OPERATIONAL TRAFFIC CHARACTERISTICS OF KANO-NGURU RAILWAY TRANSPORT SERVICE, NIGERIA

BY

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A THESIS SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, AHMADU BELLO UNIVERSITY, ZARIA, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE DEGREE IN TRANSPORT MANAGEMENT

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DECLARATION

I declare that the work in this thesis entitled **Operational Traffic Characteristics of Kano-Nguru Railway Transport Service, Nigeria** has been performed by me in the Department of Geography under the supervision of Dr. I.J Musa and Dr. A.E. Ubogu. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this thesis was previously presented for another degree or diploma at this or any other Institution.

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Name of Student	Signature	Date

CERTIFICATION

This thesis titled **"**Operational Traffic Characteristics of Kano-Nguru Railway Transport Service, Nigeria**"** by **Suleiman Dahiru** meets the regulations governing the award of the degree of Master of Science (Transport Management) of the Ahmadu Bello University, and is approved for its' contribution to knowledge and literary presentation.

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DEDICATION

I dedicate this research work to Almighty Allah for His abundant blessing that has made it possible and help in making this research a reality. Also to my parent Alh. Suleiman Attahiru and late Mal. Hajara Suleiman, my wife Mal. Aisha Mahmood Baba, my children, Hajara Dahiru (Afrah) and Hauwa'u Dahiru (Jiddah).

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ABSTRACT

The study examines the operational traffic characteristics of Kano-Nguru rail transport service in northern part of Nigeria. The Kano-Nguru train service remained operational even when train operation along the major railway corridors were short down due to industrial crisis faced by the Nigerian Railway Corporation between 2005-2010. Data used were derived from both primary and secondary sources. The primary data focused on the train passengers and railway staff in the study area in order to capture their view on the train operations. Passengers were systematically selected and a sample size of 172 was used and this represented the total number of questionnaires that were administered for the study. The study adopted the use of descriptive method of data analysis. The findings of this study reveals that 68.6% of the train passengers were traders, while 89% of the passengers opined that the train transport fare was relatively cheap. The study further indicates that majority of the passengers agreed that the train was always punctual at departure. The findings shows that year 2007 recorded the highest frequency of trips representing 18.5% of the total trips between 2007-2013 while 2010 recorded the list frequency of trips representing 10.3% of the total trips between 2007-2013. The findings also indicates that between 2007-2013 the total quantity of freight transported is 4086 metric tons. Similarly, the haulage of cows for the period under investigation was 4,644 cows, while 26,496 passengers were transported. Generally, there is need to upgrade the existing facilities at the railway terminals and inside the train so as to attract more passengers and increase revenue to the Nigerian government.

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CHAPTER ONE: INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Rail transport is a means of conveyance of passengers and goods by way of wheeled vehicles running on rail tracks in contrast to road transport, where vehicles merely run on a prepared surface. Rail coaches are also directionally guided by the tracks on which they run (Wolmar, 2009). A track usually consists of steel rails installed on sleepers, on which the rolling stock, usually fitted with metal wheels, moves. However, other variations are also possible, such as slab track where the rails are fastened to a concrete foundation resting on a prepared subsurface (Skempton, 2002).

According to American Railway Engineering and Maintenance of Way Association (AREMA) (2003) a train is a connected series of rail vehicles that move along a purposely constructed track. Propulsion for the train is provided by a separate locomotive or from individual motors in self-propelled multiple units. Most trains carry a revenue load, although non-revenue cars exist for the railway's own use, such as for maintenance-of-way purposes. The engine driver controls the locomotive or other power cars.

The earliest evidence of a railway was a 6-kilometre (3.7 m) Diolkos wagon way, which transported boats across the Corinth isthmus in Greece during the 6th century BC. Trucks pushed by slaves ran in grooves in limestone, which provided the track element. The Diolkos ran for over 600 years (Lewis, 2009). Railways began reappearing in Europe after the Dark Ages. The earliest known record of a railway in Europe from this period is a stained-glass window in the Minster of Freiburg im Breisgau in Germany, dating from around 1350 (Hylton, 2007).

Clearly, a virile railway system plays a significant role in the sectoral development and overall growth of any economy. It opens up regions, hinterlands and rural areas by facilitating agricultural development as well as facilitates the growth of cottage/large scale industries. It also attracts residential, commercial, educational and recreational settlements and developments around its corridor. It is in this context that rail transport mode is seen as the mainframe or pivot around which an integrated national transport system should be built with other modes complementing. Its capacity which is further accentuated by its safety and security factors as well as its ability to travel longer

distance, with ease and lower unit costs, places it in good stead to serve as the hub of a transport system of a nation (Nwanze, 2002).

According to U.S. Bureau of Transportation Statistics (2010) rail transport is one of the safest forms of land travel. Trains can travel at very high speed, but they are heavy, unable to deviate from the track and require a great distance to stop. Possible accidents include derailment , a collision with another train or collision with an automobile or other vehicle at level crossings. The most important safety measures to prevent accidents are strict operating rules, for instance, railway signaling and gates or grade separation at crossings. Train whistles, bells or horns warn of the presence of a train, while trackside signals maintain the distances between trains.

The American association of railroads (2009) noted that rail transport is an energy-efficient but capital intensive means of mechanized land transport. The tracks provide smooth and hard surfaces on which the wheels of the train can roll with a minimum of friction. Moving a vehicle on and/or through a medium (land, sea, or air) requires overcoming resistance to motion. However, railways soon became the pioneers of modern management techniques, particularly in North America and England where private companies operated the enterprises. Railway companies were the first corporations run by professional managers (Richards and MacKenzie, 1988).

Jean (1981), stated that in providing new opportunities for people to travel, railways helped break down old cultural divisions and expand social exchange for ordinary people. The railway station emerged as the place where people met and mingled, the starting and arrival point for journeys to work, the city the country, and the wider world. The station was a gateway through which individuals could expand their network of social exchange beyond their town and village to the wider world.

According to Hong Kong information services department (2009), railways have also been shown to contribute to social vibrancy and economic competitiveness in its ability to transport large amounts of customers and workers to city centres and inner suburbs. Hong Kong has recognized rail as "the backbone of the public transit system" and as such developed their franchised bus system and road infrastructure in comprehensive alignment with their rail service. China's large cities such as Beijing, Shanghai, and Guangzhou recognize rail transit lines as the framework and bus lines as the main body to their metropolitan transportation systems (Hau, Yun-feng, Zhi-gang, Xiao-guang, 2010).

Rail system everywhere in the world is cheap (after the initial costs) and capable of effectively and efficiently transporting large number of people, goods, services, machineries and all kinds of raw materials all over the country at minimal costs to the users (Squires, 2002). It will help open up rural areas to the rest of the country in terms of development and access to services. Rail system will encourage companies; local and multinational to site their industries in the rural areas and thus bring jobs and all kinds of development to that area (Puentes, 2008).

Perhaps, the most significant distinguishing characteristic of the typical railway traffic is the type of traffic it carries. This is important in several dimensions. First, the mix of freight carried determines the ability of the railway to capture a number of production economies which have emerged over the last two decades: Railways carrying large amounts of bulk traffic between a limited number of origins and destinations (especially coal and grain) can operate unit trains which permit extremely high productivity of both labour and equipment, whereas railways carrying mostly wagonload (or smaller) amounts of merchandise traffic are highly constrained (Thompson and Julie, 1993).

More critical, certain railways especially in the United State, China, and Mexico) carry mostly freight which permits higher productivity and which, at least in principle, permits a "commercial" approach to prices and services. Other railways for instance in Sri Lanka, India, and most of the Western European countries carry much more passenger service than freight, which constrains productivity, raises cost, and invites political interference in operations and pricing. Also, the passenger problem is aggravated where, as in the case of India, Russia and the Western European railways, a significant part of the passenger activity is suburban commuting which is the most costly and the least remunerative of all (Thompson and Julie 1993).

Pachl, (2002) noted that passenger rail traffic operations serve a wide variety of functions, from long distance intercity travel to daily commuter trips to local urban transit services. These operations encompass a diversity of vehicle types, operating speeds, right-of-way requirements and service frequencies. The characteristics of each type of traffic operation are so different from one another.

Capacity as one of the operational traffic characteristics of railway is defined as a measure of the ability to move a specific amount of traffic over a defined rail line with a given set of resources under a specific service plan. This capacity is highly dependent on a number of infrastructure and operational factors (Krueger, 1999; Vantuono, 2005)

There are variety of factors that influence rail capacity, and different metrics to measure it. Both operating and infrastructure characteristics influence capacity and major factors include: average and variability in operating speed, traffic volume, stability, terminal efficiency and heterogeneity in various train characteristics. The train characteristics of speed, per ton / km ratio and priority were considered for their effect on delay and capacity, with priority appearing to have the greatest effect (Mark, Yung-Cheng, Christopher, 2009).

It goes without saying that, over the past two hundred years, the railroad has created development compared to the past several millennia. Up till now, the rail-road has played an important role in developing modern civilization, and has contributed greatly to bettering humankind and making human existence more convenient. When the railroad appeared in Britain in 1829, it was seen as a product without precedent, as a magic tool that would forever change the economy, society, politics, culture, and psycho-emotional impact of individuals (Drucker, 1999).

1.2 STATEMENT OF THE RESEARCH PROBLEM

Rail transport has and continues to play a key role in the movement of goods and passengers in many countries around the world including Nigeria. However, while rail transport continues to enjoy relative importance in terms of investment, growth and contribution to the national economy in several countries, it has suffered and continues to decline (in terms of modal share contribution) in Nigeria and other African countries (Adesanya, 2010). At some point in time, the Nigerian railways played a key role in enhancing colonial administration, by maintaining links between the central seat of colonial government in Lagos and other parts of Nigeria (Elechi, 1998). It also served as a major mode of transport used in facilitating the opening up of several mineral producing and agricultural areas.

The primary reason for constructing the railways in Nigeria was to open up the hinterland for the exploitation of agricultural and mineral resources, as well as to provide leverage for strengthening colonial political administration (Jaekel, 1997). In fact, the motive for constructing the railway was partly administrative, in order to provide a link between the northern and southern parts of Nigeria, and partly economic, so as to enhance the evacuation of mineral resources and agricultural products from the hinterland to the seaports, for onward shipment to overseas markets in Europe (Jakpa, 1981). The flow of goods to the hinterland was also facilitated by the railway (Olanrewaju, 1986).

The existing Nigerian Railway Corporation (NRC) was created by the enabling Act of 1955 (as amended in 1990), after starting as a Government Department in 1898. The responsibilities of the NRC as spelt out in the Act establishing it include 'carriage of passengers and goods in a manner that will offer full value for money, meet the cost of operations, improve marker share and quality of service, ensure safety of operations and maximum efficiency, meet social responsibility in a manner that will meet the requirements of rail users, trade, commerce, industry and the general public (Adesanya, 2010).

Several studies have been carried out on railway transport including Aba's (2008) on economic impact of the decline in Nigerian railway transport system. The study evaluated the effect of the decline in railway transportation on settlements along the Kafanchan-Kaduna railway route. The study concluded that the decline in operations of the railway resulted to the reduction of accessibility and mobility of those settlements and reduced productivity in agricultural production, affected occupational structure, increased unemployment and degenerating environmental quality.

The study of Ubogu (2011), on the potentials of rail-road integration for port-hinterland freight transport in Nigeria, revealed that the potentials of integrating rail-road in port-hinterland freight transportation would be beneficial to the economic development of the country. It is therefore important that efforts should be geared towards sustaining the emergence of a reliable transportation system that is characterized by timely, safe, efficient and cost-effective method of freight distribution. The paper demonstrated in clear terms that integrating rail-road transport from Nigerian seaports to

the hinterland would reduce freight cost, the time of delivery and unnecessary operational delays, accidents and loss of cargo in transit, and by extension, reduce the pressure on Nigerian roads.

Similarly, Okanlawon's (2006) work on the enhancement of light rail system in efficient transportation of commuters in Lagos state, revealed that in order to maximize the role of railway transport, light rail transport must be integrated within the overall transit system. This can be achieved by developing a joint network with existing railways and bus lanes, by using Transport Demand Management (TDM) strategies that encourage park and ride and other links with motor vehicle traffic, and by establishing convenient fare-payment systems.

Adesanya (2002), examined the contributory factors to the poor performance of the Nigerian railway system as well as some of the remedial steps taken to deal with existing problems. The researcher revealed the need to restructure rail operations to meet existing and emerging rail transport needs, and also to modernize the rail transport system.

However, none of the studies cited above examined the operational traffic characteristics of rail transport service along a defined railway route. Also, to the best of the researcher's knowledge, no research has been carried out on the operational traffic characteristics of railway transport in Nigeria. It is this research gap that this study intends to fill. It is against this background that this research has provided answer to the following questions:

i. Is the train running frequently and on schedule?
ii. What is the number of passengers and quantity of freights transported by Kano-Nguru train from 2007-2013?
iii. When is the peak and off-peak period of traffic along the rail corridor?
iv. What is the revenue generated from Kano-Nguru train operation from 2007-2012?

v. What is staff and passengers perception on railway operation along the corridor?

1.3 AIM AND OBJECTIVES

The overall aim of this research is to examine the operational traffic characteristics of Kano-Nguru railway transport service, Nigeria. To achieve the aim of this study, the specific objectives are to:

i. examine the frequency and punctuality of the train operation along the rail corridor,
ii. analyse the number of passengers and quantity of freight transported by Kano-Nguru rail transport from 2007-2013,
iii. determine the peak and off-peak period of traffic along the rail corridor,
iv. quantify the revenue generated from Kano-Nguru train operation from 2007-2013 and
v. examine the perception of railway staff and passengers on the Kano-Nguru train operation.

1.4 SCOPE AND DELIMITATION OF THE STUDY

The scope of this study covered Kano, Jigawa and Yobe state where the Kano-Nguru rail line passes through. Also the study looked at issues such as the frequency and punctuality of the train operation, quantity of freight transported, peak and off-peak period of traffic, amount generated and staff and passengers perception on the services render by the NRC. The study also covered the period from 2007-2013. The rationale behind selecting Kano-Nguru train operation is due to the fact that, the Kano-Nguru train service is one of the few train service that remains actively operational in Northern Nigeria from 2007 till date. Other branch lines such as Baro line had been closed since 1988, while the Zaria-Kauran Namoda

branch line was also closed since 2003 and is now under rehabilitation. Western line (Lagos-Kano line) resumed operation in December 2011, while eastern line (Enugu-Maiduguri line) is still under rehabilitation. In addition, the reason for choosing 2007 is because the Kano-Nguru train resumed operation in 2007 after two years of stoppage due to industrial crises faced by the NRC during that period.

1.5 SIGNIFICANCE AND JUSTIFICATION OF THE STUDY

The Kano-Nguru rail line passes across agricultural, commercial, industrial, and densely populated areas were agricultural products, livestocks and industrial products are transported using the rail transport service. Therefore, this research intends to examine the role of the Kano-Nguru rail transport service to the socio-economic development of towns and villages along the rail corridor in Kano, Jigawa and Yobe state. Beside, problems associated with the Kano-Nguru rail transport service were also highlighted.

CHAPTER TWO: LITEREATURE REVIEW

2.1 INTRODUCTION

This chapter present a compendium of thoughts of previous works and research on the role of transportation to national development and the development of the development of railway transportation in Nigeria and how it has contributed to the development of Nigerian economy, challenges facing the Nigerian railways and rail concession in African countries.

