural industries. The large number of secondary school leavers, polytechnic and university graduates provide a growing skilled labour force for the growing industries in the state.

3.1.6 Economy

3.1.6.1 Agriculture

Kaduna State is predominantly an agricultural State, engaging about 45% of its working population directly or indirectly in agricultural activities. The principal crops grown in the state are guinea corn, maize, millet, cowpeas, cassava, cocoa yam and yam. Some of the major cash crops cultivated in the state include cotton, ginger, groundnut and soya beans. In the State, there is also intensive irrigation farming of tomatoes, pepper, onions, wheat, rice and sugarcane especially in areas of Birnin Gwari, Ikara, Jagindi, Zaria and its environs. More recently farmers in Zaria and environs have started cultivating Irish potatoes for local consumption. The irrigation farming is supported by river Kaduna, Gurara, Galma, Damau, Tube, Kushekiri and other smaller rivers and ponds. Another important agricultural aspect engaged by people of the state is animal rearing, these include cattle, sheep, goat, pigs and poultry farming. Livestock resources in the state are still on a

small scale, and are used mainly to raise cash during emergencies or meet demands during religious festivals. Based on the above, some possible industries could be food and sugar processing, cigarettes manufacturing, furniture industry, ginger processing, fiber factory, palm oil, milk, starch production plant and milling.

Kaduna town is one of the industrial centers in northern Nigeria. The major products manufactured are textiles, steel, aluminum, petroleum products, local beer brewing etc. The textile industry for which Kaduna was most famous has declined completely.

Pottery is highly priced from Kaduna, especially Tom Maraban-Jos, which follows closely behind Abuja and Minna.

3.1.6.2 Industries

Kaduna State has a long history of craft and cottage industry in leather works, iron, textile, weaving and dyeing, most especially around Zaria and its environs. In the modern manufacturing sector, the State has fared well. Large scale manufacturing began with the processing of agricultural (primary) products such as oil mills, cotton processing plants, textiles and tobacco processing company. In order to promote industrial enterprises, the State government has put in place several infrastructure facilities. Kaduna and Zaria have 74 industrial estates provided with access roads, water and power (Kaduna State Ministry of Finance and Economic Planning, 2001). Kaduna is one of the few Nigerian States that have concentration of industries.

3.1.7 Social Economic Infrastructure

3.1.7.1 Education

Kaduna State enjoys leading position in educational development in the entire region north of the Niger-Benue valley. Prior to the acceptance and liberalization of formal western education by the government of the Northern region, the efforts of voluntary Agencies (Church and -rim groups) in establishing schools at both primary and secondary levels, gave present Kaduna State an enviable advantage of early education infrastructure establishment. Kaduna is home to the Nigerian Defence academy (1964). Kaduna Polytechnic (1968) A.B.U (1962) and Nigerian Institute for Trypanosomiasis Research (1951).

Most of the present primary and secondary schools in all the southern and in Sabo gari LGAs were founded by Voluntary agencies for example. S.I.M/ECWA in Kwoi, Zonkwa and Kagoro, Anglican and Baptist in Kaduna, Makera/Tundun Wada, Sabon Gari, Kafanchan, Saminaka and Kaura LGAs). It is this early start that accounts for Kaduna's relatively high level of literacy in the then Northern Region. About a third of that ends up in the estimated sixty-eight secondary schools (Federal and State Government owned and private agencies) with large average enrolments of between 300 and 500. Enrolments in some large schools in Zaria and Kaduna urban areas go up to between 2,000 and 4,000 each, respectively. There is a wide range, of tertiary institutions established to produce high-skilled manpower needed by the state. Twelve out of seventeen are located in Zaria and include the famous Ahmadu Belle University Complex, Federal College of Education, Nuhu Bamali polytechnic, College of Aviation Technology, National Institute for Chemical research and Technology (all in Zaria); the Command and Staff College, Jaji, and

a Federal Polytechnic, Federal School of Forestry, National Water Resources Institute, and a College of Agriculture and Animal Science in Kaduna.

3.1.7.2 Health Care Delivery

There is a large University Teaching Hospital in Zaria. And other fully equipped government hospitals located in Zonkwa, Jama'a and Kafanchan as well as in Kaduna and Zaria. Smaller government and private-owned ones are also found in town's liho Birnin.Gwari, Kagoro, Saminaka and Soba. The state government, together with the Federal Government and World Health. Organization, has also established comprehensive Primary Health Care Units in some selected rural areas (e.g. Yaka-Wada in Giwa LGA) which cater for child care, pre and ante-natal health care.

3.1.7.3 Water Supply

While high evaporation during long dry season poses serious limitations on available water resources, the two large river systems, the Kaduna and Gurara that run through the state provide opportunities for good sources of water supply. But many of the tributary dried up during the long dry season. Even so, the wide alleviated valley bottom lands in many medium drainage basin - [e.g. Galma, Tubo, Karami, sarkin pawa and Damari) favour extraction of ground water from shallow aquifers and boreholes Tom deep ones. Presently, there are five completed large and medium dams and water intakes at Zaria on Galma and Kubanni rivers; at Kangimi on Karami River; at Birriin Gawri on Kuseriki River; at Kaduna on Kaduna River. Also, one or two boreholes in every LGA have been completed and are now in operation to complement water supply for rural domestic uses provided by the Federal Government through the new defunct Directorate of Foods, Roads

and Rural Infrastructure, DFRRI). The state government signed N10 million World Bank loan to boost and expand water supply scheme to both the urban rural populace.

3.1.7.4 Transport and Communication

Kaduna state is served with 2,820km stretch of trunk "A" Federal, well- surfaced roads radiating from Kaduna City. The State government has also constructed good roads with tarred surface roads comparable- to the trunk "A" totaling 1,200km; and several other road --development projects are still going on. Apart from motor roads, railway and air transport which has linked the state to every corner of the country, this welcome progress has brought the state closer to foreign investors. Indeed, business in any part of Kaduna State from any part of the Federation can be reached within an hour or two by car. Also, a modern telecommunication system connects Kaduna State with all other states and outside world. Nigeria Telecommunications Corporation (Nitel), MTN, Zain, Zoom, Multilinks, Starcom, Visa For.e, Mtel, Glo etc. provides twenty four hours automatic telephone exchange services in form of telex and [fax.www.onlinenigeria.com](http://www.onlinenigeria.com) Daily News: These services have extended to most local government areas in the State.

There are a lot of positive effects from improved roads. One of which 'is that it will improve people's access to recreational activities especially those residing adjacent to the road will find it easy to travel to places of tourists' attraction. Besides, the travel time and travel cost was saved while travelling on an improved road which could be spent on recreation. Commenting on this claim, Onakomaiya (1978), reported that road development provide accessibility to places of tourist attraction. For instance, Iicsa-Erinmo road in Osun State was built to enhance the attractiveness of the Erin - Ijesa Waterfalls, while Ikorodu-

Ijede, Lagcs-Badagry and Victoria Island-Lekki roads (all in Lagos State) were designed to take advantage of the tourist attractions along the beaches of the state.

The residents of Kaduna State will benefit directly or otherwise from an improved roads. The presence of an improved road in places of tourist's attraction will lead to the development of such areas. Tourists may buy some products from the rural dwellers around the attractive place. Again, exchange of ideas may take place between the tourists and the rural dwellers. This may further enhance the life of the people in the State.

Although the present state of tourism in Kaduna does not reflect the state's long history and its rich cultural developments, there are several tourist attractions in different parts. For example, the famous Zaria city walls, the Emir's legendary insignia and the palace drums are all in the old city. During Muslim festivals, like those mentioned, above, mini-durbar "Hawan Daushe", is normally staged in the open field in front of the palace. The origin of Nigeria's famous Nok terracotta and its rich cultural heritage in Jaba Local Government Area and the annual traditional festival of "Tuk - Itamo" in Nok Village and Kwoi respectively; and the "Afan" festival among the peoples in Jama'a, Sanga and Kaura Local Government Areas are held during Christmas and Easter. The festivals attract other Nigerians and foreigners in their thousands. The most recent Nok terracotta find is the dual face portraits (male and female said to predate the single female burst culture. Wildlife parks and games are very limited in the state, but there are some good spots 'of natural history and recreational sites, such as the Plateau scarp, "The Assob Falls and Kagoro hills bathylith with the Matsirga falls all in the Jama'a LGA.

3.2 Methodology

3.2.1 Reconnaissance Survey.

For the purpose of this study, a reconnaissance survey was carried out to acquaint the researcher with the study area and help in preliminary field data accumulation. This helped the researcher to acquire more knowledge concerning the state, types, and functionality and distribution by zones of the Road Transport Infrastructure development in the study area.

3.2.2 Types of Data Required

The types of data collected are as presented;

- a. Information on government road infrastructure development plan
- b. Published statistics on road infrastructure in Nigeria from government agencies/establishment.
 - i. Records of achieved results in road infrastructure provision.
 - ii. Records on major highway condition, performance and management.
- iii. Record on the nature of traffic (passenger volume), vehicular movement on major highways of Kaduna state.
- iv. Road map of Kaduna state.
- v. Record of various government interventions programme on road infrastructure through it various agencies.
- vi. Information on the nature of management of road infrastructure in Kaduna state.
- vii. Information on impact assessment of road transport infrastructure.

- viii. Annual budgeting allocation to Federal Ministry of Works (FMOW) relative to National budget (percentage)

3.2.5 Source of Data

The required data were obtain from Magazines, Gazettes, Journals, Bulletins and field survey. These sources are:

- i. Questionnaire administration and personal observation.
- ii. Infrastructure development map from federal ministry of works and transport
- iii. Design and road infrastructure development records from the office of director of highway, FMW/works bulletin
- iv. State controller of works bulletin and compendium on road infrastructure in Kaduna state.
- v. Federal Road Maintenance Agencies annual report publications.
- vi. CBN published report on infrastructure development and capital project plan
- vii. National Bureau of Statistics (NBS) publication on road infrastructure in Nigeria
- viii. Information on the traffic volume and Road Traffic Crashes (RTC), from Federal Road Safety corps

3.2.6 Sample Size

The sample size was determine by Taro Yamane (1967) formula;

$$Formuar n = \frac{N}{1 + N (e)^2}$$

Where:

- n = Sample size
- N = Population size
- e = Level of significance

1 = Constant

Base on the total projected population of (NPC) of 2015 as stated in the table below

Table 3.1: Total projected population of 3 geopolitical zones of Kaduna State

Zone	Projected Population
1	2,428,480
2	2,721,690
3	1,952,730
Total	7,102,900

Source: NPC, 2006

Therefore:

$$n = \frac{N}{1 + N(e)^2}$$

$$n = \frac{7,102,900}{1 + 7,102,900 (0.05)^2}$$

$$n = \frac{7,102,900}{1 + 7,102,900 (0.0025)}$$

$$n = \frac{7,102,900}{1 + 17757.25}$$

$$n = \frac{7,102,900}{17758.28}$$

$$n = 400$$

The sample size = 400

To determine how many questionnaire go to each zone, the total population of each zone is divided by the total population of Kaduna State and multiply by the sample size

$$\text{Zone One (1)} \quad \frac{2,428,480}{7,102,900} \times 400$$

$$= 0.342 \times 400 = 137$$

$$\text{Zone Two (2)} \quad \frac{2,721,690}{7,102,900} \times 400$$

$$= 0.389 \times 400 = 153$$

$$\text{Zone Three (3)} \quad \frac{1,952,730}{7,102,900} \times 400$$

$$= 0.274 \times 400 = 110$$

Table 3.2: Distribution of Questionnaires

Zone	Population	No. of Questionnaire
1	2,428,480	137

2	2,721,690	153
3	1,952,730	110
Total	7,102,900	400

Source: Author's field survey, 2015

3.2.7 Sampling Technique

Stratified sampling technique was used where target population was break down into group (strata) and sample from each of your groups. For example, the target population was grouped into three; the road users 47%, the road workers 31%, and the traffic law enforcement agencies 22% and a sample was taken from each group. In all, a total number of 400 questionnaires were administered to the respondents out which 380 copies were returned completed representing a success rate of 95%.

3.2.8 Data Analysis

Information and data obtained from the field through the use of questionnaires, interviews and documented materials were subjected to various descriptive and inferential statistical tools. The analysis of demographic and socio-economic characteristics of the respondents carried out from data collected and questionnaires were based on simple statistics supported by series of tables and figures showing percentage calculations of some variables. All data were coded into the IBM SPSS v20 statistical tool package.

However, the four objectives were achieved through the following ways.

Objective 1. *The state of Road Transport Infrastructure in Kaduna State.* Was achieved through section C of the questionnaire, descriptive statistical technique was used to analyze the collected data and the results were presented in a Table and summarized in a vertical bar graph.

Objective 2. *The Characterization of the types of Road Transport Infrastructure in Kaduna State.* Was achieved through section D of the questionnaire, descriptive statistics technique was used in analyzing the data and the results were presented in a Table and summarized in horizontal bar graph and replicated in a map.

Objective 3. *Functional status of Road Transport Infrastructure in Kaduna State.* This objective was achieved through section E of the questionnaire and descriptive statistics was used to analyzed the data, while, the results were presented in a Table and summarized in a horizontal bar chart.

Objective 4. *Determine the distribution of Road Transport Infrastructure by zones in Kaduna State;* Standard score (Z- score) analytical technique was adopted to depict variation in the distribution of the infrastructures among the zones in the study area and results was also replicated in a map

CHAPTER FOUR

RESULTS AND ANALYSIS OF DATA

4.1 Introduction

Data collected from the field were analyzed and discussed in this chapter, using descriptive and inferential statistics, and parametric tests. The descriptive statistics include frequencies, percentages, pie charts and bar charts. The section analyzed and explained data collected from road users, road workers, and traffic law enforcement agents.

4.2 General Information on Respondents

This sub section examines the name of political zone as well as types of respondents such as the road user, road workers and traffic law enforcement agents.

4.2.1 Distribution of Political Zones

Analysis of the respondents on general information shows on table 4.1 the zone with the numbers of returned questionnaires and spatial locations of the respondents. Zone 2 has the highest number of respondents at 39.5%, perhaps this might not be unconnected with the fact the zone has the highest population of over 2.7 million (NPC, 2006) and it's closely followed by zone 1 with 34.2% while zone 3 is last at 26.3%.

Table 4.1: Distribution of respondents on political zones

Zones	Frequency	Percentage
1	130	34.2
2	150	39.5

3	100	26.3
Total	380	100.0

Source: Author's field survey, 2015

4.2.2 Types of Respondents

Analysis of the types of respondents reveals that road users are on the high with 47% of the total respondents interviewed on the field. Road workers and traffic law enforcements constitutes 31% and 22% of the total respondents respectively. The higher number on the side of road users might not be unrelated with the fact that these group of respondents are more and often involved in plying road and so make use of transport infrastructures due to daily engagements. As such it is assumed that they are in better position to provide response

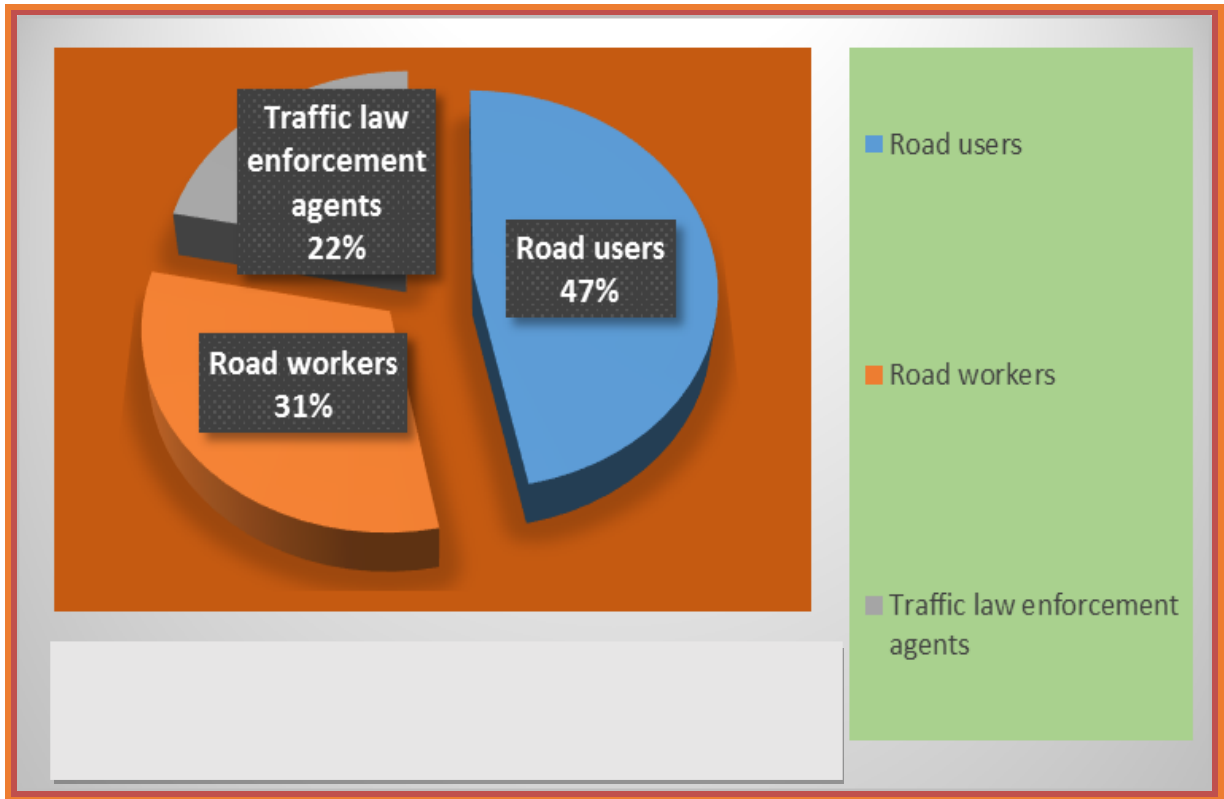


Figure 4.1: percentage distribution of types of respondents

4.3.1 Socio economic characteristics of respondents

This sub section examines the socio economic characteristics of the respondents. Types of data collected from the respondents include information about their gender, age, level of their educational attainment and their frequency of travel on the highways. Information regarding state of road transport infrastructure, types of road transport infrastructures as well as the functionality of road transport infrastructure in Kaduna state were also collected for analysis.

4.3.2 Age Distribution of the Respondents

The age distribution of any population is characterized by those in the dependent and independent range that is the active and inactive age range. Out of the 380 respondents administered on the field about their age distribution, 20.9 percent of them within the age bracket of 35-39 constitutes the highest age range with 79 respondents, followed by the age bracket of 30-34 having 19.0%, while those within the range of 40-44 constitutes the least at 4.3%. The higher range of 20.9 percent and 19.0 percent for those within the age bracket of 35-39 and 30-34 years might as well justify those in their active working age. A clearer look at the age range shown on the table below indicates a gradual climb in the age range and a subsequent fall in the age range as people grow older thus making the age bracket of 35-39 years the peak age point.