2.2 TRANSPORTATION AND NATIONAL DEVELOPMENT

Transportation is an essential part of economic development. It is one of the indices for measuring the development of a country. Nigeria's rural transport infrastructure has been identified as a crucial component for the economic development of the country by linking the rural communities to the urban areas (Gbenga, 2007). A good transportation network expands economic activities by improving accessibility and facilitates movement of goods including agricultural commodities in all the nooks and cronies of the country.

According to Oni and Okanlawon (2002), transport is the cornerstone of civilization. As the society and economic organizations become complex, the relevance of transport grows. Also, the demand for transport is a derived one, because it depends on the demand for the commodities carried or the benefit of personal travel and each travel is unique in time and space. Hence, the demand for transport services increases with the extension of the input-output relationships of an economy. Transport infrastructural development remains a major tool for achieving meaningful development. Transport system is classified into four basic categories, namely, rail, road, water and air transport (Ademiluyi 2006).

Economic transformation, and indeed, the development of any country are hardly possible without an efficient transport system (Salim, 2003, Lingaitiene, 2006). Indeed, no two locations will relate effectively without a viable means of movement. In many developing countries, inadequate transport facilities are often the norm rather than the exception. According to Transport Statistics Report (2010), a good transport system is essential to support economic growth and development.

Like most modes of transport, railways have the capability of impacting

tremendously on the spatial and economic growth of settlements, regions and countries. Rail transport can contribute to the administration of territories, creation of employment opportunities, promotion of trade and commerce, enhancement of internal cohesion, facilitation of urban development and the movement of military troops, as well as the generation of revenue. Indeed, the availability or otherwise of a reliable and responsive rail transport system, in terms of the quality and quantity of rail transport infrastructure and services, can affect, substantially, the transportation of raw materials for the industries, the movement of exports and imports, the internal distribution of freight, as well as the movement of passengers. Undoubtedly, the prime objective of a rail transport policy, or any transport policy for that matter, is the entrenchment of an effective and efficient rail transport system, which is capable of meeting rail users' needs at all times (Adesanya, 2002).

2.3 RAIL TRANSPORT AND ITS IMPACT ON DEVELOPMENT

In many countries, rail transport has and continues to play a catalytic role in bringing about socio-economic development. It contributes substantially to the movement of passengers and freight. Indeed, railways can provide the most cost-effective, affordable, energy saving and environmentally friendly form of transport, when traffic densities are high. When properly integrated with other modes of transport, economic levels of traffic can be consolidated to enable the railway to provide efficient services for high density flows of homogenous traffic carried over relatively long distances, including high volumes of containerized cargo or bulk freight such as oil, coal, steel or agricultural produce. Railway transport could be energy flexible and energy efficient, when electric traction is used (Adesanya 2010).

Rail transport is also an important mode for passenger transport. Commuter traffic by rail for example is essential to keep cities accessible. Therefore, many cities, particularly in the developed world continue to develop various forms of rail transport (metros, Light rail transit, transport) in order to divert traffic to the rail and partly reduce congestion on city roads (Adesanya, 2010).

Hilling (1996) observed that in many parts of Africa, railways provided the really first alternative to human porterage, and brought with them some economic advantages. In East and

Central Africa, early rail lines were critical to the development of commerce, the expansion of commercial agriculture and the stimulation of settlement expansion. Also, in Ghana, the Accra-Kumasi-Takoradi rail line clearly reflects a concentration of economic activities.

In many countries around the world, freight is transported by train. This is largely because transporting freight by train is highly economic when freight is being carried in bulk and over long distances (Hilling, 1996). The importance of rail transport in providing the stimulus for administrative control, regional growth and development are well documented. Economic growth, for example, followed the provision of rail lines into the cocoa belt of Ghana (then Gold Coast) in 1903 and the groundnut belt of Northern Nigeria in 1912 (Mabogunje, 1980). In Ghana, the completion of the first rail line in 1903, from the coast of Sekondi to the gold mining areas of Tarkwa immediately resulted in a sharp fall in land transport cost per tonne of exported goods from the mines (Hilling, 1996). It was observed that the impact of the railway on the development of the Nigerian economy was such that it enhanced the exportation of groundnuts from about 10,000 tons in 1912 to an average of 40,000 tons per annum for the next decade (Onakomaiya, 1978).

The rail transport sector is also a key employer of labour. According to Galenson and Thompson (1994), railways employed substantial number of workers. For instance in China the railways employ 3 million workers while that of India was estimated to be about 1.6 million in the 1990s (Fukui, 1992).

In spite of its benefits, the weaknesses of railway transport include inflexibility of operation (hence, its inability to provide door-to-door services), vulnerability to level of industrial activity, the image of inefficiency and unreliability, and it is usually vulnerable to industrial action due to its being a labour intensive and heavily unionized industry (Gubbins, 1988).

2.4 HISTORY OF RAILWAY TRANSPORT IN NIGERIA

Of all the overland transport modes in Nigeria, the railway is the oldest and perhaps has the greatest carrying capacity. Railway development in Nigeria began in 1898 with the Lagos – Ibadan line that was completed in 1901 (see table 2.1). Its original conception by the colonial authorities was to open up the country to trade with England as well as an instrument of administrative control, regional growth and development, politics and military control (Ademiluyi 2006). The Lagos – Ibadan

line was extended to Jebba in 1909, and this line later joined the Kano – Baro line in 1911. In the East of Nigeria, the Port-Harcourt line reached Enugu in 1916. Between 1916 and 1966, the railway line was connected to towns and cities like Jos, Kaduna, Zaria, Namoda, Nigwu, Ifo, Maiduguri and Gombe. Alesa – Eleme oil refinery to Eleheruwa in Port-Harcourt.

Table 2.1 Development of Nigeria Railway Network

Construction	Location	Length (km)	Geographical axis
1898-1901	Lagos-Ibadan	193	South-West
1901-1909	Ibadan-Jebba	295	
1907-1911	Kano-Baro	562	North
1909-1915	Jebba-Minna	255	
1914-1916	Port Harcourt-Enugu	243	South-East and North-Central
1922-1927	Kafanchan-Jos	179	
1958-1961	Kafanchan-Bauchi	238	North-East`
1961-1968	Bauchi-Maiduguri	302	

Source: Nigeria Railway Corporation 2007

The Nigerian railway network comprises 3,505 kilometres of narrow gauge (1.067m), single track running parallel through north-west to south-west and from south-east to north-east of the country. 1,788km of this network is on 1,600 sharp curves between 4 and 10 degrees, and this has reduced the maximum permissible speed to 65km/h (Odeleye 2000). See figure 2.1 and 2.2 showing railway lines across Nigeria and the Kano-Nguru rail line.

The shift in government priority to the development of infrastructure for motorized transportation led to the neglect of the rail network. This gradually took a toll on the performance and financial balance of the Nigerian Railway Corporation (NRC). Twelve years after independence, the NRC began recording financial losses, a trend that has not only continued but has increased in enormity. In 1981 alone, the corporation recorded a loss of more than N83 million and since then the lost has been continuous (Solarin, 2000; Abubakar, 2006; Ademiluyi, 2006).

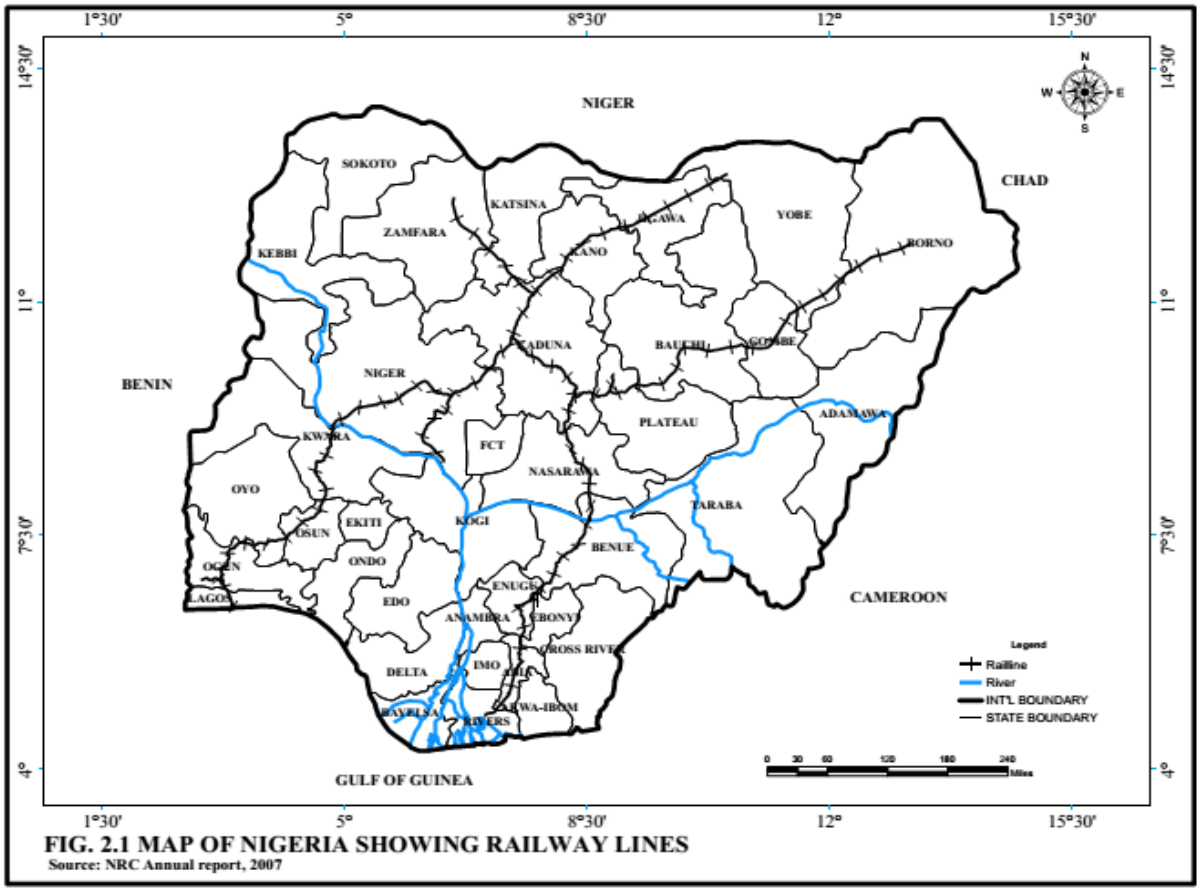


FIG. 2.1 MAP OF NIGERIA SHOWING RAILWAY LINES
Source: NRC Annual report, 2007

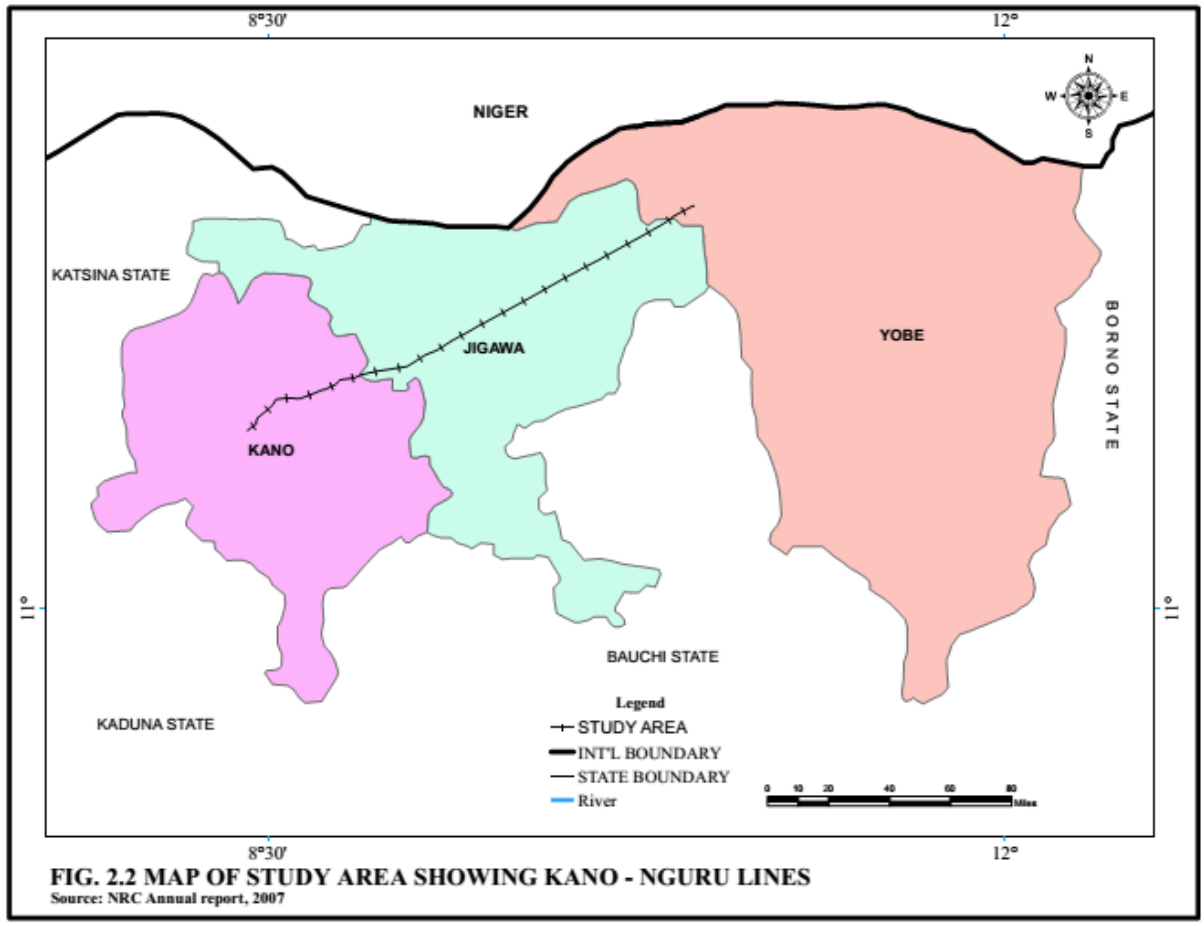


FIG. 2.2 MAP OF STUDY AREA SHOWING KANO - NGURU LINES
Source: NRC Annual report, 2007

2.5 OVERVIEW OF RAILWAY TRANSPORT AND NATIONAL EVELOPMENT IN NIGERIA

Following the laying of the first railway track in 1898, the rail network had expanded from the South-West (Lagos) to the North-East (Maiduguri), and from the South (Port Harcourt) to the North-West (Kaura Namoda). The Nigerian railway consists of 3,505 kilometers of single track route of 1,067mm (narrow) gauge and 277 km of the standard gauge (that is, the Itakpe-Warri line). Railway in Nigeria still maintains a predominantly North-South orientation which makes a Port Harcourt bound rail commuter from Lagos traverse 1,820km as compared with only about 500km as the crow flies.

The primary reason for constructing the railways in Nigeria was to open up the hinterland for the exploitation of agricultural and mineral resources, as well as to provide leverage for strengthening colonial political administration (Jaekel, 1997). In fact, the motive for constructing the railway was partly administrative, in order to provide a link between the northern and southern parts of Nigeria, and partly economic, so as to enhance the evacuation of mineral resources and agricultural products from the hinterland to the seaports, for onward shipment to overseas markets in Europe (Elechi, 1998 and Jakpa, 1981). The flow of goods to the hinterland was also facilitated by the railway (Olanrewaju, 1986 and Adesanya 1988).