Table 4.2: Distribution of the age of respondents

Age	Frequency	Percentage
<20 years	21	5.5
20-24 years	29	7.5
25-29 years	41	10.7
30-34 years	72	19
35-39 years	79	20.9
40-44 years	16	4.3

45-49 years	33	8.7
50-54 years	44	11.5
55-59 years	21	5.5
>60 years	24	6.3
Total	380	100

Source: Author's field survey, 2015

4.3.3 Level of educational background of the respondents

The description on figure 4.3 depicts the percentage distribution of the level of educational attainment by the respondents. The results shows that those with primary school education has the highest value accounting for about 23.27% of the sampled respondents, those with no formal education and secondary education amounts to 22.81 % and 19.65.16% respectively, while those with quranic educational qualification has a reasonable value at 17.95%, whereas those with HND/B.Sc amounts to 16.32% of the respondents.

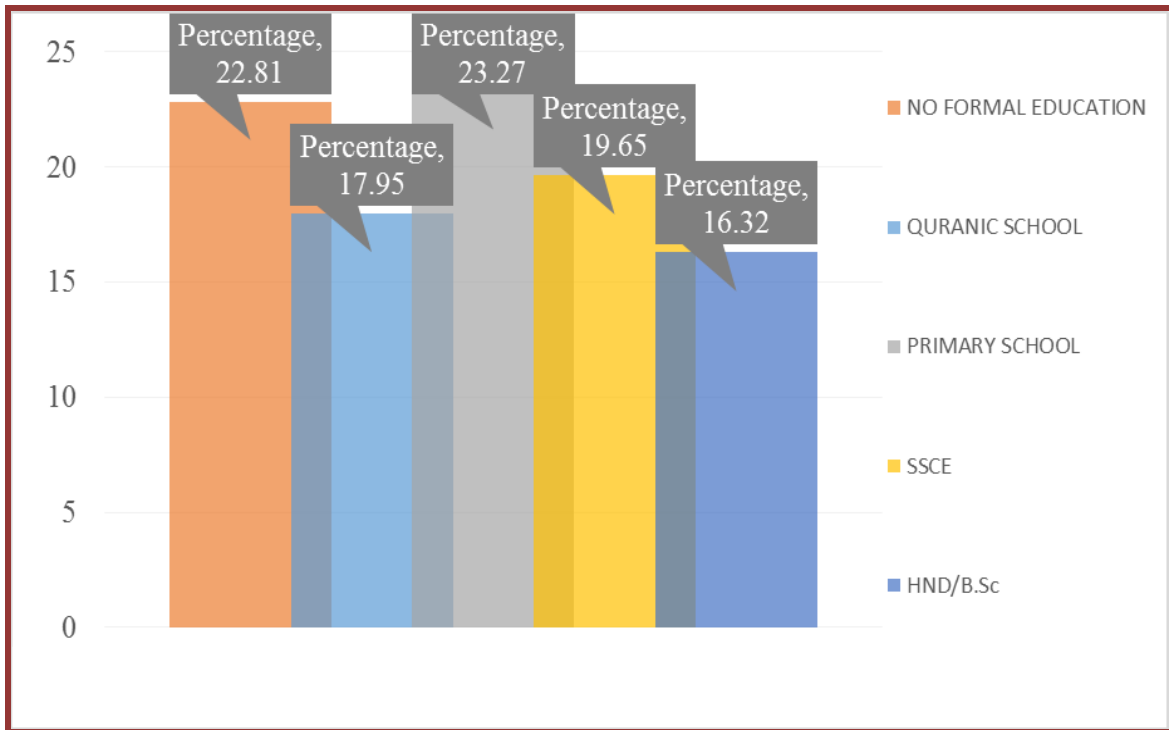


Figure 4.3: Percentage distribution by level of educational attainment

4.3.4 Distribution of the frequency on how often the respondents travel

Analysis of the respondents on the observation carried out on the field reveals that 44.5% representing 169 respondents indicates that they travel often while 38.68% indicating 147 respondents' travels very often while 16.82% says they do not travel often.

Ume (1977) states that road transportation is involved in almost all the activities of people, and he said that road transportation has a wide dispersed network of roads and motor vehicle transport is the most popular type of transport. Thus, road transportation has enhanced the capacity to rapidly move people, goods and services over a wide area. It has become a recurring feature of the 21st century. Mbagwu (1977) further asserted in his study that road transport is apparently the most patronized means with regards to speed and

haulage capacity among other modes of transport. Furthermore, it is the most suited for the conveyance of consumable goods because of its wide geographical coverage, its flexibility in scheduling departure and arrival time, road accessibility, prompt services and delivery of commodities.

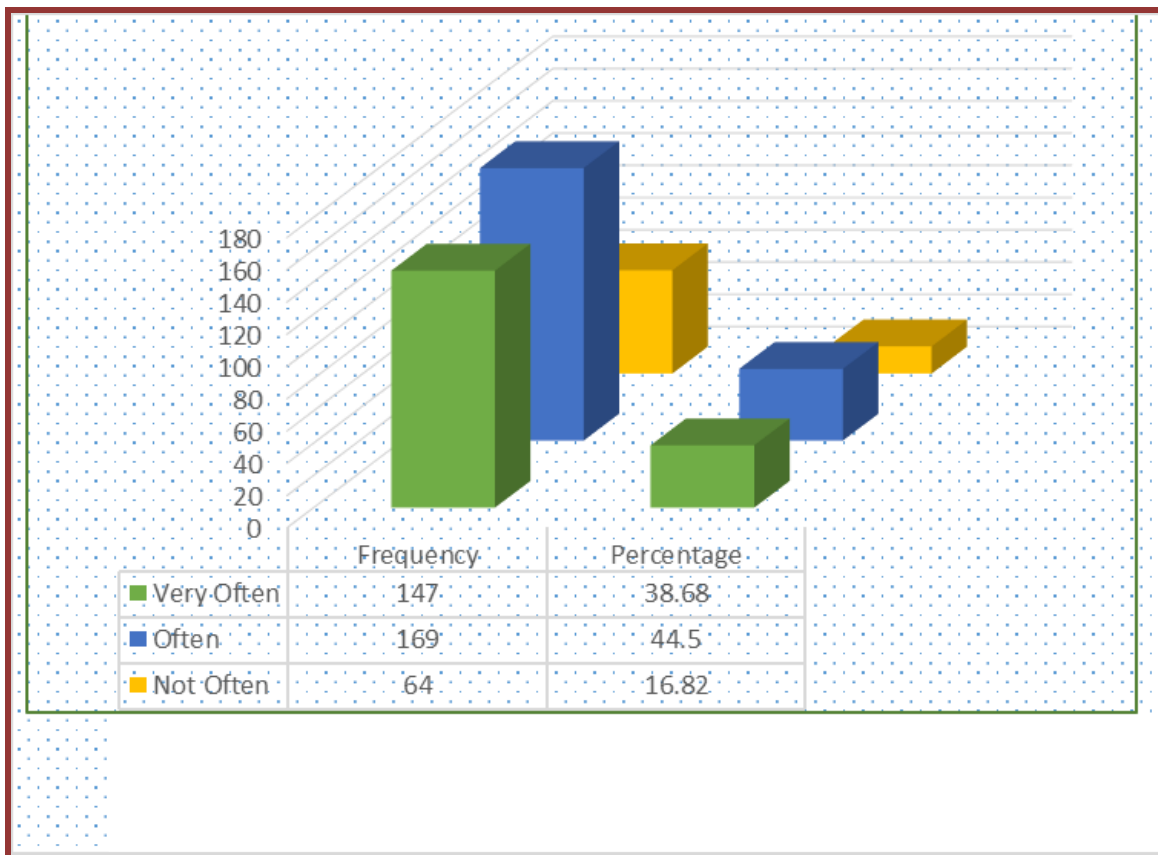


Figure 4.4: Percentage distribution of frequency of travel by respondents

4.3.5 Existing state of Road Transport Infrastructure in Kaduna State.

The ever increasing population of Kaduna state mount immense pressure on available Infrastructure including Transportation network. Kaduna state is presently estimated to have 7,102,900.00 people (NPC, 2006). And most of the people relying mainly on road for their daily movement. The age of the roads, the continuous use of the roads

coupled with untimely maintenance or sometimes near neglect manifest as rough surface and potholes with resultant human discomfort, man hour lost, increase vehicular maintenance cost, vehicular accidents, and loss of lives and property among others.

Attempt have been made to rate the State of Road Transport Infrastructure in Kaduna state among 380 respondents as shown in figure 4.5 below, the result reveals that; 10% representing 38 of the respondents says are in Excellent state, while, 23.3% representing 86 respondents attest that are in Good state. So also, majority of the respondents 117 representing 30.7% are on the opinion that road transport infrastructure in Kaduna state are in Fair state, similarly 20.5% representing 79 respondents believes that they are in Poor state, while the remaining 15.7% representing 60 respondents are of the opinion that the state of road transport infrastructure are Very poor. , this insights from the respondents might not be unconnected with their locations and forms of urban/rural classifications. The summary is represented in Table 4.3 and replicated in horizontal bar-graph below. (Figure 4.5).

Table 4.3. State of Road Transport Infrastructure in Kaduna State

PERCEPTION OF RESPONDENTS	FREQUENCY	PERCENTAGE (%)
Excellent	38	10
Good	86	23.1
Fair	117	30.7

Poor	79	20.5
Very Poor	60	15.7
TOTAL	380	100

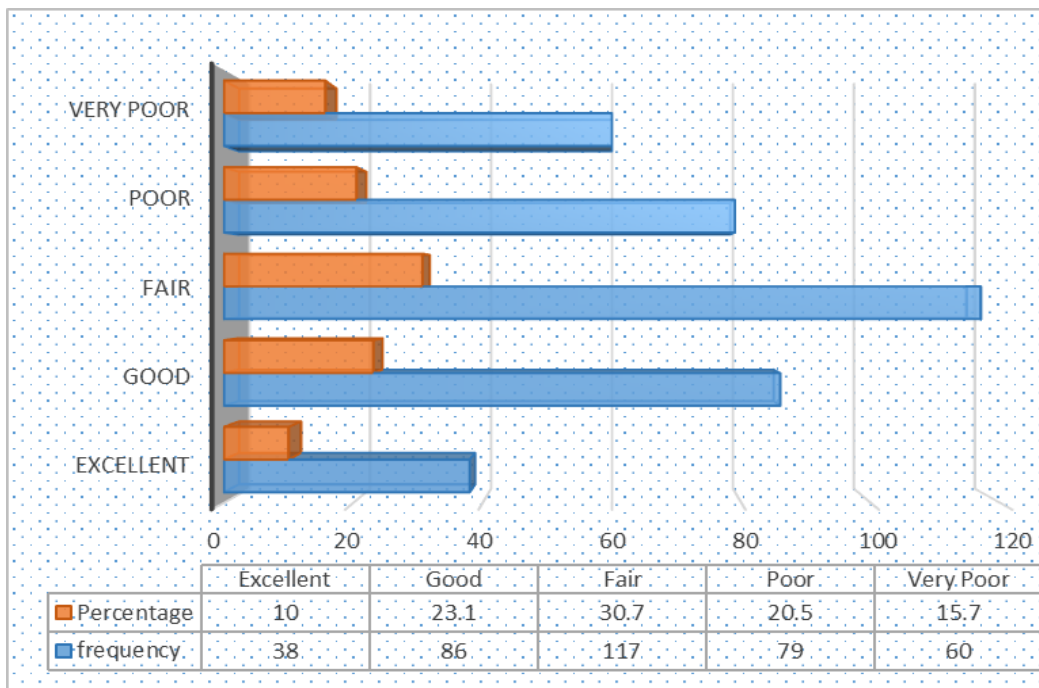


Figure 4.5 State of Road Transport Infrastructure in Kaduna State

4.3.5 Characterization types of road transport infrastructure in Kaduna state

In Nigeria, socio-economic development goes as far as road infrastructure improvement can attain and Kaduna state is not an exception. This is simply because to connect means to grow. In order to catalyze the present rate of growth and development of

the economy, the requisite road infrastructure must be put in place. Attempt was made to analyze the perception of respondent on the awareness of the type of road transport infrastructure in Kaduna state. The summary is presented on table 4.3

Table 4.3: Distribution of types of road transport infrastructures in Kaduna state

Infrastructure	Available		Not available	
	Frequency	Percentage	Frequency	Percentage
Kerbs	206	54.2	174	45.8
Culverts	332	87.4	48	12.6
Camber (cross slope)	177	46.6	203	53.4
Traffic Lights	158	41.6	222	58.4
Road Signs	117	30.8	263	69.2
Road Marking	267	70.3	113	29.7
Media	153	40.3	227	59.7
Shoulder	231	60.8	149	39.2
Zebra	79	20.8	301	79.2
Round about (intersections)	282	74.2	98	25.8
Bridges	316	83.2	64	16.8
Overhead Bridge	137	36.1	243	63.9
Pedestrian Bridge	96	25.3	284	74.7

Source: Author's field survey, 2015

The result reveal that nearly all the basic in Road Transport Infrastructure are available on Road in Kaduna State, this is because the percentage score seem to indicate high affirmed response. However, Zebra crossing and Pedestrian bridges exhibit low scores.

This table is replicated in a vertical bar graph and a map to bring out the level of availability of Road Transport Infrastructure in Kaduna State clear.

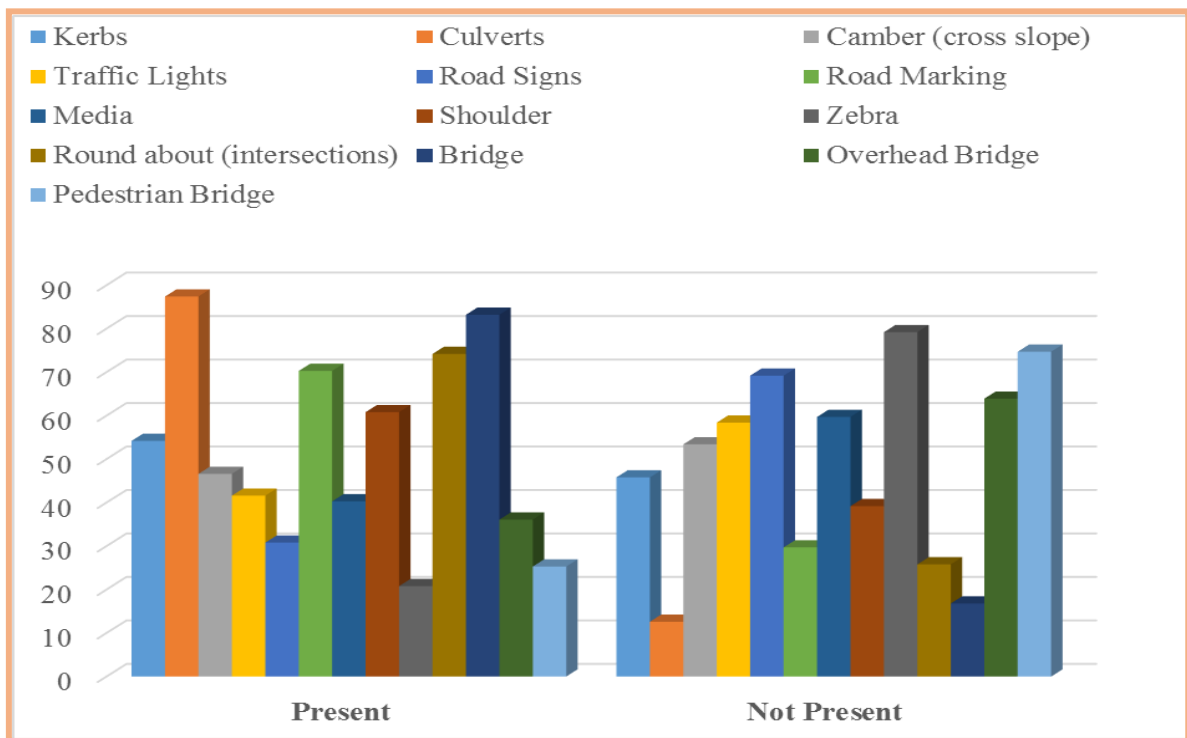


Figure 4.5: Distribution of the types of road transport infrastructure in Kaduna state

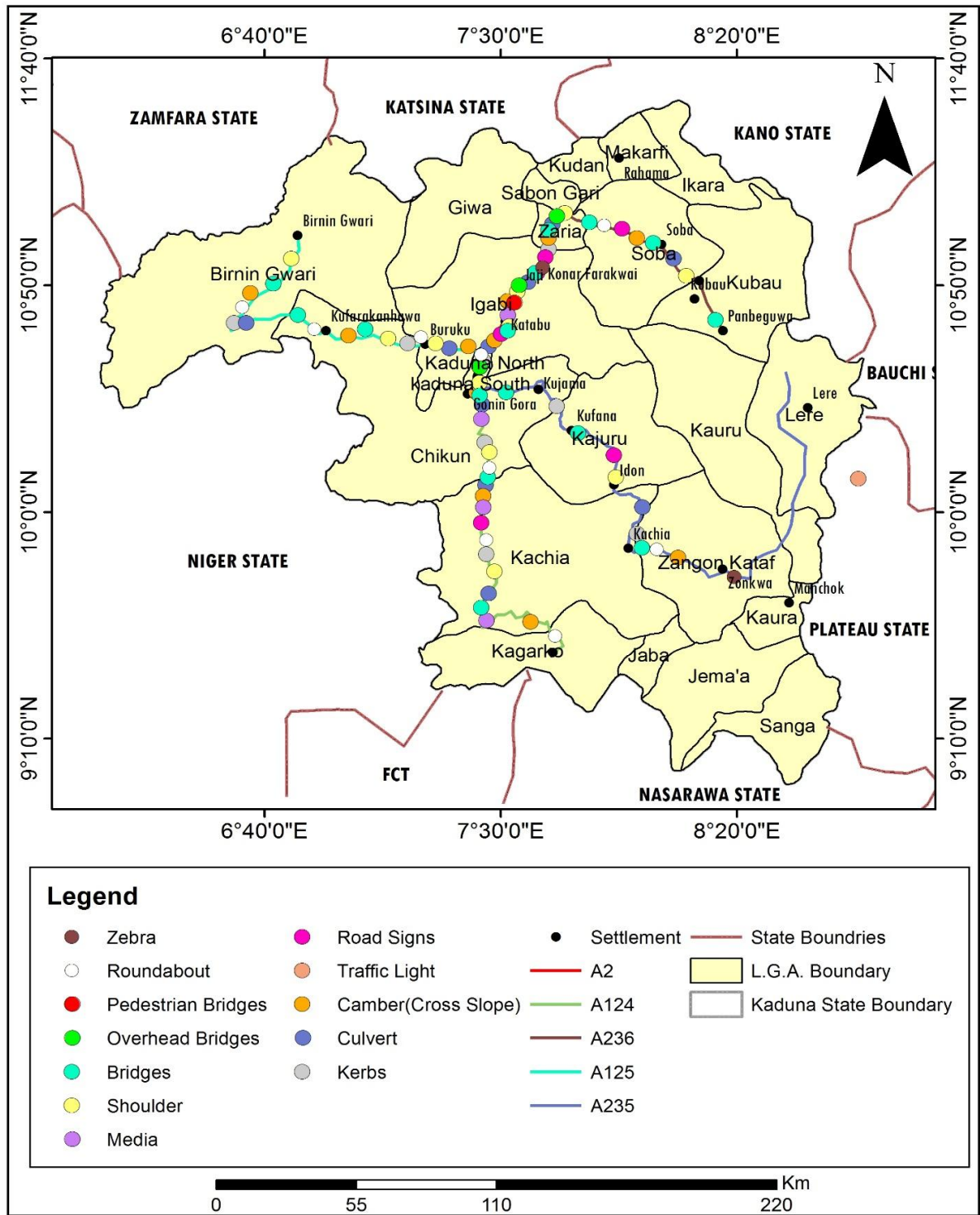


Fig. 4.7 The Map of Kaduna State showing the types of road transport infrastructure