The existing Nigerian Railway Corporation (NRC) was created by the enabling Act of 1955 (as amended in 1990), after starting as a Government Department in 1898. The responsibilities of the NRC as spelt out in the Act establishing it include ‘carriage of passengers and goods in a manner that will offer full value for money, meet the cost of operations, improve market share and quality of service, ensure safety of operations and maximum efficiency, meet social responsibility in a manner that will meet the requirements of rail users, trade, commerce, industry and the general public.

The Nigerian railways during its heyday, contributed significantly to the export of products such as cotton, groundnut, hides and skin, tin and columbite, coal and so on, and all of the promote growth and development in the areas where they were produced (Onakomaiya, 1978). As a result of the oil boom of the early 1970s, the Nigerian Railway Corporation benefited from the patronage of Peugeot Automobile of Nigeria, Inland Containers Limited, Steel Rolling Mills, West African

Portland Cement (now Lafarge), Flour Mills, Nigerian National Petroleum Corporation and Cattle traders among others (Ayodele, 2000 and Adesanya, 2002). In addition, a sizeable proportion of the goods movement to and from the Nigerian seaports was by rail transport. More significantly, the rail transport sector contributed partly to industrial growth as well as interregional trade and commerce. It also facilitated passenger movement and generated employment, while also contributing reasonably to National gross domestic product.

To a considerable extent, the Nigerian railways met some of its responsibilities, in terms of their contribution to economic growth as well as promoting interregional and international trade, especially in the first half of the twentieth century (Onakomaiya, 1978). Given limited rail expansion activities, as at today, only a few state capitals are connected by the railways. Besides, only the Apapa and Port Harcourt major seaports are served by the railways (Okanlawon, 2006). In short, just 19 out of the existing 36 states are connected by the railway (Edward, 2001).

2.6 CHALLENGES FACING THE NIGERIA RAILWAYS

The problems confronting the Nigerian railway system are numerous. Some of these problems includes: poor track structure consisting of single track narrow gauge, steep gradients and sharp curves, poor maintenance, and poor track equipment limiting maximum permissible speed to 65 km/h. Others include shortage of locomotives and rolling stocks, corruption and bad management, poor equipment/state of technology, neglect of rail system

for road transport development by government, frequent interference with NRC management, myriads of pensioners, and a volatile labour union Abubakar (2006).

2.7 RAIL CONCESSIONS IN AFRICA

With respect to the railways of Sub-Saharan Africa, many of them are said to be in a particularly parlous state, having been starved of investment and even basic maintenance funds for years (Huff *et al*, 1989 and Courier, 1998). In Africa, private financing of railways became a reality in 1995 with the afterimage of the railway operations between Abidjan (Cote d'Ivoire) and Ouagadougou (Burkina Faso) (Thiam, 1998 and Mitchell and Budin, 1999). This is a type of concession contract in which the operator leases assets from the public authority, while the latter provides major investments (Guislain, 1997). This transaction has since been followed by a series of railway concession

agreements between the private and public sectors in countries such as Cameroon, Gabon, Madagascar, Zambia, Zimbabwe, Mozambique and Senegal/Mali among others (Table 2.4).

Table 2.2: African Countries that Have Concessioned their Railways

Country/Countries Involved	Concessionaire	Year
Burkina Faso/Cote d'Ivoire	Sitarail	1995
Cameroon	Camrail	1999
DRC	Sizarail	1995-1997
Gabon	Transgabonais	1999
Kenya/Uganda	URC/KRC	-
Malawi	CEAR	1999
Mali/Senegal	Transrail	2003
Mozambique	(Beira)	2004
Togo	WACEM	2002
Zambia	RSZ	2003

Source: World Bank Transport Form: Rail concessioning since 1990.

Early results from privatisation transactions in the railway have so far been mixed. Given the weak investment and regulatory climate in many African countries, investment flows have been understandably limited in the first place. Additionally, the nature and size of the privatized transport operations and infrastructure have necessitated the abundant use of a range of incentives (financial, economic, commercial and regulatory) in order to secure private operators' interest. These practices have raised many questions about the actual viability of the completed transactions given the scope of the 'financial sweeteners' granted to private operators to compensate for the weak investment climate.

CHAPTER THREE STUDY AREA AND METHODOLOGY

3.1 INTRODUCTION

In this chapter, the location, climate, relief, soil, vegetation, population and human activities of the study area were examined. In addition, types of data required for this study, sources of data, sampling size and sampling techniques and method of data analysis were also analysed.

3.2 THE STUDY AREA

The Kano-Nguru rail track cut across three northern states namely Kano, Jigawa and Yobe state. Therefore, information about the study area cover these three states.

3.2.1 Location

Kano is found in Northern Nigeria. It is located between Latitude 10° 38 N and 12° 28′ N and Longitude 8° 04′ E to 9° 10′ E. Kano **derived its** name from the' ancestor of the Abagayawa (earliest settler), a blacksmith who migrated from Gaya in search of iron - stone and chemicals (Illiffe, **2007** and Falola, 2002). Kano State was created on 27th May, 1967 when Nigeria assumed 12 states structure with Kano as its Capital. On 27th August, **1991** Jigawa State was carved out of the most populous state. Bounded to Kaduna and Bauchi States, to the South West and South East respectively. Thus, the state composes of forty four local Government areas.

Similarly, Jigawa state is located between longitude 7^0 6′ N and 9^0 8′ N and latitude 13^0 2′ E and 12^0 8′ E in the Northern part of Nigeria. The state was created out from Kano state in 1991, It is bounded in the north by Niger republic, in the north east by Yobe state, in the south east by Bauchi state and in the West by Katsina and Kano. Administratively, Jigawa state is made up of twenty-seven (27) Local Government Areas and Dutse is the state capital. The Southern part of the state is relatively more developed and densely populated than the Northern part. It is also more physically and functionally linked to Kano state. The northern part is more physically sparse, characterized by underdeveloped transportations and communications links.

Also, Yobe state is located in the North East zone of the country. It is located within between Latitude 10° 35′ N and 13° 22′ N and Longitude 9° 36′ E to 12° 30′ E.Yobe state was created out of the former Borno State on 27th August 1991. It has a total land area of 47,153 km2 and shares common boundaries with Borno state to the East and South East, Jigawa state to the north west, Bauchi and Gombe states to the south west. It also shares an international border with the Republic of Niger stretching to over 323 kilometers to the North. Major towns in the state include Damaturu (state capital), Potiskum, Gashua, Geidam and Nguru. See figure 3.1 showing states of the study area.

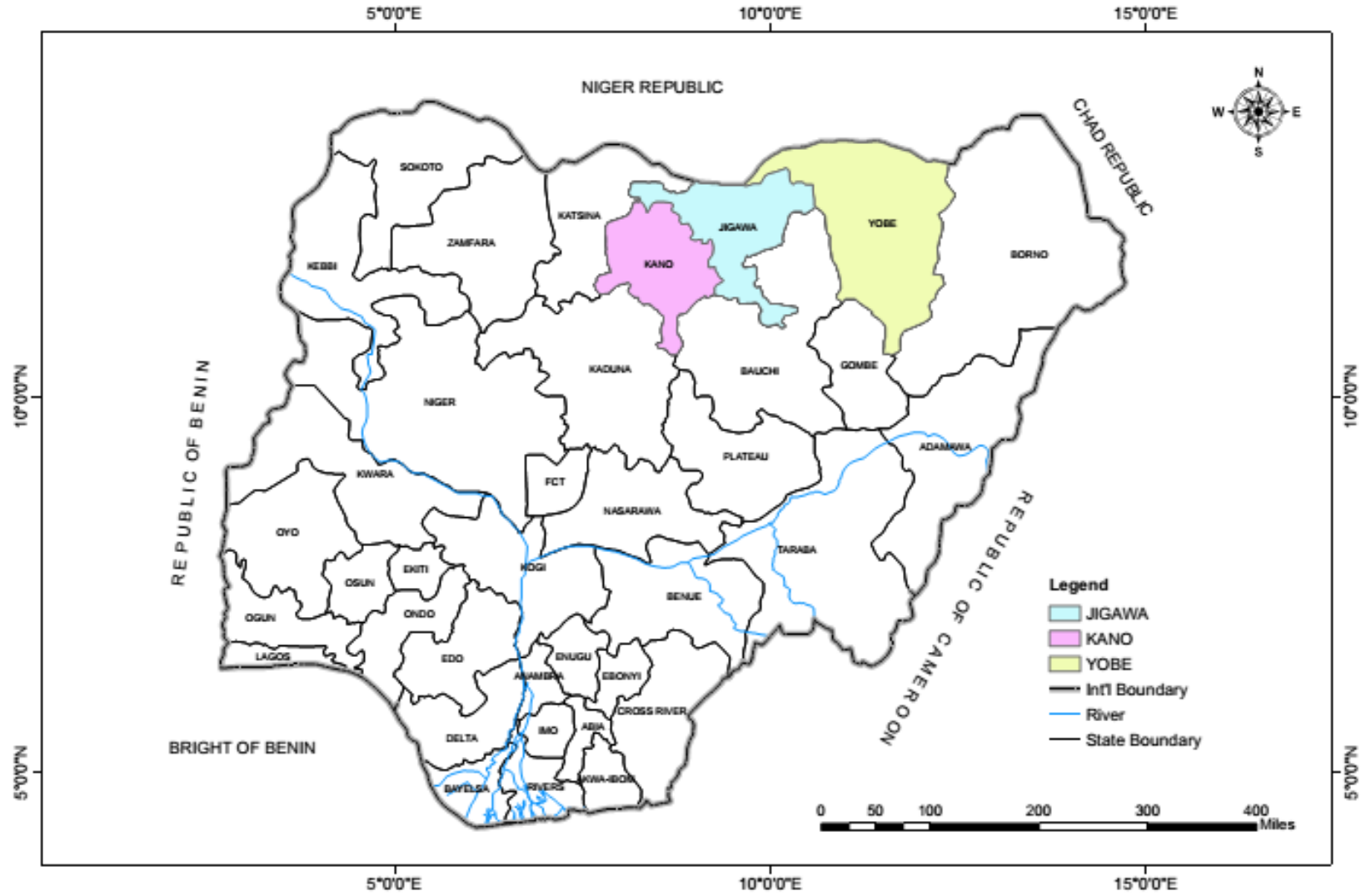


FIG. 3.1: MAP OF NIGERIA SHOWING STATES OF STUDY AREA

Source: NRC Annual report, 2007

3.2.2 Climate

Generally, Kano lies within the wet and dry Climate with more dry than wet months (Olofin, 1987), which is coded as Aw in Koppen's classification. Although, climatic changes are believed to have occurred in the past, the characteristics of the major elements of the present climate are described below. The climate of northern Nigeria is divided into the following:

(a) A warm rainy season from June to September

(b) A cool dry season from October to February

(c) A hot dry season from March to May

The warm rainy season is traditionally the farming period. There is a high amount of precipitation in July and August; rainfall exceeds the potential evapotranspiration in most of (July, August, and September). During the rainy Season the cloud has a moderating impact on daily temperature.

In the cool dry season the weather condition are suitable for crops to be able to be harvested. North - Eastern winds prevail. They are cool and sometimes carry fine dust from the Sahara, which intercepts a great deal of sunshine. This season is favourable for the cultivation of many crops from temperate region. Wheat and various vegetables are provided by irrigation water. The hot dry season is characterized by rise in temperatures, while the relative humidity dwindles progressively. The high temperature affects the growth of crops from temperate regions, which are susceptible to catch diseases' and to mature precociously.

However, the climate of Jigawa and Yobe State is hot and dry for most period of the year. The mean temperature for most stations in the state is about 37°C. The highest temperature (about 42°C) is normally experienced in April, while minimum temperatures (about 30°C) are usually recorded in December. The States exhibits a remarkably high annual range of mean monthly temperatures. There is a marked dry season of between eight to nine

months and a wet season of only three to four months. Rainfall in the states is highly irregular in space and time, which makes farming difficult since small differences in the amount and timing of rain received at a site may determine the success or failure of critical stages in vegetation development and hence crop production. The development of agriculture would, therefore, effectively depend on irrigation farming especially in the drier parts of the states.

3.2.3 Relief

The study area (Kano, Jigawa and Yobe state) region occupies the southern east rim of the Chad depression and share physiographic divides with the Niger and Benue River systems to the south and with the Niger systems to the southeast and West as the Chad - Sokoto divide. The elevation of the study area is above mean Sea level ranges from about, 400 metres to 1200 meters of north and south tip. The region is part of the popular high plains of Hausa land except for the section east of the Hydro-Geographic divide. The rock structure, the relief, and the landforms of the region are closely linked.

The relief of this region can be described under three types occupying three distinct zones, as high lands, the high plains and the low Chad plains. The first two types are parts of the high plains of Hausa land, and the third is a part the Chad plains. The relief is greatly influenced by the geology; the highest elevations, associated with structures, and the lowest with the Chad formation.

3.2.4 Soils

The soils in Kano are generally matured on the plain but seriously altered due to human settlements. The influence of topography, wind drift (materials from I lie desert) and climate are what shaped the aggregate of the soil. The matured soils are said to be Jatosols of ferruginous type (Olofin, 1987). The soil is however well drained, brown to reddish in colour. Along the floodable area of river channels, hydromorphic soils are -found. These are dark in colour and have high clay content. Intensive use of soils and addition of manure and chemical

fertilizers have altered their characters, profile, texture, structure and chemical characteristics (Falola, 2002).

Mean while, the soils of the north east zone is generally very loose sub-soil, slightly clayey sand red to orange brown with not more than 1m deep. The soils are formed from wind sorted desert sand with evidence ol encroachment of the Sahara Desert. Most of southern Jigawa and Yobe have semi-arid brown and arid soil. The soil in most of Jigawa and Yobe State is derived from drift materials which vary in textural characteristics, but are mainly silt clay or clayey. The profile of the soils is poorly developed, and it has a low water retention capacity (Anon, 1992).

3.2.5 Vegetation

The natural vegetation of Kano region is savannah type. Most of the area is contained within the Sudan savannah variety. The exceptions include the southernmost area which is characterized by northern Guinea savannah occupies area south of Tundun Wada, particularly the Lilly areas of Dadi plains and Rishi liills. This is a woodland type of vegetation Composed of numerous medium trees and grass undergrowth most of the vegetation here is a secondary re-growth in forest reserves.

The Sudan savannah can be said to be the typical vegetation of the Kano region, it composes of variety of trees scattered over an expense of grassland. The trees are usually characterized by broad canopies all over the landscape. Most of the trees species are adapted to drought conditions through long taproots, lathery leaves and tiny leaves. These retained their greenness throughout the year other shed their leaves during the dry season. Grasses hardly grow taller than 1.5m at maturity except in favorable spots.

Based on the vegetation map of Nigeria, the Jigawa and Yobe states are situated within the Sahelian zone. Agro-ecologically, Borno, Yobe and Jigawa States are dry sub-humid zones

while Bauchi and Adamawa are sub-humid zones (ANON, 1992). There are two vegetation zones in the state. These are the Sahel in the north and the Sudan Savannah in the south. Vegetal cover is sparse as the grass grows in individual tufts leaving bare surfaces in between. The grasses in the Sahel are short and tussocky, 0.5m to 1.0m high. They are interspersed with sand dunes are the most common types here.

The acacia is a thorny, narrow leafed tree, fairly short and sometimes umbrella shaped. In the Sudan Savannah, the actual vegetation is made up of short grasses, 1.5m to 2.0m high, and some stunted tress. Typical trees include the acacia, dum palm, silk cotton and baobab. The baobab stores water in the trunk like a sponge and it draws water from this source during the dry season. It has short and undersized branches shooting out from the head of a fat juicy trunk. The silk cotton tree is the tallest of the group, and grows to a height of 9m to 15m. It is from this tree that silk cotton, which is used for making local mattresses and pillows, is obtained. The vegetation is also exploited for a number of medicinal and other purposes. Most of it is now exploited as firewood, and for thatched roofing and mat making.

3.2.6 Population

Kano is the largest urban center in Hausa-land, and most influential commercial town in the Sudan region, it is the largest in the Federation of Nigeria followed by Lagos, with a long standing sedentary population in an organized emirate, Kano's growth has been phenomenal. At the time of British occupation, the population estimate was 139,000, it rose to 295432 (1963), 322000 (1973) declined due to civil war with large exodus of the Igbo population. By 1991, it attained 5.8 million. The current population of Kano according to 2006 Population census is 9,383,682 with 3.3 percent growth rate (National Population Commission, 2009). The majority of Kano's population is Hausa-Fulani. There are the Nupe and Kanuri "natives", Igbo, Yoruba and other ethnic groups from all over the country as well as Lebanese, Asians and other foreigners. Pressure on rural land has continued the age-

old principle of "gida ya kori gona" (the houses have driven the farm away) in peripheral areas. Indeed Kano has sprawled into several previously distinct villages taking up parts of ungogo, Kumbotso, Dawakin-Tofa, Kiru and Rirnin Gado Local Government areas (Falola, 2002).

Similarly, according to 2006 census the population of Yobe State is 2,321,591(1.658% of total), the state has one of the lowest population density in the country (49 persons per km2). Major towns in the state include Damaturu (state capital), Potiskum, Gashua, Geidam and Nguru.

Administratively, Jigawa state is made up of twenty-seven (27) Local Government Areas and Dutse is the state capital. It has five emirates, each administered by a tradition ruler called Emir, they are: Kazaure, Dutse, Gumel, Hadejia and Ringim, which together have an estimated populations of 4, 348,649 people (N.P.C. 2006).

3.2.7 Human Activities

Manufacturing and commercial activities are prominent in Kano due to the large population of tradesmen and small-scale light manufacturing activities. The heavy industries are located in industrial estates; Bompat dating from the colonial period, Sharada, Challawa, Dakata, Zaria road, Hadejia road. These estates house over 98% of the medium and large scale manufacturing industries in the state. Among the forty industrial types listed for Kano, food processing industries (oil-mills and confectionaries) are the most important. Others are leather tanneries, textiles and garments, plastic products, bottling companies, sugar refineries, metal and steal work and furniture making (Falola, 2002).

On the other hand, the economy of Jigawa and Yobe states have simimar economic characteristics which are mostly agrarian and dependent on statutory constitutionally guaranteed transfers from the federal government. Federal allocations accounted for more than 84% of the states revenue. More than 80% of the citizens are engaged in small scale

subsistence farming. Crops such as millet, sorghum, beans and maize are grown for local consumption. Crops like groundnut, Cotton, Benni seeds are grown as cash crops. Wheat, rice and vegetables are cultivated along the Fadama wetland areas and the basins of River Yobe, Kumadugu Gana, Ngalda, Annumma and their tributaries that cut across the state.

Livestock such as cattle, sheep and goats are reared in abundance. Solid minerals also exist in commercial quantities. Limestone, kaolin, diatomite, gypsum, clay, trona, sandstone, bentomite, silica and granite chips are found in large quantities under the ground. These have remained largely unexploited.

3.3 METHODOLOGY

This part of the study highlights the type of data required, sources of data, sample size, sampling techniques and analytical techniques adopted for this study.

3.3.1 Types of Data Required

The types of data required in order to achieve the aim and objectives of this study include data on the train frequency and punctuality of operation, train operations and time schedule, peak and off-peak period, number of passengers and quantity of goods transported, revenue generated from Kano-Nguru rail operation from 2007-2013 and perception of railway staff and passengers on railway operation along the rail corridor, characteristics of the users e.t.c.

3.3.2 Sources of Data

The main sources of data adopted in this study are the use of primary and secondary sources of data.

3.3.2.1 Primary Source of Data

This involved administration of questionnaire to respondents in order to collect information required for the research. The questionnaire are designed to contained questions aimed at eliciting responses from passengers and railway staff that can aid the understanding of the Kano-Nguru railway

traffic characteristics in the study area. The questionnaire contained questions which elicit information on the perception of staff and passengers on the Kano-Nguru railway transport service.

3.3.2.2 Secondary Source of Data

The secondary source of data was the Nigerian Railway Corporation, were information on the frequency of operation, peak and off- peak period of traffic, number of passengers and quantity of freights transported, revenue generated from Kano-Nguru train operation from 2007-2013 were obtained. This secondary source of data served as the pivot for analysing the operational traffic characteristics of Kano-Nguru railway transport service.

3.3.3 Sample Size and Sampling Techniques

The total number of staff within the Kano railway station were 89 and 41 staff at the Nguru railway station making a total of 130 staff for both Kano and Nguru railway station based on information obtained from the Nigerian railway corporation. Therefore, 20% of 130 staff, which is 26 questionnaires were administered to the staff of NRC.

Also, the population size for the passengers of Kano-Nguru train was 370 based on the average outgoing and incoming passengers per week. The average Kano outgoing passengers per week is 245 passengers (for two trips, Monday and Thursday) and the average incoming passengers per week is 125 passengers (for two trips, Wednesday and Sunday). Therefore, by summing the average outgoing and incoming passengers per week, there is an average of 370 passengers per week. Krejcie and Morgan (1970) method was adopted; where population size of 360-379 was represented with 186 sample size. Based on the average outgoing passengers per week which represent 66.2% of the entire population size, 123 questionnaires (66.2% of 370) were administered to the outgoing respondents. While for the incoming passengers that represent 33.8% of the entire population size, 63 copies of questionnaire (33.8% of 370) were administered to the incoming respondents making a total of 186 copies of questionnaire, 172 copies were duly completed and analysed. However, systematic sampling technique was employed to select respondents so as to ensured equal representation of targeted population sample.

3.3.4 Method of Data Analysis

Descriptive statistical techniques were employed to summarize data collected using percentage, bar chat and graphs. Data for this study were analyzed using appropriate simple descriptive statistics such as frequency, percentages, averages, charts and tables.

CHAPTER FOUR: DATA PRESENTATION AND ANALYSIS

4.1 INTRODUCTION

In this section, the data obtained from field survey are presented and analysed using appropriate analytical tool. The data was analysed using the Statistical Package for Social Sciences (SPSS) and Ms Excel. Analysis of the socio-demographic characteristics of respondents, frequency and punctuality of operation, peak and off peak period of traffic, number of passengers and quantity of freight transported, amount generated and the perception of passengers and staff on the Kano-Nguru rail operation are presented in this section.

4.2 SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

Two categories of respondents were used in order to examine the perception of users of Kano-Nguru rail operation. They include the staff of NRC and the passengers of Kano-Nguru railway transport service.

4.2.1 Socio-Demographic Characteristics of Kano-Nguru Railway Passengers

In order to examine the perception of passengers of Kano-Nguru railway transport service, a total of 186 copies of questionnaire were administered to the passengers of the train and only 172 copies were duly completed and valid for analysed.

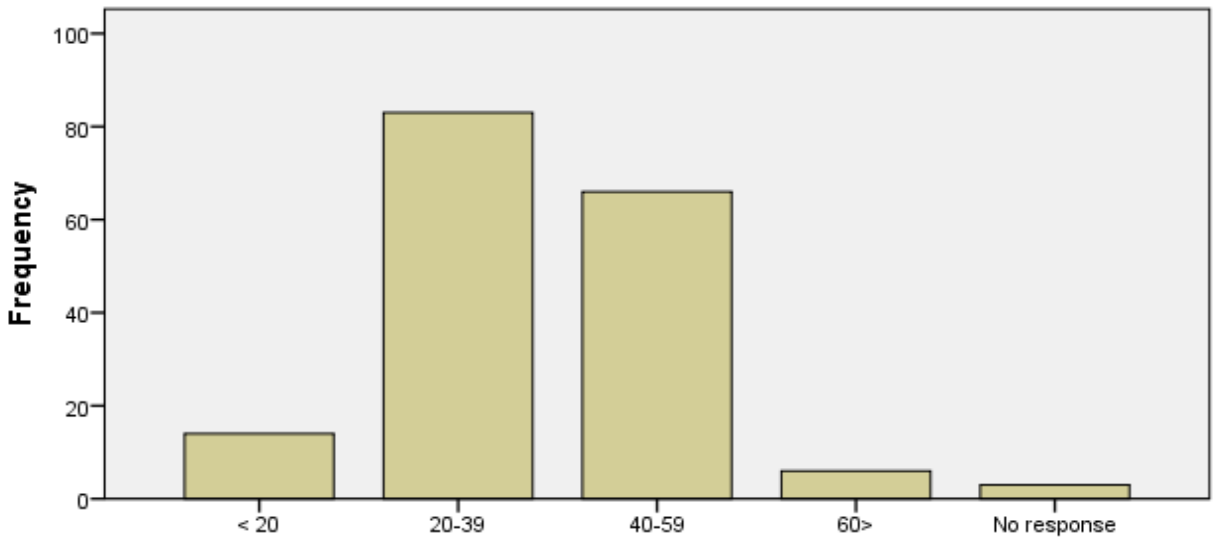


Figure 4.1: Age Distribution of Passengers
Source: Author's Field Survey May, 2014

Figure 4.1 reveals that 48.3% and 38.4% of the Kano-Nguru passengers were between 20-39 and 40-59 years respectively, while 8.1% of the respondents were below 20 years. This reveals that majority of the respondents were within the middle age group between 20-59 years. This also indicated that more middle age people patronize the Kano-Nguru train than very young and elderly. The implication is that children and elderly people do not often make use of the train service along the Kano-Nguru rail corridor. The difficulty of boarding and disembarking from the train and also the departure and arriving time of the train might perhaps be responsible for the low patronage of this group of people since according to the train schedule, the train depart Kano railway station by 9pm and arrived Nguru by 5am the next day.

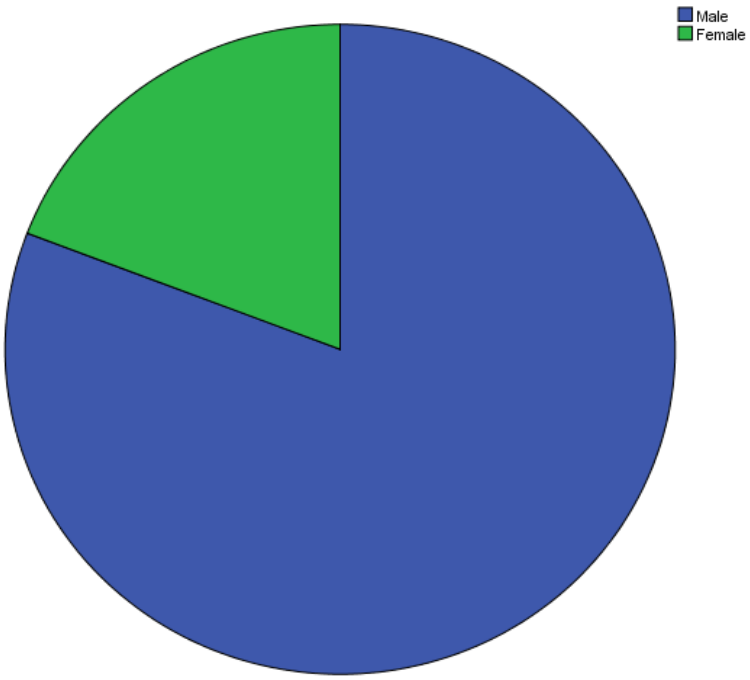


Figure 4.2: Gender of Passengers

Source: Author's Field Survey May, 2014

Figure 4.2 reveals that 80.8% of the passengers were males, while 19.2% of the respondents were females respectively. This shows that majority of the passengers were males. This result further revealed the nature of typical Hausa culture were male gender usually travel for work and business purposes to feed their family while females are restricted to stay at home in order to take care of the children.

Table 4.1: Marital Status of Passengers

Marital Status	Frequency	Percent
Married	124	72.0
Single	34	19.7
Divorce	9	5.3
Never married	4	2.3
No response	2	0.8
Total	172	100.0

Source: Author's Field Survey May, 2014

Table 4.1 reveals the various responses of the Kano-Nguru railway passengers on their marital status. It can be seen that 72% of the respondents were married while 19.7% were single and 2.3% constituted never married. This finding suggested that, majority of the respondents were married. This also implies that majority of the train passengers were family people who travelled for business purposed as a means of their lively hood in order to satisfy their family needs.

Educational status is defined as the level of education and skill obtained within a discipline or profession, usually referred to as a generalist or specialist in that discipline.

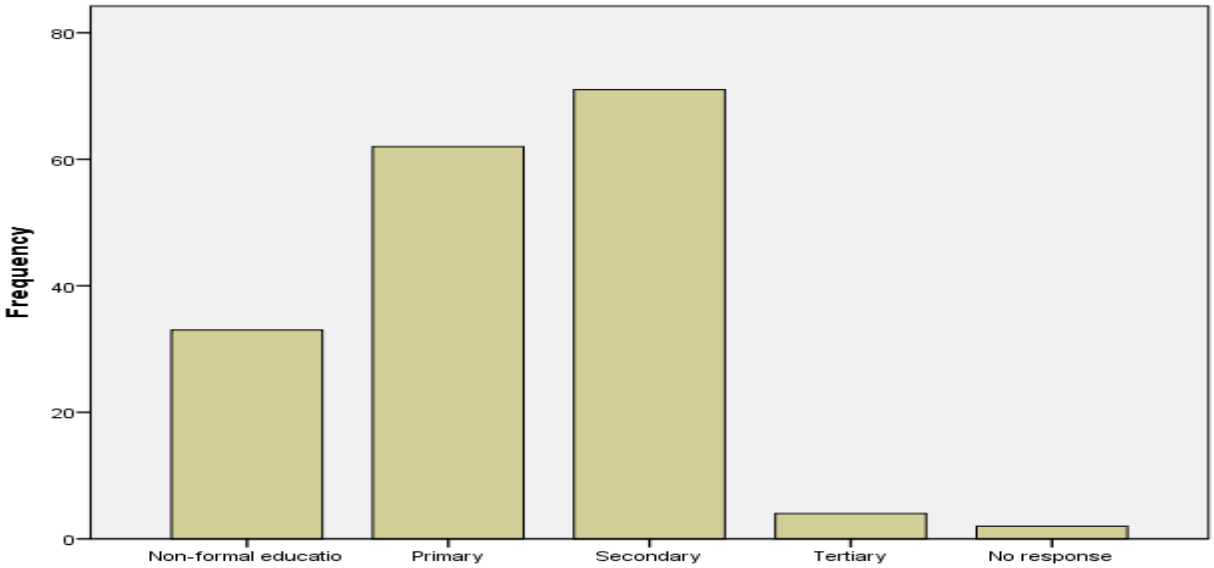


Figure 4.3: Educational Status of Respondents

Source: Author's Field Survey May, 2014

Figure 4.3 reveals that 41.3% and 36% of the passengers had secondary and primary education respectively, while 2.3% had tertiary education. This indicated that majority of the passengers were holders of primary and secondary schools certificates. This also implies that majority of the passengers were literate and consequently indicated a high level of literacy among respondents which will help in enhancing good communication and mutual understanding between the railway staff and passengers of the train.