According to Olomola (2003) inadequate provision of road transport infrastructure and services provide a basis for explaining the incidence of poverty across various Nigerian communities in both urban and rural areas. The categories of road transport infrastructure problems that can be identified are: bad roads, fuel problem (high fuel price, shortage of fuel supply and consequential high transport cost), traffic congestion (long waiting time, bad driving habits, hold-ups), inadequate high passenger capacity/mass transit vehicles and overloading, high cost and shortage of spare parts, poor vehicle maintenance and old vehicles. It is clearly established that inadequate road transport facilities and services as well as the constraints imposed on the mobility and accessibility of people to facilities such as markets, hospitals and water sources have grave implications on deepening poverty levels. Thus, there is need for urgent policy measures to address the prevailing travel and road transport infrastructure deficits.

4.3.7 Functional status of road transport infrastructure in Kaduna state

Transport is the cornerstone of civilization as it is an essential part of human activity. As society and economic organizations become more complex, the relevance of transport grows. Road transportation in particular plays a significant role in the economic development of any nation, reason being that a large proportion of its economic activities are largely dependent on an efficient network of roads. Indeed, no two locations will interact effectively without a viable means of movement from one point to another (FMW, 2013). Analysis shown on table 4.4 and reflected on figure 4.8 reveals that 165, representing 43% of the respondents indicates that the roundabout [intersections] are highly functional while 117 representing 31% of the respondents says it is fairly functional while 98 representing 26% of the respondents indicates the absence of it. On the issue of the

functionality of culverts as a critical road transport infrastructure 151, representing 40% of the respondents affirms its high functionality while a sizeable number of them within 89, representing 23% and 48 representing 13% of the respondents indicates that it is not functioning and not present respectively. Further analysis of the results on the table shows 124 representing 33% of the respondents indicating the high functionality of bridges as a road transport infrastructure while 81 representing 21% of the respondents laments its non-functionality. Similarly, 113 representing 30% of the respondents attest to the high functionality of road Kerbs, 64 representing 17% indicates its fairness, while 29 representing 8% and 174 representing 45% attested to its non-functionality and non-availability respectively.

Table 4.4: Frequency distribution of the functionality of road transport infrastructures in Kaduna state

Infrastructu re	Highly Function al	%	Fairly Function al	%	Not Function al	%	Not presen t	%	Tota l
Kerbs	113	30	64	17	29	8	174	45	380
		0		7				5	
Culverts	151	40	92	24	89	23	48	13	380
Camber (cross slope)	76	20	39	11	62	16	203	53	380
Traffic Lights	45	12	34	9	79	21	222	58	380

Road Signs	37	10	22	6	58	15	263	69	380
Road Marking	78	21	85	22	104	27	113	30	380
Media	57	15	61	16	35	9	227	60	380
Shoulder	99	26	67	18	71	19	149	38	380
Zebra	17	4	24	7	38	10	301	79	380
Round about (intersections)	165	43	117	31	0	0	98	26	380
Bridge	124	33	111	29	81	21	64	17	380
Overhead Bridge	95	25	42	11	0	0	243	64	380
Pedestrian Bridge	21	6	12	3	63	17	284	74	380

Source: Author's field survey, 2015

Indeed, socio-economic development can be facilitated and accelerated by the presence of road transport infrastructure. If these facilities and services are not in place, development will be very difficult and in fact can be likened to a very scarce commodity that can only be secured at a very high price and cost. Adequate access to social welfare services, such as medical services, education, potable water supply, roads, electricity, employment opportunities etc., are strong indices of development (Adeyemo, 1989). In any discourse on infrastructure, it is important to note that road transport infrastructure being a physical infrastructure is often referred to as economic infrastructure. Thus, the role of road infrastructure in economic development cannot be overemphasized.

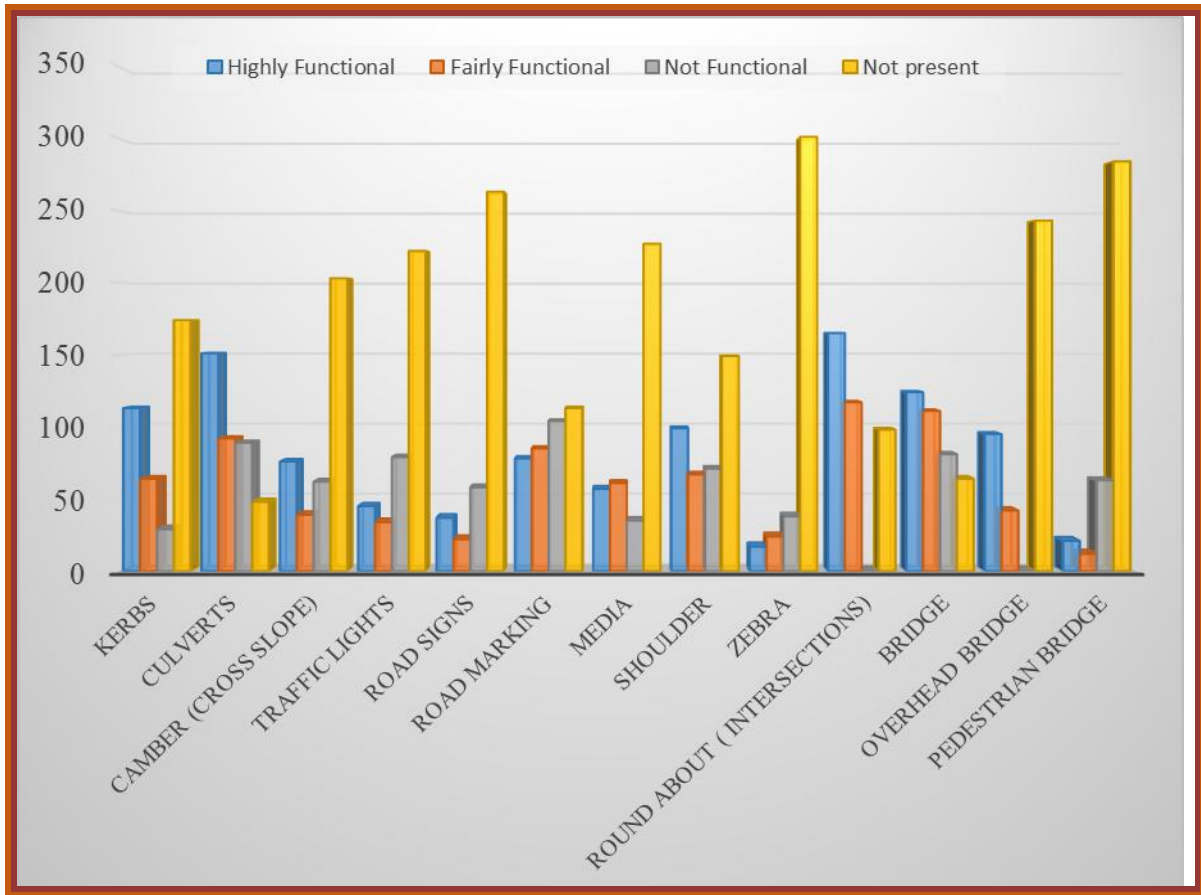


Figure 4.7: distribution of the functionality of road transport infrastructure in Kaduna state

Inefficient transport infrastructure adds between 7 - 10% to the cost of doing business in Nigeria. As part of the ongoing reforms, the strategy for improving the transport infrastructure emphasizes the leading role of private sector capital. This opens up great avenues for investment. The Federal Government has chosen to kick-start the process with massive investment which will attract private sector capital in the immediate future. (Rediscover Nigeria 2013).

4.3.8 Distribution of Road Transport Infrastructure by zones in Kaduna State.

Road Transport remain the main mode of Transportation among other modes in Kaduna State. The importance of a balance distribution of Road Infrastructure in Achieving efficient Road Transport delivery cannot be overemphasized as the consequence of neglect are enormous and costly.

Similarly, the potential significance of road transport infrastructure development for investment, trade, growth and poverty alleviation has long been recognized. Not only does road transport infrastructure facilitate the direct provision of services to consumers, it also provides intermediate inputs that enter into production of other sectors and raise factor productivity (Ighodaro, 2009). By lowering the cost and reducing the time of moving goods and services to where they can be used more efficiently, road development adds value and spurs growth (Ibid). Over time this process results in increasing the size of markets which is a precondition for realizing economies of scale. Good road projects clearly contribute to poverty reduction by improving the living conditions of people and by augmenting the opportunities available for trade and employment (Anyanwu, *et al.* 1997).