Occupational status is defined as a way to describe the relative social class position people have. It also refers to the consensual nature of rating a job based on the believe of its worthiness.

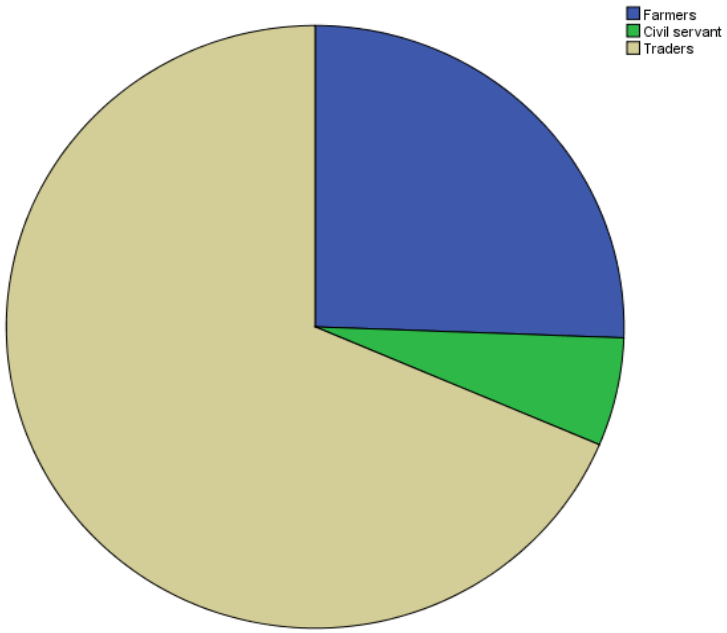


Figure 4.4: Occupational Status of Passengers

Source: Author's Field Survey May, 2014

Figure 4.4 shows that 68.6% of the passengers were traders, while 5.8% were civil servants. This finding indicated that, majority of the train passengers were traders who engaged in buying goods at Kano and transport it to other parts of the country. This perhaps may be as a result of the fact that Kano

served as the hub of industrial and commercial activities in the Northern part of Nigeria while Nguru served as a centre for live stock production and distribution to different part of the country.

4.2.2 Socio-demographic characteristics of Kano-Nguru railway staff in the study area

In order to examine the perception of railway staff on the problems associated with the Kano-Nguru railway operation and the reason behind the train operation at a period when train operations at the major railway corridors was shut down, 26 questionnaires were administered to the railway staff and analysed.

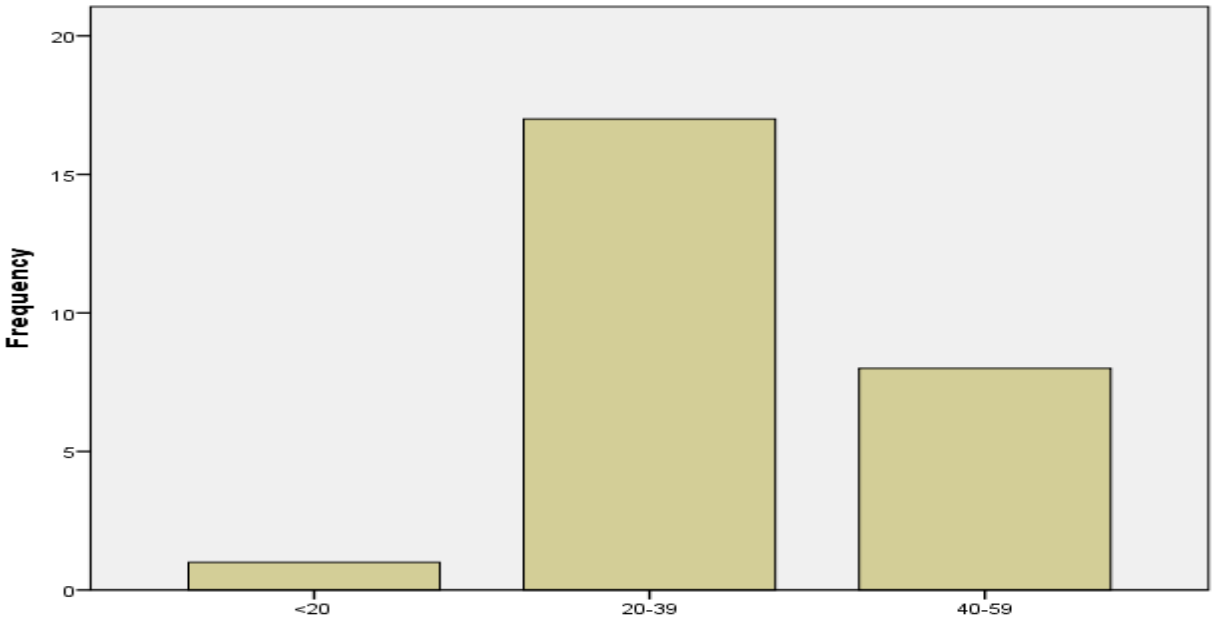


Figure 4.5: Age Distribution of Railway Staff

Source: Author's Field Survey May, 2014

Figure 4.5 reveals that 53.8% of the railway staff were between 20-39 years, while 3.8% of them were bellow 20 years. This shows that majority of railway staff in the study area were within the middle age group between 20-59 years, this will consequently enhance greater productivity and good service delivery to the railway organisation. Also, the 18 years minimum working age limit in the Nigerian constitution might perhaps be the reason behind the low level of railway staff below 20 years in the study area.

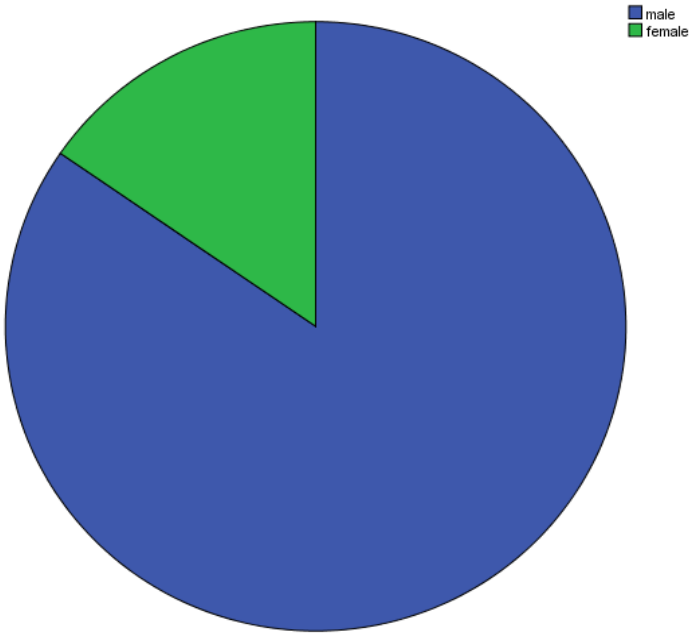


Figure 4.6: Gender of Railway Staff

Source: Author's Field Survey May, 2014

Figure 4.6 shows that 84.6% of railway staff in the study area were male, while 15.4% were female. This reveals that male gender dominated the work force in the study area which might leads to greater productivity and better service delivery in the railway organization due to nature of railway work which requires physical strength in the discharge of duty, especially in departments such as track civil and mechanical department which have the highest number of staff in the NRC. On the order hand, the low level of female work force in the study area might perhaps be related to the restriction of movement placed on females by some cultures in the Northern part of Nigeria.

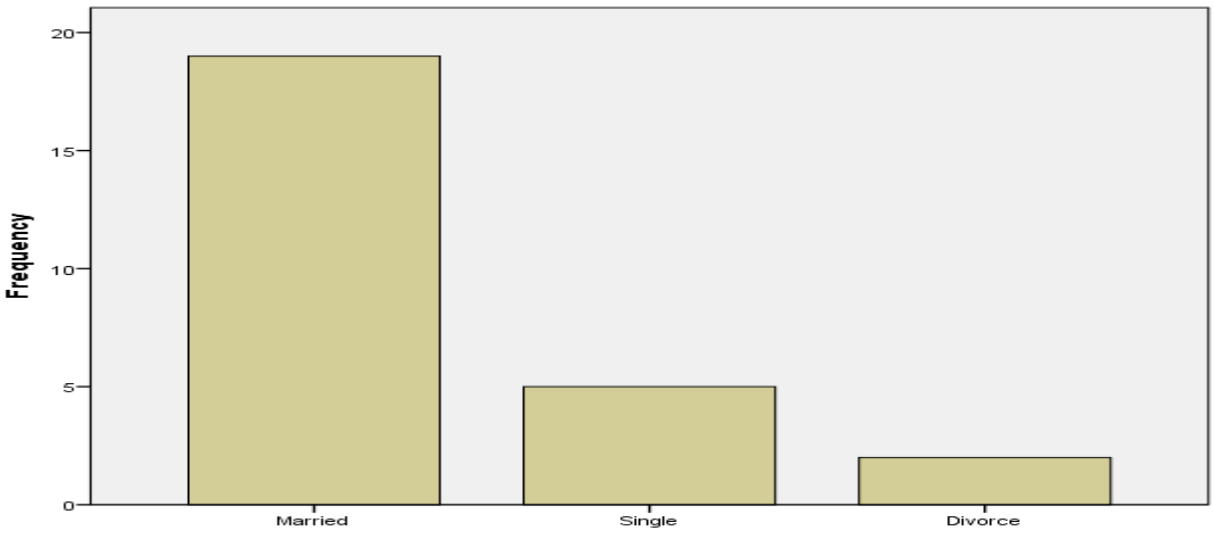


Figure 4.7: Marital Status of Railway Staff

Source: Author's Field Survey May, 2014

Figure 4.7 reveals that 73.1% of staff were married while 19.2% were single and 7.7% constituted divorced. This result indicated that majority of staff in the study area were married, this further reveals that a greater percentage of the railway staff in the study area were responsible people who struggle to carter for their families needs.

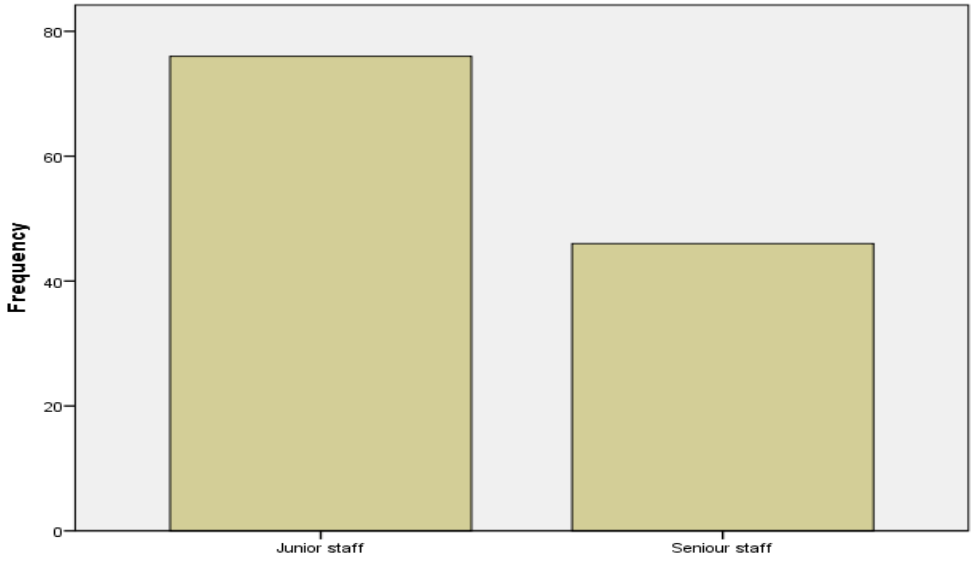


Figure 4.8: Staff Cadre

Source: Author's Field Survey May, 2014

Figure 4.8 reveals that 62.3% of the staff are junior staff whose grade levels were between 06 and below. While 37.7% of the staff respondents were senior staff between grade level 07 and above. This indicated that majority of railway staff in the study area are junior staff who are labourers. This is because railway is a labour intensive organization.

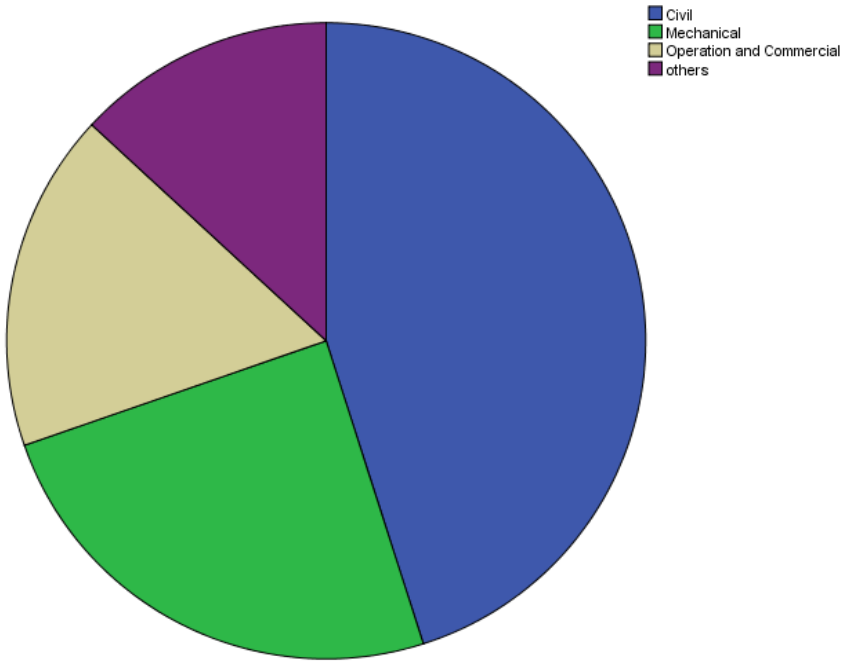


Figure 4.9: Staff Departments

Source: Author's Field Survey May, 2014

Figure 4.9 reveals that 45.1% the staffs are from civil engineering department, whereas 13.1% constituted staff from other departments. This finding indicated that majority of the staff within Kano railway station were from civil engineering department who are mainly concerned with the track maintenance work. This is because the NRC still depends on human labour in carrying out track maintenance work instead of using machines.

4.3 PUNCTUALITY AND FREQUENCY OF THE KANO-NGURU TRAIN OPERATION

At this stage the punctuality and frequency of the Kano-Nguru railway transport service was examined according to the passenger opinion and existing record from the Nigerian railway corporation.

4.3.1 Punctuality of the Kano-Nguru train operation

Punctuality of train services is expressed as the percentage of trains passing, arriving or departing at given locations of the railway network no later than a certain time in minutes. Delays smaller than 5 minutes are usually not considered as delays by the European railway companies because of limited precision of the applied modes of measurement, tolerances of the timetable and insufficient means of control of operations in practice. Below is table 4.2 showing punctuality of train operations.

Table 4.2: Punctuality of Kano-Nguru Train Service

Punctuality	Frequency	Percent
Punctual	90	52.3
Very Punctual	37	21.5
Fairly punctual	27	15.7
Not punctual	12	7.0
No response	6	3.5
Total	172	100.0

Source: Author's Field Survey May, 2014

Table 4.2 shows that 52.3% of the Kano-Nguru train passengers opined that the train was punctual at departure, whereas 7% of the passengers opined that the train was not punctual at departure. This finding revealed that majority of train passengers indicated that the Kano-Nguru train was punctual at departure. This might perhaps be due to proper organisation by the railway authorities were they make sure that all necessary arrangement is been made before the departure time. This could boost the confidence of passengers on the railway operation and account for increase in the level of patronage and consequently result to increase in revenue generation by the railway corporation.