The economic development of Nigeria has reflected the development of her transport systems. This is particularly true of the road transport system, which is by far the most widely used mode of transport in the country (Adebumiti, 2005). Of all commodity movements to and from the sea-ports, at least two-thirds are now handled by road transport while up to 90% of all other internal movements of goods and persons take place by roads (Onakomaiya, 1981). Road transport can contribute to the economy directly through addition to capital stock via increases in transport infrastructure (Umar, 2013), and Kaduna state is not an exception. Road transport infrastructures provides the arteries through which

the economic life of the people, information and raw materials as well as finished products can be moved from one place to the other. This therefore helps to build and maintain the society thereby leading to economic growth (Onakomaiya, 1981).

Developing countries such as Nigeria has a fragmented type of transport infrastructure and system development, it lacks effective integrations, optimal performance, poor maintenance and appropriate investment through suitable balance between public and private provision of transport infrastructure and by implication the economic returns is perpetually low (Ocholi, 2013).

The standard score (Z- score) analytical technique was adopted to depict variation in the distribution of the infrastructures among the zones in the study area. The Z- Score model is popular to depict spatial pattern of distribution of infrastructural facilities (Aderamo and Aina, 2011; Ifabiyi, 2011). Thus the formula is expressed as follows:

$$Z_i = \frac{X - \bar{X}}{SD}$$

Where Z_i = Z-score for observation i

X = the original value in the cell,

\bar{X} = the mean for the variable, and

SD = the standard deviation of the X values and

$$SD = \sqrt{\frac{\sum (X - \bar{X})^2}{N}}$$

Where N = Total number of observation.

Table 4.8: Distribution Road Infrastructural Facilities

Infrastructure	Z- Scores		
	<i>Zone 1</i>	<i>Zone 2</i>	<i>Zone 3</i>
Kerbs	-0.074	1.035	-0.961
Culvert	0.320	0.801	-1.121
Camber	-0.473	1.149	-0.676
Traffic Lights	-0.415	1.141	-0.726
Road Signs	0.484	0.666	-1.150
Road Marking	0.651	0.501	-1.151
Media	0.756	0.378	-1.134
Shoulder	0.218	0.873	-1.091
Zebra Crossing	0.676	0.473	-1.149
Round About	0.188	0.893	-1.081
Bridge	1.109	-0.277	-0.832
Overhead Bridge	1.091	-0.218	-0.873
Pedestrian Bridge	0.577	0.577	-1.155
Sum Z- Score	5.108	7.119	-13.100
Ranking	2	1	3
Chi-Square = 34.558	Df = 12	Asymp. Sig = .001	Remark = Significant

Source: Field Survey, 2015

The result of the analysis of the distribution of road infrastructures shows that disparity exists among the zones in the study area. A close examination of Table 4.8 reveals that Zone 2 was most advantaged recording the highest score value of (7.119) while Zone 3 with a score (-13.100) appears to be the most disadvantaged. Table 4.8 further shows that in Zone 2 was disadvantaged only on two infrastructures namely; bridge (-0.277) and overhead bridge (-0.218), whereas in Zone 1 it was kerbs (-0.074), camber (-0.473) traffic Lights (-0.415) while in all road infrastructures Zone 3 was disadvantaged. Also Zone 1 was most advantaged in bridge (1.109) and overhead bridge (1.091) infrastructures whereas camber (1.149), traffic lights (1.141) kerbs (1.035) represents same in Zone 2. The result of the Friedman's Two-Way Analysis of Variance (ANOVA) shows that there is a statistical significant difference in the distribution of road infrastructures across the zones in the study area.

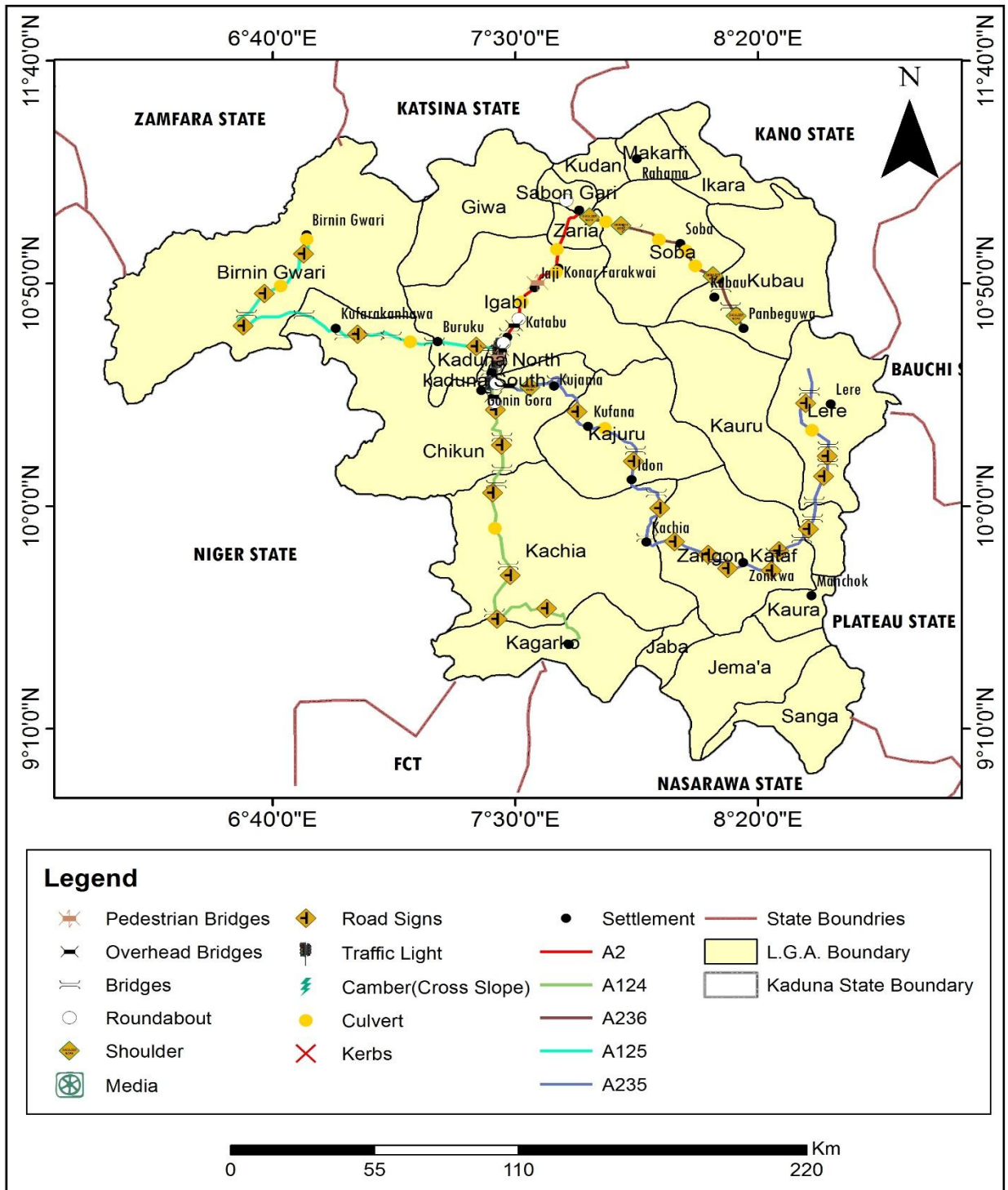


Fig. 4.8 Map of Kaduna State showing the distribution of Road Transport Infrastructure..

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Major findings

In this study an attempt was made to undergo an assessment of road transport infrastructure development in Kaduna state, Nigeria. In order for the research to be carried out, both primary and secondary data were used. Questionnaires were designed to elicit information from respondents about their socio economic characteristics as well as issues relating provision, growth and functionality of road transport infrastructures in Kaduna state.

The study shows that the development and growth as well as the functionality and distribution of road transport infrastructures is a critical investment factor in the growth and perhaps the effective and efficient functioning of any society and urban and Kaduna state is not excepted. The study focuses on how to assess road transport infrastructure development in Kaduna state with specific interest in the state, types and functionality and distribution of such road transport infrastructure vis –a– vis the kerbs, culverts, camber (cross slope), traffic lights, road signs, road marking, media, shoulder, zebra, round about (intersections), bridges, overhead bridge and pedestrian bridges.

Investigation of the insights of respondents carried out from the 380 responses on the field shows that about 30.7% indicates that the state of road transport infrastructure in Kaduna state is considerably fair, while 20.5% believes the state of road infrastructure is poor. However, a reasonable amount of the respondents of about 23.1% says it is good while 15.7% strongly indicate their opinion as being very poor state of road transport

infrastructure, but, 10% of the respondents indicates that the state of road infrastructure to be excellent.

Similarly, on the types of road transport infrastructure in Kaduna state discloses that 87.4% of them representing 332 respondents attest to the presence of culverts while 12.6% of them says it is absent. But, 83.2% of the respondents' beliefs that there is presence of bridges while 16.8% of them attest to the absence of it. On the presence of roundabout (intersections) as an integral part of road transport infrastructure, 74.2% of the respondents says it is present while 25.8% says it is not present. Also, on the issue of zebra crossing, 20.8 percent of them says it is present while a significant 79.2% says it is not available.