4.3.2 Frequency of the Kano-Nguru train operation

Frequency is defined as the number of times a modality of a particular line dwells at a stop. According to NRC train schedule time table, the Kano-Ngunu train was scheduled to make four trips per

week. The train depart Kano railway station every Monday and Thursday by 9pm, it also arrived to Kano Wednesday and Saturday by 5am making a total of sixteen trips in a month. The train comprises of both passengers and freight coaches moving passengers and freight from Kano to Jigawa and parts Yobe state and returns back to Kano with agricultural product and live stocks.

Table 4.3: Frequency of Trips (Passengers/Freight) by Kano-Nguru Train from 2007-2013

Years	Jan	Feb	Mar	Apr.	May	June	Jul.	Aug.	Sep	Oct.	Nov.	Dec.	Ann. total trips	Perc.% of trips	Ave. trips/ Month
2007	16	12	12	14	16	12	16	16	12	14	16	16	172	18.5%	14.3
2008	16	-	16	14	16	16	12	14	14	12	10	16	156	16.8%	13.0
2009	16	16	16	10	10	16	14	10	10	14	8	16	156	16.8%	13.0
2010	10	8	10	12	16	12	14	6	-	-	-	8	96	10.3%	10.7
2011	-	8	12	8	16	14	16	-	-	10	14	16	114	12.3%	12.7
2012	14	12	12	8	10	10	4	-	-	12	14	12	108	11.6%	10.8
2013	16	16	14	10	14	10	-	-	8	14	12	14	128	13.7%	12.8
Total	88	72	92	76	98	90	76	46	44	76	74	98	**Tot. = 930**	**Tot. 100%**	

Source: Railway Traffic Register, Zaria District, 2007-2013

Table 4.3 shows the monthly trips made by the Kano-Nguru train and the total frequency from 2007-2013. An observation of the table indicated that year 2007 recorded the highest number of trips made representing 18.5% of the total trips from 2007-2013, the train operated throughout the months in 2007 without been absent with an average of 14.3 trips per month. This is followed by 2008 and 2009 which both recorded 16.8% of the total trips with an average of 13 trips per month. On the other hand, 2010 recorded the least number of trip frequency representing 10.3% of the total trips made from 2007-2013 with an average of 10.7 trips per month. This finding also observed that the Kano-Nguru train did not moved from September to November 2010 and from August to September in 2012 as a result of the poor operational management by the railway corporation. However, it was also observed from the table that in August and September 2013 the train did not make a single trip due to engine failure. The table also revealed that the train hardly make 16 trips per month as scheduled in the train time table.

4.4. NUMBER OF PASSENGERS AND QUANTITY OF FREIGHT TRANSPORTED FROM 2007-2013

Based on the NRC traffic record register, railway traffic is group into three categories passengers, goods and cows. Passenger is counted in numbers, goods in metric tonnes while cows are also counted in numbers. For the purpose of this research, data shall be presented on monthly bases. Beside, origin and destination of traffic was used in table 4.4, 4.5 and 4.6 to highlight the origin and destination of passengers, freight and cow traffic transported by the Kano-Ngugu train from 2007-2013.

Table 4.4: Number of Passengers Transported by Kano-Nguru Train from 2007-2013

Years	Kano- Nguru		Nguru-Kano		Total
	Origin	Destination	Origin	Destination	
2007	17428	9328	13496	4310	44562
2008	15174	6214	9455	3011	33854
2009	15741	5672	10433	3488	35334
2010	9357	2346	7651	2743	22393
2011	8459	3930	5954	2711	21054
2012	9041	4611	6454	3452	23558
2013	9907	4998	7530	4063	26498

Source: Railway Traffic Register, Zaria District, 2007-2013

Table 4.4 shows the total number of passengers transported by the Kano-Nguru train from 2007-2013. It was discovered that year 2007 recorded the highest number of passenger transported with 44562 passengers representing 21.5% of the total passenger transported. This is followed by year 2009 with 36772 passengers representing 17.7% of the total passenger transported. This finding is expected as a result of high frequency of operations recorded in 2007 and 2009 respectively as showed in table 4.3. Also year 2011 recorded the least number of passenger transported with 20113 passengers representing 9.7% of the total passengers. This might be as a result of the poor management by the railway corporation in which the train did not moved in January, August and September 2011and September, October and November 2010 due to engine failure. The pattern of passengers' movement on the Kano-Nguru origin and destination shows that majority of passenger board the train at Kano which is the origin while less number of passengers arrived at Nguru which is the destination. This might be due to the fact

that most of the passengers are traders who purchased goods from Kano and transport it back to their towns along the Nguru rail route. Also Nguru-Kano origin and destination shows that majority of passengers' board the train at Nguru and many dropped along the way before reaching Kano.

Table 4.5: Quantity of Freights Transported by Kano-Nguru Train (in tons) from 2007-2013

Years	Kano- Nguru		Nguru-Kano		Total
	Origin	Destination	Origin	Destination	
2007	701	326	614	548	2189
2008	306	126	393	133	958
2009	294	130	380	144	948
2010	198	94	225	83	600
2011	2862	2712	588	520	6682
2012	1344	807	968	592	3711
2013	1540	1053	882	611	4086

Source: Railway Traffic Register, Zaria District, 2007-2013

Table 4.5 reveals that 2011 recorded the highest quantity of freight transported with 6682 tonnes of freight representing 34.9% of the total freight transported followed by 2013 with 4086 tonnes of freight, representing 21.3%. This might be as a result of increase in agricultural out-put and the transportation of 2,968 tonnes of industrial materials in May, 2011. However, 2010 recorded the least freight transported with 600 tonnes, representing 3.1% of the total freight transported followed by 2009 with 948 representing 4.9% of the total freight transported. Also, the freight origin and destination from Kano-Nguru shows that majority of freight were moved from Kano to Nguru because Kano is a centre of commercial activities in the northern part of Nigeria. Therefore, passengers used the train to transport manufacturing products from Kano to their various destinations along the Nguru rail route. While the Nguru-Kano origin and destination of freight shows that agricultural products were transported from Nguru to Kano because Nguru is an agrarian town.

Table 4.6: Number of Cows Transported by Kano-Nguru Train from 2007-2013

Years	Nguru-Kano		Total
	Origin	Destination	

2007	6249	4466	6249
2008	4053	2944	4053
2009	4556	3114	4556
2010	2060	1150	2060
2011	1749	1055	1749
2012	2201	1246	2201
2013	4644	3211	4644

Source: Railway Traffic Register, Zaria District, 2007-2013

Table 4.6 shows that 2007 recorded the highest number of cows transported from Nguru to Kano with 6249 cows transported representing 24.5% of the total number of cows transported. This might also be related to high level of frequency recorded in 2007and 2013 respectively. Also 2011 recorded the least number of cows transported with 1749 cows representing 6.9% of the total cows transported due to absent of train operation in three months of 2011 as a result of engine failure. Furthermore, the pattern of origin and destination for cows transported by rail reveals that cows were completely transported from Nguru to Kano. This is because Nguru is one of the centres for livestock production in the northern Nigeria. Therefore, people came from other parts of the country to purchased cows (especially during festive period) and transported them back to their various places.

4.5 PEAK AND OFF-PEAK PERIOD OF TRAFFIC

Peak period is defined as a period when demand increase temporarily, returning later to the normal level. It is also a period of maximum demand and it affects freight and passenger transportation. However, the definition of peak period in this presentation will be based on the two months that recorded the maximum traffic (passengers, freight and cows) transported by the train from 2007-2013 and also the off-peak period will also be based on two months that recorded the least traffic. This was presented according to each category of railway traffic (passenger, freight and cows). Table 4.7, 4.8 and 4.9 showing the peak and off peak period of traffic below were extracted from the NRC traffic record register.

Table 4.7: Peak and off-Peak Period of Transporting Passenger

Year	Peak period of passenger traffic		Off-peak period of passenger traffic	
	Months	**No. of Pass.**	**Months**	**No. of passenger**

2007	January	4907	September	2720
	February	4516	October	2689
2008	January	4401	October	1639
	December	4124	November	1161
2009	January	5839	September	1772
	March	5000	November	1657
2010	May	3387	February	1545
	July	3650	August	1640
2011	July	5054	February	275
	December	4663	March	473
2012	March	3459	July	106
	May	3546	June	1694
2013	January	4228	June	994
	February	4560	April	1740

Source: Railway Traffic Register, Zaria District, 2007-2013

Table 4.7 shows that the peak period of passenger traffic along the Kano-Nguru rail corridor from 2007-2013 were between December to March. This might be linked to festive periods such as Sallah, Christmas, New year, Easter e.t.c. when people travel a lot to visit their relatives and love ones during such months of the year. On the other hand, the off-peak period of passenger traffic were between Jun to September. This might be linked to rainy season when movements of people minimal due to people engaging in farming activity.

Table 4.8: Peak and off-Peak Period of Transporting Freight

Year	**Peak period of freight (in tons)**		**Off-peak period of freight traffic(in tons)**	
	Month	**Volume of freight (in tons)**	**Month**	**Volume of freight (in tons)**
2007	March	239	October	127
	May	237	April	144
2008	January	126	November	33
	May	128	July	56
2009	January	77	August	54
	June	91	September	44
2010	July	106	January	21
	August	149	April	35
2011	May	2958	February	244

	December	1166	April	159
2012	May	482	March	293
	October	673	July	65
2013	January	735	June	246
	February	554	November	54

Source: Railway Traffic Register, Zaria District, 2007-2013

Table 4.8 reveals that the peak periods of freight traffic along the Kano-Nguru rail corridor from 2007 to 2009 and also 2013 were between January to June, this might be linked to festivity that usually fall between such months when people travel a lot to visit their relatives and love ones. But from 2010 to 2012 the peak periods were from May to December, this might be related to harvesting period when farmers transported their products to markets or stores. While the off-peak period from 2007 to 2009 and also 2013 were between July to November which might be connected to farming season, where people movement is usually restricted due to engagement in farming activities.

Table 4.9: Peak and off-Peak Period of Transporting Cows

Year	Peak period of Cows		Off-peak period of Cows	
	Months	**No. of Cows**	**Months**	**No. of Cows**
2007	January	709	April	315
	October	770	August	285
2008	March	525	September	160
	May	458	November	175
2009	October	735	April	70
	December	770	August	210
2010	February	315	July	53
	June	315	August	132
2011	November	385	February	70
	December	390	April	35
2012	May	420	March	140
	October	400	December	86
2013	January	1031	June	75
	November	951	September	153

Source: Railway Traffic Register, Zaria District, 2007-2013

The table 4.9 shows that the peak period of cow traffic along the Kano-Nguru rail corridor were from October to May. This might strongly be connected to festivity periods that occurred within such months due to increase in the demand of meat. While the off-peak period might be linked to farming season from June to September when people engage in farming activities.

4.6. PASSENGER AND FREIGHT REVENUE GENERATED FROM RAILWAY TRANSPORT FROM 1996-2006

The passenger and freight revenue generated by the Nigerian Railway Corporation varies over time and season. Table 4.10 shows passenger and freight revenue generated by the Nigerian railway corporation from 1996 to 2006.

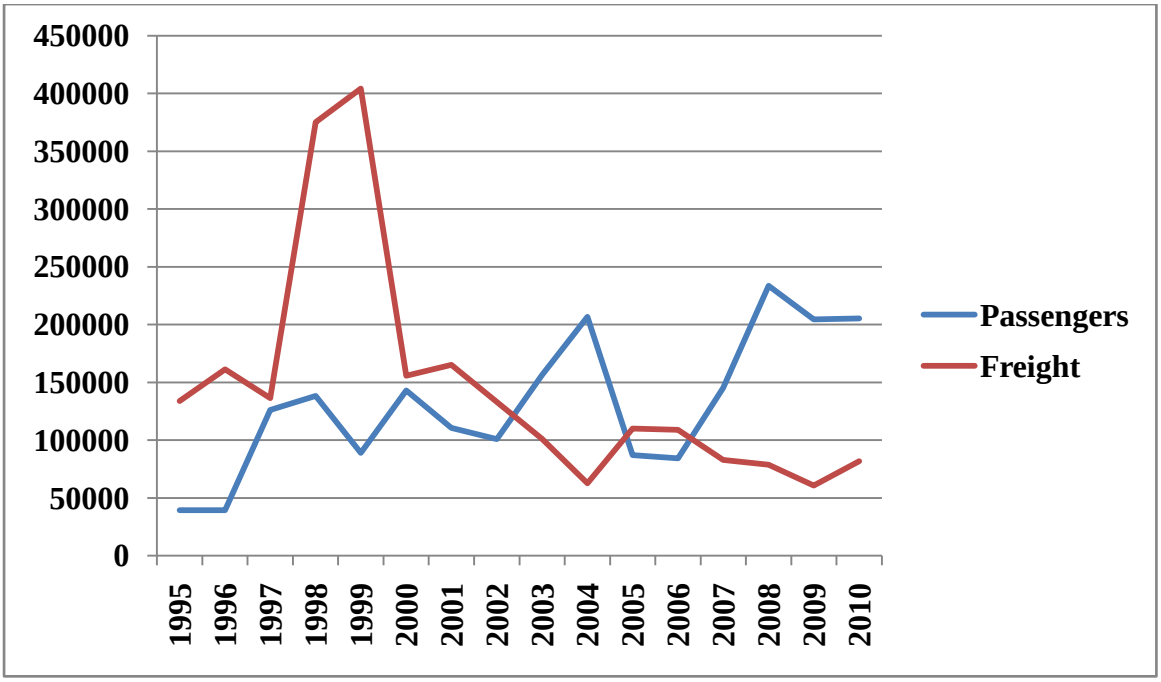


Figure 4.10: Passenger/Freight Revenue Generated by the NRC from 1995-2010
Source: Nigeria Railway Corporation, 2007

Figure 4.10 reveals the passengers and freight revenue generated by the NRC from 1996 to 2006. The table indicates that revenue generated from freight traffic was far higher than that of passenger traffic. The table further illustrated that there was an increase in revenue generated by the NRC between 1995 to 1999 while from 2000 to 2006 the table shows a decline in revenue generated by the NRC.

4.6.1 Revenue generated from Kano-Nguru train from 2007-2013

Revenue generated from the Kano-Nguru rail operation is categorised into passengers, freight and cows revenue as grouped in the railway traffic register. However, the revenue generated from the Kano-Nguru rail operation will be presented annually from 2007-2013. Below is table 4.11 showing revenue generated from 2007-2013.