In addition, the observations of the respondents on the functionality of road transport infrastructures in Kaduna state reveals that 165 of the respondents indicates that roundabout [intersections] are highly functional while 117 of them says it is fairly functional, but, 98 respondents indicates the absence of it. On the issue of the functionality of culverts as a critical road transport infrastructure 151 respondents affirms its high functionality while a sizeable number of them within 89 and 48 respondents indicates that it is not functioning and not present respectively. Further analysis of the results on the table shows 124 respondents indicating the high functionality of bridges as a road transport infrastructure while 81 respondents laments its non-functionality. Similarly, 113 respondents attest to the high functionality of road Kerbs, 64 indicates its fairness, while 29 and 174 attested to its non-functionality and non-availability respectively.

Furthermore, observation made by the researcher on the distribution of Road Infrastructure by zones indicate that, zone 1 has the highest well distributed road infrastructure, followed by zone 2 and 3 respectively.

5.2 Conclusion

Road infrastructure plays a crucial role in the socio-economic development of every country in that it ensures smooth movement from one point to another. However despite this crucial role, road transport infrastructures has been inadequate and poorly maintained especially in most cities of developing countries like Nigeria. It is obvious that this study have established similar condition in Kaduna State. The study revealed uneven distribution across the zones in the provision of the various types of road transport infrastructures in Kaduna State which Zone 3 was the most disadvantaged. There is therefore the need for proper planning and provision of road infrastructure development in Kaduna State.

5.3 Recommendations

This research work has examined an assessment of road transport infrastructure development in Kaduna state, Nigeria. The study has also identified various components of road transport infrastructure necessary for the facilitation of effective and efficient movement of people and goods from one location to another within Kaduna state which in turn could spring up further economic and developmental growth in other parts of the state. The following recommendations is hereby made with the hope of assisting the government on areas of sustaining and providing additional road transport infrastructure

- ✚ Efforts should be made by the government of Kaduna state to quantify the number of existing road transport infrastructures while also establishing state maintenance board to rehabilitate them urgently.

- ✚ The government should diversify its objectives on provision of road transport infrastructures through partnership arrangements with private sectors on the public private partnership (PPP) to rehabilitate existing and construct new road transport infrastructures.
- ✚ The government should also put action into plan for the future to provided alternative means of transport to reduce burden on the existing road transport infrastructures.
- ✚ Government should introduce tolling systems on strategic road transport infrastructure to raise additional funds for maintenance dilapidated road structures.
- ✚ Finally, there should be public sensitization on the proper use of various road transport infrastructures by Federal ministry of transport, so as to prolong its usage and economic value. Components such as zebra crossing, pedestrian bridges, kerbs, media and road marking including road signages should promptly provided and maintained.
- ✚ Government should maintain a balance distribution of road transport infrastructure by zones in Kaduna State.

REFERENCES

- Adebayo, A. (1985). The Implication of Community Leadership for Rural Development Planning in Nigeria, *Community Development Journal*, Volume 20, No. 1.
- Adebumiti, O.J. (2005). Operations and management of motorcycle transportation in Akure metropolis of Ondo state, Nigeria. A term paper submitted to the department of management science, LAUTECH, Ogbomosho
- Adefila, J.O. and Bulus J.S (2014). The study of Rural Infrastructure Facilities in Kajuru area, Kaduna state Nigeria. *A spatial analysis or planning*.
- Aderamo, A. and Aina, O. (2011). Spatial Inequalities to social Amenities in Developing Countries: A Case from Nigeria. *Australian Journal of Basic and Applied Science* 5(6): 316-322.
- Adeyemo, A.M (1989). Spatial Variation in Secondary to Accessibility to Secondary School Facilities. *Unpublished PhD Thesis*, Geography Department, University of Ibadan, Nigeria.
- .Antle, J.M., (1983): Infrastructure and Aggregate Agricultural Productivity: International Evidence. *Economic Development and Cultural Change* 31 (S), 609-619.
- Anyata, B. U. (2009). Highway Drainage and Road Maintenance as Aspects of Highway Safety, University Press, Ibadan.
- Anyanwu, J.C; Oaikhena, H., Oyefusi, A. and Dimowo, F.A. (1997). *The Structure of the Nigerian Economy (1960-1977)* Onitsha, Nigeria: Joanne Educational Publishers Ltd
- Akinyemi, E. O. (2009). Contributing Road Factors in Accidents on Rural Road in Nigeria, in *Road Traffic Accidents in Developing Countries Vol. I* Asalor, Onibere and Ovuworie – eds, Joja press, Lagos.

- Aschuer, D. (1989). Is Public Expenditure Productive? *Journal of Monetary Economics*, 23(2) 177-200.
- Atubu, A. (2013). Evaluation of Transport Infrastructure in Lagos state; *Journal of Geography and Earth science*.
- Badejo, D. (1999). An overview of freight forwarding in Nigeria: Problems and Prospects. *The Journal of Transport Development Initiative*. Vol.1, No.1, PP. 71-79
- Baffes, J. and Shah A., (1993). Productivity of Public Spending, Sectarian Allocation Choice and Economic Growth. *Paper Prepared for Presentation at the 1993 Annual Meeting of American Economic Association, Anaheim, California*.
- Biehi, D. (1986). The Contribution of Infrastructure to Regional Development, European Community and Luxembourg. <http://catalogue.nla.gov.au/Record1557598>
- Binswenger, H.S, Khandker S. and Rosenzweig M. (1989): How Infrastructure and Financial Institution Affect Agricultural Output Investment in India. *World Bank Working Paper Series 163*. Washington DC;
- Boopen, S. (2006). Transport infrastructure and Economic Growth; Evidence from Africa Using Dynamic Panel Estimates. *The Empirical Letters*, 5 (1): ISSN 1681 8997.
- Brain H, and Richard K (2000). *Modern transport geography Edition 2 revised edition*. Wiley
- Brown, D. M. (1999). Highway investment and Rural Economic Development; *An Annotated Bibliography*, Food and rural Economic Division, Economic Research Service, U.S. Department of Agriculture, *Bibliographies and Literature of Agriculture No 33*.
- Buhari M. (2000): Cited in CBN 2010 Annual reports.

BPE, (2011). Privatisations and commercialization, mergers and acquisitions, divestments, international contract negotiation and documentation. Retrieved from www.benchmacince.net

Caldron, C. (2007). Infrastructure and Growth in Africa, *Policy Research Working paper 4914*, The World Bank, Washington, D.C.

Camemark, C (1979). Some Economic, Social and Technical Aspect of Rural Road. Dhaka; *ESCEA Workshop on Rural Road*. Retrieved from Role- of-Transport-in-Economic-Development.

Central Bank of Nigeria (2002) *Annual Report and Statement of Account for the Year Ended 31st December, 2001*, CBN, Lagos, April

Central Bank of Nigeria (CBN, 2003). *Statistical Bulletin* Vol. 15 December.

Central Bank of Nigeria (2009). Highway Maintenance in Nigeria: Lessons from the other Countries. *Research Department*, Central Bank of Nigeria Occasional Paper No.27

Central Bank of Nigeria (CBN, 2010). *Statistical Bulletin* Vol. 15 December.

Easterly and Rebelo (1993). Fiscal Policy and Economic Growth: An Empirical Investigation, *Journal of Monetary Economics*, 32(3).

Encyclopedia of nation (2008). Encyclopedia of nations – information about countries of the world. www.nationsencyclopedia.com

Federal Ministry of Work Published Report (2009): Reforming Road Transport in Nigeria, *2009 Report*.

Federal Ministry of Work Published Report (2012): Reforming Road Transport in Nigeria, 2012 Report.

Federal Republic of Nigeria (FRN), (2010): *Federal Republic of Nigeria 2006 Population and Housing Census*, Priority table Vol. III Abuja National Population Commission.

Filani, M. O. (1986). *How do we get there from here: A 1986 Alumni Lecture at University of Ile-Ife*

Filani, M.O. (1999). Transport and Rural development in Nigeria: *Journal of Transport Geography*, 1; 248-354.

Federal Ministry of Works, (2013). Compendium Report on road infrastructure & related development in Nigeria - an investor's manual

FRSC, (2013). Federal Road Safety Corps annual bulletin on road traffic accidents. Retrieved from frsc.gov.ng

FMW Bulletin (2012): Lesson from other Countries. *Central Bank of Nigeria Statistical Bulletin* 2004 Vol. 15. 2012.

Garcia-Mila T., and McGuire T. (1992). The Contribution of Public Inputs to State Economies, "*Regional Science and Urban Economics*", 22 (2,)

Gungul, T.T (2012). Road traffic accidents in Nigeria: causes and control. *Journal of Applied Science and the Environment*, Vol. 3, pp 25-29, 2012. ISSN: 2141-1360 © 2012 School of Technology, Federal Polytechnic, Idah, Kogi State, Nigeria.

- Ifabiyi, I. (2011). Spatial Distribution and performance of Water pumps in the Areas of Kaduna State, Nigeria before the Second Republic. *European Journal of Social Sciences*. 26(1): 15-25
- Ighodaro, A.U. (2009). Transport infrastructure and economic growth in Nigeria. Department of Economics, University of Lagos, Nigeria.
- Ikya, S.M. (1998). Urban mass transportation in Nigeria. Matriv Press Ltd, Abuja.
- Ishaya, S. Agbaje, I.B, and Usman S.U (2008; 2009). An Analysis of Rainfall Trends in Kafanchan Kaduna State, Nigeria: *Research Journal of Environmental and Earth Science* 2(2) 89-96
- Jacobs, G. D. (2010). Further Research on Accident Rates in Developing Countries, Accidents Analysis and Prevention, Vol.24, Ibadan University Press, Ibadan.
- Kaduna State Government, KDSG (2012). History of Kaduna State. Retrieved January 6, 2015, from <http://www.kadunastate.gov.ng>
- Library of Congress, (2009). Library of congress update for 2009 ALA annual conference. January-May, 2009.
- Loto, M.A (2006). The State of Infrastructure Facilities and its Implication for Private Investment Growth in Nigeria. *The National Economic Empowerment and Development Strategy: Philosophy, Opportunities and Challenges*, (University of Lagos Press) 474-487.
- Mbagwu, T. C., (1977), "Transport constraint in Rural Urban flow of Agricultural Food Products. *A case of Owerri area*. In: Onakomaiya & Ekanem (Ed). *Transportation in Nigeria National Development*, N1SER.