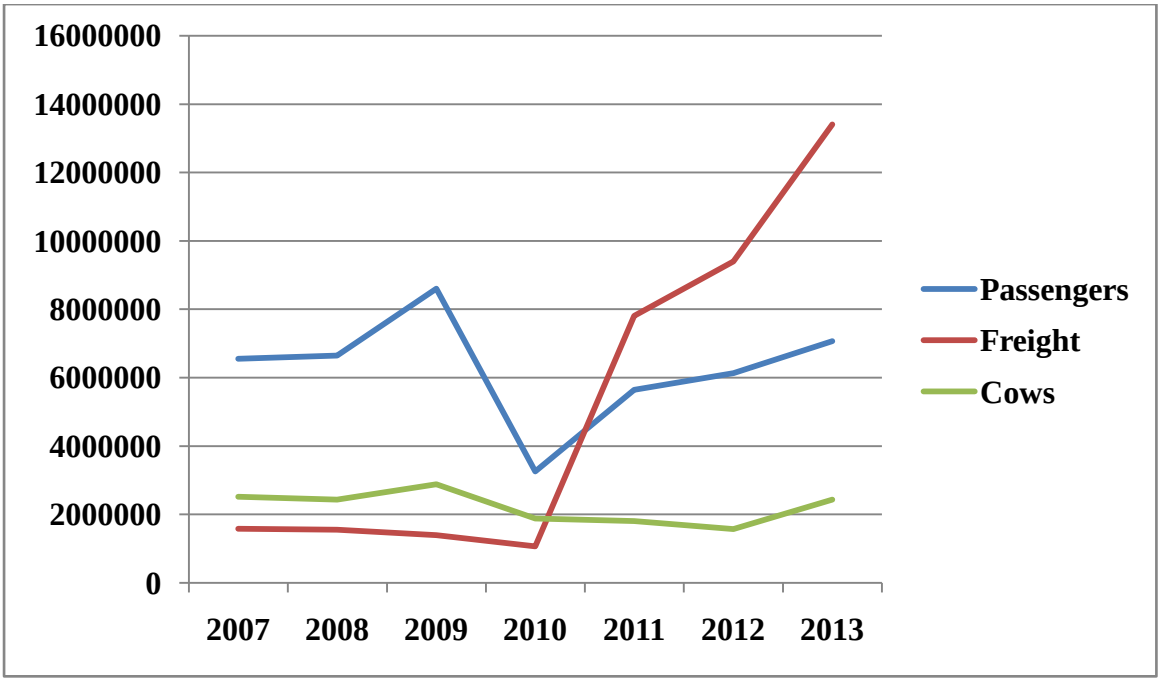


Figure 4.11: Passenger, Freight and Cow Revenue from 2007-2013
Source: NRC Traffic Register, Zaria District, 2007-2013

Figure 4.11 reveals the revenue generated from the Kano-Nguru rail transport service from 2007-2013. The table revealed that year 2013 recorded the highest revenue generated by the Kano-Nguru rail service representing 24.1% of the total revenue generated from 2007-2013. This might be related to the high number of frequency recorded in 2013. This was followed by 2012 representing 17.9% respectively. The finding indicated that in 2013 revenue generated from freight traffic (freight and cows) was far higher than that of passenger traffic and that freight traffic generate more revenue in railway transport than passenger traffic. On the other hand, year 2010 recorded the least revenue generated representing 6.5% of the total revenue generated. This was because between 2007-2010 the train transported more of passenger traffic than freight traffic and passenger traffic does not generate revenue in transportation compare with freight. Also the trip frequency made in 2010 was low as shown in table 4.3 due to poor management by the NRC and this consequently led to low revenue in 2010. Also the reason why revenue generated from passenger traffic led that of freight traffic between 2007-2010 might be due to absent of railway operation at the major railway corridors such as Lagos-Kano as a result of track rehabilitation work that took place during that period. Therefore, the Kano-Nguru train transported more of passenger traffic than freight because there is no flow of goods from West-North by rail. But

after the completion of the track work in 2011 and the commencement of Lagos-Kano rail service in the same year, this led to flow of goods from West-North by rail, which eventually led to increase in freight transportation from West-North by rail because it's cheaper than road. This might be the reason why the Kano-Nguru freight traffic record led passenger traffic from 2011-2013.

4.7 Perception of passengers and staff on the Kano-Nguru railway operation

The perception of passengers of Kano-Nguru railway transport service and railway staff covers informations on the challenges facing the railway transport service and also ways to improve on service delivery in other to attract more passengers and income generation.

4.7.1 Perception of passengers on the Kano-Nguru railway operation

Passengers perception covered information related purpose of trip, transport fare, facilities at the railway station and inside the train, delay encountered in the journey and level of security personnel within the Kano railway station and en-route.

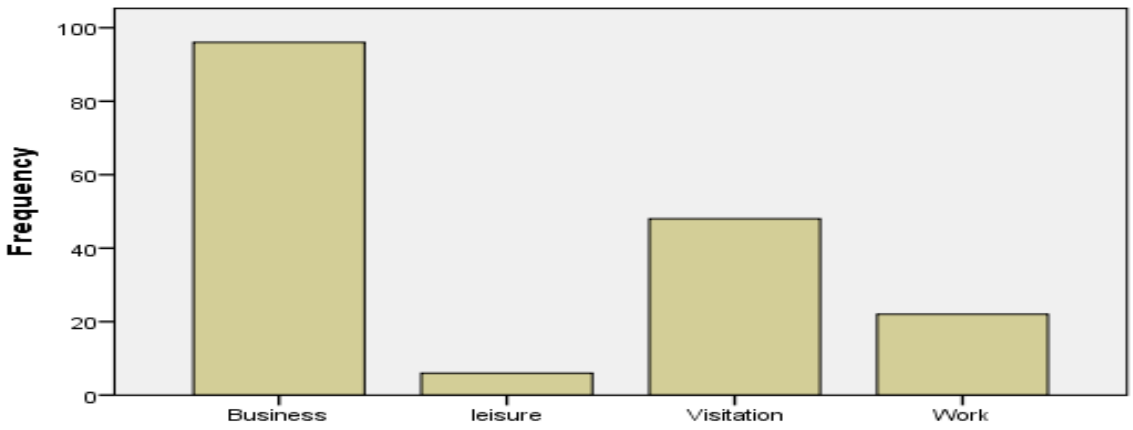


Figure 4.12: Purpose of Trip

Source: Author's Field Survey May, 2014

Figure 4.12 reveals that 55.8% of the train passengers were people who travelled for business purposes, whereas 3.5% of the train passengers travelled for leisure. This clearly revealed that majority

of the train passengers were traders who purchase goods in Kano and transport it to other parts of the country and also traders that transport cows to Kano and other neighboring states.

Table 4.10: Cost of Transport Fare

Transport fare	Frequency	Percent
Very cheap	67	39.0
Cheap	86	50.0
Expensive	14	8.1
No response	5	2.9
Total	172	100.0

Source: Author's Field Survey May, 2014

Table 4.10 shows that 50% of the train passengers opined that the rail transport fare was cheap and affordable. Whereas 8.1% of the train passengers opined that the transport fare was expensive. This finding indicated that majority of the train passengers believed that the rail transport fare was cheap and affordable especially when compare with road transport fare. This clearly revealed the reason why passengers preferred to travel with the train than road.

Table 4.11: State of Facilities at the Kano Railway Station

Facilities	Frequency	Percent
Very good	10	5.8
Good	48	27.9
Poor	76	44.2
Very poor	24	14.0
No response	14	8.1
Total	172	100.0

Source: Author's Field Survey May, 2014

Table 4.11 shows that 44.2% of the train passengers opined that the facilities (fan, toilet, waiting room etc) at the railway station and inside the train were in poor condition. While 5.8% and of the train

passengers opined that the condition of facilities at the railway station and inside the train were in good condition. This finding revealed that majority of passengers believed that facilities at the railway station and inside the train were in poor condition, and this could discourage some passengers from patronising the train service.

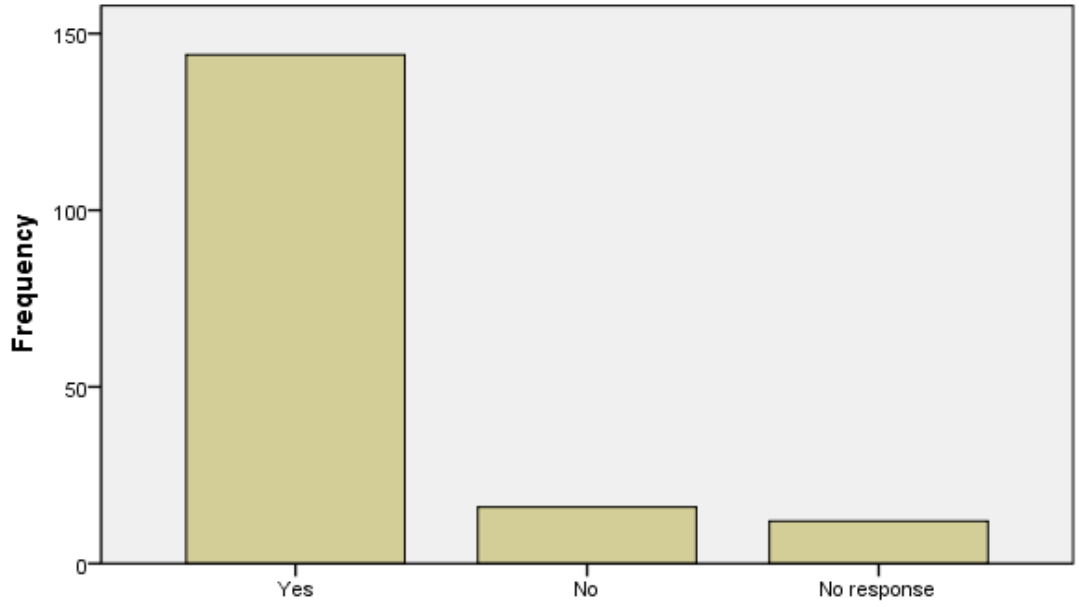


Figure 4.13: Responses of Passenger on Delayed Encountered

Source: Author's Field Survey May, 2014

Figure 4.13 reveals that 66.3% of the train passengers indicated that they experienced delay as a result of loading and off-loading of goods, engine failure or track problem, while 26.7% of the train passengers opined that they did not encountered any delay in their journey. The result of this finding indicated that most of the delayed encountered by the passengers were as a result of prolong loading and off-loading of goods due to high volume of freight traffic transported by the train.

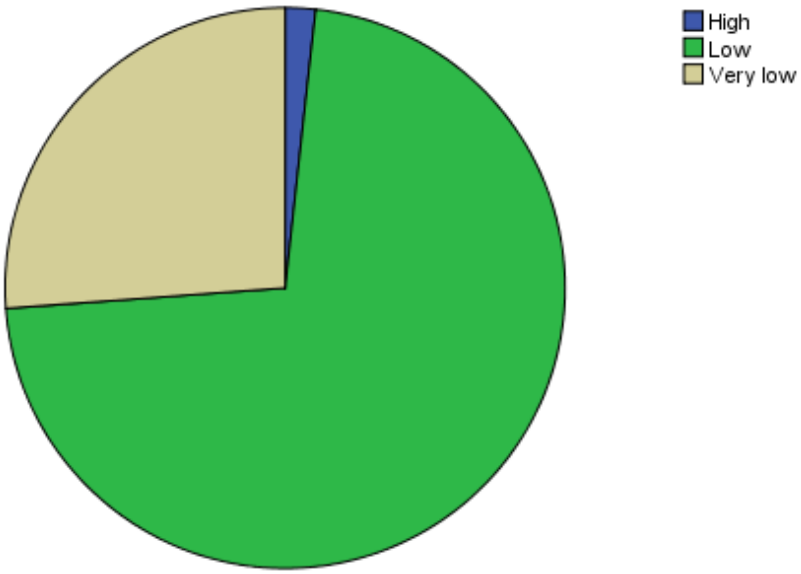


Figure 4.14: Security Personnel

Source: Author's Field Survey May, 2014

Figure 4.14 shows that 72.1% of the train passengers opined that security personnel at the railway station and en-route was low, while 1.7%f the train passengers opined that security personnel at the railway station and inside the train was high. This finding clearly indicated that majority of the train passengers believed that security personnel were not in sufficient number and therefore passengers and their freight are not safe since the number of security personnel as compared to the traffic is low. This could discourage higher class individuals from patronising the train service.

4.7.2 Perception of railway staff on the train operation

This comprises informations collected from railway staff in various departments such as civil engineering, mechanical, operation and commercial department etc. In this regard, information were collected from the railway staff as related to the staff cadre, departments and the reason behind the kano-Nguru train operation between 2007-2013 when train operations along the major railway axis such as Lagos-Kano, Pot-harcort-Maidugudri, and pot-hacort-Kano e.t.c. stopped running. Also, information on the problems associated with the Kano-Nguru train operations were also collected from the railway staff.

Table 4.12: Reasons Behind the Kano-Nguru Train Operation

Reason behind rail operation	Frequency	Percent
Political	16	63.9
High volume of traffic	6	31.1
Other reasons	2	2.5
No response	2	2.5
Total	26	100.0

Source: Author's Field Survey May, 2014

Table 4.12 shows the opinion of staff on the reason behind the operation of the train during the era of industrial crises faced by the NRC between 2007-2011 when train operation along the major railway corridors was at stand still. The table revealed that 63.9% of the staff opined that the reason for the Kano-Nguru railway service at that period was purely political, this is because sometimes the affected states namely Kano, Jigawa and Yobe state provide funds to the railway authority just to make sure that the train continue running especially during the time railway was seriously facing financial crises. Also, 31.1% believed it was due to high volume of traffic. While 2.5% of the staff believed reasons such as special interest by the railway authority was the reason for the train operation. This finding revealed that the major reason behind the train operation was because of political influence by some prominent people and key decision makers in the three affected state namely Kano, Jigawa and Yobe states.

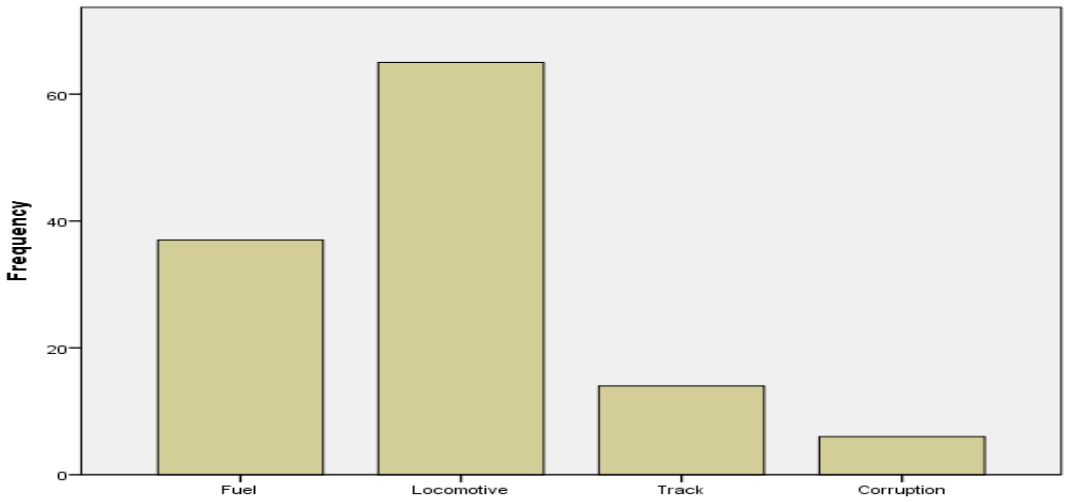


Figure 4.15: Problem Associated with the Kano-Nguru Rail Transport

Source: Author's Field Survey May, 2014

Figure 4.15 shows that 53.3% of the staff opined that lack of sound locomotives constituted the major problem of the train operation which sometimes causes the train stopped running for some months due to engine failure. While 30.3% believed that lack of reliable arrangement for fuel supply by the railway corporation constituted the major problem facing the Kano-Nguru rail service. Whereas 4.9% believed that corruption on the side of railway staff in charged with ticket sales and other sources of revenue generation constituted the major problem. Therefore, this finding revealed that lack of consistence and reliable arrangement for fuel supply and sound locomotives constituted the major problems facing the Kano-Nguru railway operation.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

This research on the operational traffic characteristics of Kano-Nguru rail transport service attempt to identify the potentials of rail transportation on towns and villages that lies along the rail corridor and how it enhances social, political and economic development of any country especially where it involve transportation of bulky goods. The findings of this study revealed that rail transport system is the most affordable, safer, reliable and convenient means of transportation to towns and villages that lies along the Kano-Nguru rail corridor especially when compared with road transport. Therefore, the Kano-Nguru train transported agricultural products and live stocks to Kano and major towns along the rail corridor and returns back with manufacturing products.