- Mera, K. (1973): Regional Production Function and Social Overhead Capital: An analysis of the Japanese case, *Regional and Urban Economics*, 3(2) pp. 157-185
- Mobolaji, O. (2012). Vision 20:2020 and the challenges of infrastructural development in Nigeria. *Journal of sustainable development*. Vol5, No.2; February, 2012
- Munnell, A.H. (1990). Why has Productivity Declined? Productivity and Public Investment. *New England Economic Review* (Federal Reserve Bank of Boston), 3-22.
- Mustapha, M. (2009). "Development Planning in Nigeria: Reflections on the National Economic Empowerment and Development Strategy (NEEDS) 2003-2007".
- Nwakaze, M.N, and Mulikat A.Y. (2010). Transportation and Economic growth in Nigeria. *Journal of research in national development* 18 (2).
- National Planning Commission. (2006). "Nigeria's Vision 20:2020", Report of the Vision 2020 National Technical Working Group on Employment
- Ocholi, A.S. (2013). An assessment of road Transport Infrastructure in Nigeria.
- Odugbemi, O. O. (2010). Road Transportation and Tourism in Nigeria, Joja Press, Lagos.
- Odeleye, J.O. (2000) 'Public- Private Partnership to Rescue Railway Development in Nigeria'. Retrieved from <http://www.jrtr.net/jrtr23/pdf/f42-odeleye>
- Odekunle, T.O (2006). Climate change and vulnerability and adaptation. Retrieved from <http://books.google.com.ng/books/> ISBN=1134072821
- Odekunle, T.O, *et. al.*, (2008). Going Global: Identifying trends and drivers of international education. Edited by Mary Stiasny, Tim Gore.

- Ogbuozobe, (1997), “Infrastructural Development” in Nigeria in 2010: Nigerian Institute of Social and Economic Research (Pp. 163-193), Ibadan.
- Ogun, T.B (2010): Infrastructure and Poverty Reduction. Implications for urban Development in Nigeria. UNU WIDER Working Paper No 2010/43.
- Olagunju, K. (2011). “Articulated Lorries’ management in Nigeria: *Road safety perspective*”, a paper presented at the Road Safety forum, organized by the International Road Safety organization: at Ladi Kwali hall, Sheraton hotel & towers, Abuja, 6th May, 2011.
- Olanrewaju, S.A. (1986) “Transportation in Nigeria’s Economic Setting” in: Falola, T. and Olanrewaju, S.A. (Eds.). *Transport Systems in Nigeria*. University Press: Syracuse.
- Olsen, W. (2004). Triangulation in Social Research; Qualitative and Quantitative Methods can really be mixed. Retrieved January, 2015 from <http://ccsr.ac.uk/stalTriangulation.pdf>
- Olomola, A. S. (2003), “Understanding Poverty in Nigeria: Highlights from NISER Review of Nigerian Development” in NISEREEL, The Magazine of the Nigerian Institute of Social and Economic Research, Nos. 4 & 5, December, 2003, Ibadan.
- Olubemehin, O.O. (2012). Road transportation as a lifeline of the Economy in Western Nigeria, 1920 to 1952. *African Journal of History and Culture*, 4(3), 33-45.
- Oni, S.I and Okanlawon (2008): Nigeria Transport Infrastructure Development: *An integral Part of National Economic Empowerment and Development strategy (NEEDS)*.
- Onakomaiya, S.O. (1981). Transportation in Nigeria National Development, NISER
- Pravakar, S.K, Ranjo, and N. Geethanjani (2010); Infrastructure development and economic growth in China. *IDE Discussion* paper No 261 pp-16.

Rae, J.B. (1968) "Transportation Technology and the Problem of the City". *Traffic Quarterly* Vol. 22. pp. 299-314

Ratner J.B (1983). Government Capital, Employment and the production for US Private Output, *Economic Letter*, (13), 213-217.

Rediscover Nigeria (2013).

Senbeta, A. F. (2009) Climate change impact on Livelihood, Vulnerability and Coping Mechanism: A Case Study of West Arsis Zone, Ethiopia, M.Sc. Thesis Submitted Lund University Master's Programme in Environmental Studies and Sustainability Science (LUMES), Sweden.

Sheriff, M. A. (2009). Traffic Education and Safety in Nigeria, Nitours. Journal Vol. II, Kano

Taube W (2013). "Minibuses the way ahead", paper presented to planning and transport research and computation (PTRC) international association conference.

Troy, P. (2003) 'Urban Planning in the Late Twentieth Century' in: Bridge, B.

Umar, M.M. (2013). Road Transport Accidents: Causes, Effects and Prevention, General Hospital Zurmi, ZAMFARA State.

WIR, (2008). World Investment Report. Guidelines for dissemination of investment data. Retrieved from <http://www.unctad.org>

WIR, (2013). World Investment Report Annex Tables. Retrieved from <http://www.unctad.org>

World Bank (2008) Project Information Document Report No. AH3515: World Bank, Washington DC, World Investment report (2008)

Yunusa, M. (2011). Planning Cities for Wealth Creation: Lecture delivered at the First Urban Dialogue Series of Department of Urban and Regional Planning, Faculty of Environmental Sciences, University of Lagos

APPENDIX I

QUESTIONNAIRE FOR RESPONDENTS

DEPARTMENT OF GEOGRAPHY

AHMADU BELLO UNIVERSITY, ZARIA

Dear Respondent,

I am a M.Sc. student of the Department of Geography, Ahmadu Bello University, Zaria, carrying out a research on “Assessment of Road Transport Infrastructure development in Kaduna state”. I therefore solicit for your cooperation to respond to the following question by ticking [] at the appropriate item and where necessary, you fill in the blank spaces. All information given will be treated confidentially as the research work is only for academic purpose.

Thank you.

Yakubu Hamza

P15SCGE8075

SECTION A – General Information

Name of Political Zone: Zone 1 [] 2 [] 3 []

Types of Respondent: Road users [] Road workers []

Traffic law enforcement agents []

SECTION B: Bio data of Respondent

INSTRUCTION: Tick [] as appropriately as it applied to you.

1. Gender: Male [] Female []

2. Age: < 20 [] 20-24 [] 25-29 [] 30-34 [] 35- 39 [] 40-44 [] 45-49 [] 50-54 [] 55-59 [] 60 > []

3. Educational Status: Primary [] Secondary [] Tertiary []
Quranic [] No Education []

4. How often do you travel (by highway)? Very often [] Often []
Not often []

SECTION C: Tick the types of road transport infrastructure in Kaduna State.

Please tick as appropriate.

How can you rate the state of road transport infrastructure in Kaduna State?

Excellent [], Good [], Fair [], Poor [], Very Poor []

Section D. Examining the types of Road Transport Infrastructure in Kaduna state.

Please tick as appropriate.

Infrastructure	Present	Not present
Camber (cross slope)	[]	[]
Krebs	[]	[]
Culverts	[]	[]
Traffic Lights	[]	[]
Road Signs	[]	[]
Road Marking	[]	[]
Media	[]	[]
Shoulder	[]	[]
Zebra	[]	[]
Round about (intersections)	[]	[]
Bridge	[]	[]
Overhead Bridge	[]	[]
Pedestrian Bridge	[]	[]

SECTION E: Examining the functionality of Road Transport infrastructure in Kaduna State.

Please tick as appropriate.

Infrastructure	Highly	Fairly	Not	Not
-----------------------	---------------	---------------	------------	------------

	Functional	Functional	Functional	present
Camber (cross slope)	[]	[]	[]	[]
Krebs	[]	[]	[]	[]
Culverts	[]	[]	[]	[]
Traffic Lights	[]	[]	[]	[]
Road Signs	[]	[]	[]	[]
Road Marking	[]	[]	[]	[]
Media	[]	[]	[]	[]
Shoulder	[]	[]	[]	[]
Zebra	[]	[]	[]	[]
Round about (intersections)	[]	[]	[]	[]
Bridge	[]	[]	[]	[]
Overhead Bridge	[]	[]	[]	[]
Pedestrian Bridge	[]	[]	[]	[]

Thank you.

APPENDIX II

Infrastructure	Mean	Std. Deviation	Minimum	Maximum
Kerb	20.67	9.018	12	30
Culvert	63.33	20.817	40	80
Camber	14.33	4.933	11	20
Traffic light	17.67	6.429	13	25
Road sign	17.33	5.508	11	21
Road marking	19.67	6.658	12	24
Media	11.00	2.646	8	13
Shoulder	66.67	15.275	50	80
Zebra crossing	9.67	4.933	4	13
Round about	58.67	7.095	51	65
Bridge	31.00	3.606	28	35
Overhead bridge	1.33	1.528	0	3
Pedestrian bridge	.67	.577	0	1
Friendman Test Result = 34.558				
Df 12				
Asymp. Sig. .001				