5.2 SUMMARY OF FINDINGS

- The investigation revealed that the Kano-Nguru train was not meeting the required number of trips that was scheduled in the train timetable due to poor management by the Railway authority. This affects the confidence of passengers on the train operation and consequently affects revenue generation from the railway service.
- The study finds out that year 2007 recorded highest passengers transported representing 21.5% of the total passengers transported. While 2011 recorded the least representing 9.7%. On the other hand, 2011 recorded the highest freight transported representing 34.9% of the total freight transported and 2010 recorded the least representing 3.1%. Year 2007 recorded the highest cows transported representing 24.5% of the total cows transported. Year 2011 recorded the least representing 6.9%.
- The study further revealed that that year 2013 recorded the highest revenue generated representing 24.1% of the total revenue generated from 2007-2013. While 2010 recorded the least representing 6.5% of the total revenue generated.
- In addition, the study finds out that the major constraints facing the Kano-Nguru rail operation were lack of consistence and reliable arrangement for fuel supply and sound

locomotives which sometimes led to stoppage of operation for some months due to in-ability of the railway management to purchase diesel for the train operation despite the fact that the train is generating huge revenue to Northern district.

- The study revealed that facilities at the railway station and inside the train are not in good condition. This could obviously affect the patronage of the rail service by some people due to poor conditions of facilities.
- The study revealed that the security personnel within the railway station and en-route are not in sufficient number especially when considering the high volume of traffic recorded by the train and the importance of security personnel in safe guarding passengers and their goods in the transport sector. This also affects the level of patronage in the railway service.
- The study finds out that the major reason behind the Kano-Nguru rail operation between 2007-2011 when rail operation at the major rail corridors such as Lagos-Kano was at stand steel was because of political influences by some highly influential people couple with high level of patronage. And also the fact that the Kano-Nguru rail service served as the major source of revenue to the Northern district (Zaria district).
- The study revealed that the peak and off-peak period of traffic along the rail corridor is directly related to the frequency of operations, therefore where the train met the required number of trips as schedule in the train time table, then volume of traffic in that month will be high and vice versa. This was the reason why there is inconsistency in the records of peak and off-peak period of traffic along the rail corridor over the years.

5.3 CONCLUSION

This study highlighted the potentials of railway transport system in social, political and economic development of towns and cities that lies along the rail corridor. The rail transport system enhances regional development because of its ability to transport resources from area of surplus to area of scarcity, which result to the equitable distribution of resources between different regions of a country. It also help in strengthening regional cohesion and mutual understanding of a country due to involvement of people of different religion, culture and ethnic background in the rail transport service especially where it involve long distance journey. Rail transport further ensured optimal utilisation of economic of scale especially where it involved transportation of large quantity passengers or bulky freight to a medium and long distance trip.

5.4 RECOMMENDATIONS

The Kano-Nguru rail transport service if properly managed will go a long way in creating employment opportunities, reduce accident rate, poverty, amount spend in road maintenance, improve the standard of living of people and finally boost the social and economic development of towns and cities that lies along the rail corridor. Therefore, the following under listed recommendations are needed for the NRC management in order to improve the operation of Kano-Nguru rail transport service.

I. Frequency of trip: the management of NRC needs to improve the frequency of operations so that the train can meet the required trips designed to make in the train time table (sixteen trips per month). This will boost the confidence of passengers on the train operation and consequently increase level of patronage and revenue generation to the government. Therefore total compliance to the stipulated trips per month is very crucial in regaining the confidence of passengers on the train operation.

II. Upgrading the existing facilities: most of the existing facilities in the railway stations are either outdated or in bad condition. Therefore there is need for general overhauling of

facilities in the railway transport system which will boost the morale of passengers and consequently increase the level of patronage and revenue generated to the government.

III. Security personnel: Adequate provision and proper equipping of security personnel is paramount in achieving success of any business organization. Therefore, there is need for the NRC to increase the number of available of security personnel and equipping them with modern gadgets such as security cameras, bomb dictators' e.t.c. for the Kano-Nguru rail operation. This will further ensure safety of passengers and their goods and leads to increase in patronage and revenue generation.

IV. Proper auditing: The NRC needs to improve their auditing system so that to check-mate the level of corruption involve in the transport sector. The idea of electronic mode of selling tickets will be useful in reducing corruption rate in the system. This will aid the corporation and government to realize more revenue from the rail transport sub-sector. Another way of check-mating the level of corruption in the railway operation is employ the service of private firm to handle train supervision and selling of tickets.

V. Standard gauge of track: the existing railway track is a narrow gauge track which allowed maximum permissible speed of 50-65 KM/hr. This affects the speed of train and causes delayed to passengers in arriving to their final destination. Delay is a peculiar problem associated with Nigerian railway service which discourages people from patronizing the rail transport service. Therefore, in order to reduce the extent of delay in the railway transport, the federal government needs to come in and make a concerted effort to change the existing railway track gauge to standard gauge, which permit an average speed of 120-160 KM/hr. This will reduce time wastage in journeys and consequently increase level of patronage and revenue to the government.

VI. Sound locomotives: the NRC need to provide adequate number of locomotives mainly reserved for the Kano-Nguru rail service. This will go a long way in addressing the

problem of engine failure that sometimes used to shut down the Kano-Nguru operations for several months. It also causes low frequency of operation and low revenue to the railway corporation.

VII. Fuel supply: the need for adequate and reliable arrangement for fuel supply is very necessary for an effective operation of the Kano-Nguru railway transport service. This will help in reducing passengers' disappointment due to lack of fuel supply. This will also boost the confidence of passengers on the railway operation and consequently leads to more revenue generation to the organization.

REFERENCES

Aba A.A. (2008), *economic impact of the decline in Nigerian railway transport system.* Case study of Kaduna-Kafanchan rail route, an undergraduate dissertation in the Department of Urban and Regional Planning A.B.U. Zaria.

Abubakar A.A. (2006), *Nigerian Railways: Past, present and future perspectives*. Rail News, 4(6): 4

Ademiluyi I. A. (2006), Historical evolution and characteristics of transport modes in Nigeria. Babcock Journal of Management and Social Sciences, 5(1): 91-111

Adesanya, A. (1988), *"*Railway System Renewal: System Structures, Parameters and Challenges for the Future", Paper presented at the Centenary Seminar on *Nigerian Railway System in the 21st Century: Emerging Issues, Challenges and Policy Initiatives;* Held at the International Conference Centre, Abuja, 16th-18th November.

Adesanya, A. (2002), *Declining Fortunes of Rail Transport in Nigeria: Response and Direction of Policy*,NISER Monograph Series No.8, NISER, Ibadan.

Adesanya, A. (2010), *Bringing the Nigerian Railways Back on Track: Challenges and Options.* Paper Presented at Monthly Niser Seminar Series, Held at the Niser Conference Room on November 13, 2010

American Association of Railroads (2009), *"Railroad Fuel Efficiency Sets New Record"*. http://www.progressiverailroading.com/news/article.asp?id=16740. Retrieved 12 April 2009.[Accessed on 26-09-2012]

American Railway Engineering and Maintenance of Way Association (AREMA) (2003), Committee 24 - Education and Training., *Practical Guide to Railway Engineering.* AREMA, 2nd Ed. [Accessed on 26-09-2012]

ANON; (1992 a), Federal Republic of Nigeria, forestry sector review. World Bank Confidential Report No 107444. 87pp

Ayodele, A. 'S. (2000), 'The Strategies for National Development in Nigeria in the Next Millennium', in Jiboku, O.A. *et al*. (eds) *Perspectives on National Development:* A Book of Readings, Marvel Books, Ilaro, pp.1-6.

Courier, (1998), *"Moving towards Railway Restructuring in the SADC Region",* **The Courier,** No 169, May-June, p.52.

Drucker, P. (1999), *"Beyond the information revolution."* The Atlantic Online, 284: 47-57. Ebute metta. Retrieved from the internet in 2008.

Edward, E. (2001), *'Taking Railways to a New Standard', in Rail news*, Quarterly Journal of Nigerian Railway Corporation, Vol. 2, No. 3, October – December, pp. 15 and 25.

Elechi, S.I.O. (1998), "Rail Transport in Nigeria: Problems and Prospects", in Eniola, J.O. (ed), **Transport: *A Developmental Catalyst,*** Tranec, Lagos, pp.241-256.

Falola J.A. (2002), Kano. In: Okafor, S., Osaghae E., Ikporukpo, C., and Abumere, S. (Eds) *Africa Atlases*: Atlas of Nigeria. Les Editions J.A, Paris, France, pp 146-147.

Galenson, A. and Thompson, L.S. (1994), *The Evolution of the World Bank's Railway* Lending (World Bank discussion Papers, No. 269), World Bank, Washington, D.C.

Gbenga Sesan (2007), *The Nigerian Economy* in Review and Outlook 2008. [Online] Available: www.gbengasesan.com/?p=212

Gubbins, E.J. (1998), *Managing Transport Operations*, Kogan page Limited, London.

Guislain, P. (1997), The Privatization Challenge, World Bank Regional and Sectoral Studies Series,World Bank, Washington DC.

Hau H., Yun-feng G., Zhi-gang, L., Xiao-guang, Y. (2010), *Effect of Integrated Multi-Mo dal Transit Information on Modal Shift*. Intelligent Transportation Systems (ITSC), 2010 13th International IEEE Conference. 1753-1757pg.

Hilling, D. (1996), ***Transport and Developing Countries*,** Routledge. London.

Hong Kong Information Services Department (2009), Department of the Hong Kong SAR Government. Hong Kong. 2009.[Accessed on 26-09-2012]

Huff, L.W. and Thompson, L.S. (1989), *Techniques for Railway Restructuring* (Railway Management Component, Phase II), Paper prepared for the Union of African Railways (UAR), World Bank, Washington, D.C.

Hylton, Stuart (2007), *The Grand Experiment: The Birth of the Railway Age 1820-1845*. Ian Allan Publishing.

Iliffe, J. (2007), Africa*: the History of continent*, Cambridge University press.

Jaekel, F. (1997), *History of the Nigerian Railway (Vol.2),* Spectrum Books Limited, Ibadan.

Jakpa, P.E. (1981), "Nigerian Railways in the 1980s", in Ekanem, N.F. ***and S.O. Onakomaiya (eds), Transportation in Nigerian National Development (proceedings of a National Conference), NISER, Ibadan, pp.67-89.***

Jean D. (1981), *All Stations*, London p. 6.

Krejcie, R.V. and Morgans, D. (1970), *Determining Sample Size for Research Activities* University of Minnesota, Duluth.

Krueger, H. (1999), *Parametric Modelling in Rail Capacity Planning, Proceedings of Winter Simulation Conference*, Phoenix, AZ.

Lewis, M. J. T. (2009), "*Railways in the Greek and Roman World*". published by Cambridge University press.

Mabogunje, A.L. (1980), ***The Development Process: A Spatial Perspective,*** *Hutchinson, London.*

Mark D., Yung-Cheng L., Christopher P.L. (2009), *Impact of Train Type Heterogeneity on Single-Track Railway Capacity.*

Mithell, B. and Budin, K. (1999), **"The** *Abidjan-Ouagadogou Railway.*

National Population Commission (NPC) (2006), population census of the Federal Republic of Nigeria.

Nwanze, E. (2002), *"Conceptualization of the Nigerian Transport Problems and the need for an Integrated National Transport System",* A Paper presented by the Deputy Director (Corporate Planning), Nigerian Railway Corporation during the Conference on Revitalization of Railway Transport in Nigeria at the Centre for Transport Studies, Olabisi Onabanjo University, Ago-Iwoye, August, 2002.

Odeleye J.A. (2000), *Public-private participation to rescue railway development in Nigeria.* Japan Railway and Transport Review Journal, 23: 42-49.

Okanlawon, K. R. (2006), 'Towards Enhancement of Light Rail System in Efficient Transportation of commuters in Lagos State', Journal of *Social Policy and Society*, Volume 1, Number 1, pp. 22 - 27.

Olanrewaju, S.A. (1986), 'The Rail Transport System', in Falola, T., and Olanrewaju, S.A. (eds),*Transport Systems in Nigeria,* Syracuse University, Syracuse, pp.31-50.

Olofin E.A. (1987), *some aspect of physical geography of Kano Region and Related Human Response.* B.U.K. Debis standard printers Kano.

Onakomaiya, S.O. (1978), "Overland Transport", in Oguntoyinbo, J.S. ***et al*** (eds), ***A Geography of Nigerian Development*****,** Heinemann, Ibadan, pp.316-337.

Pachl, J. (2002), *Railroad Operating and Control.* VTD Rail Publishing, Mountlake Terrace,

Puentes, R. (2008), *A Bridge to Somewhere*: Rethinking American Transportation for the 21st Century. Brookings Institution Metropolitan Policy Report: Blueprint for American Prosperity series report.

Railway traffic register for Northern district (2007-2013)

Richards, J. and MacKenzie, J. M. (1988), *The railway station* p. 20: a social history, Oxford.

Salim, I. (2003), Security Aspects of Multimodal transport, in Proceedings of the Expert Meeting on *the Development of multimodal Transport and Logistics services,* 24-26.

Skempton, A.W. (2002), *A biographical dictionary of civil engineers in Great Britain and Ireland, John Birkinshaw*. pp. 59–60. ISBN 978-0-7277-2939-2.

Solarin A.M. (2000), *An Appraisal of Rail Transportand Its Effect on Freight Mass Transit in Nigeria*. M. Sc. Thesis, Unpublished Ago-Iwoye, Centre for Transport studies Ogun-State University, Nigeria.

Squires, G. (2002), *Urban Sprawl: Causes, Consequences, & Policy Responses*. The Urban Institute Press.

Thiam, A.A. (1998), 'The Story of Railway Concession', The Courier, No.169, May-June, pp.53-55.*Transport and Telecommunication* 7(1): 92-96.

Thompson, Louis S. and Julie M. Fraser. (1993), "*World Bank Survey of Railway Performance.*" Developing Railways 1993:5-13.

Transport Statistics (2010), www.nigerianstat.gov.ng/pages/download/29.

U.S. Bureau of Transportation Statistics (2010), National Transportation Statistics. Table 2-1: Transportation Fatalities by Mode (Report). Retrieved 14 February 2010.

Ubogu, E. A. (2011), potentials of rail-road integration for port-hinterland freight transport in Nigeria. International Journal for *Traffic and Transport Engineering*, 1(2): 89 – 107.

United State Bureau of Transportation Statistics (2010), National Transportation Statistics. Table2-1:*Transportation Fatalities by Mode* (Report). http://www.bts.gov/publications/national_transportation_statistics/html/table_02_01.html. Retrieved 14 February 2010. [Accessed on 26-09-2012].

Vantuono, W. C. (2005), *Capacity is Where You Find It*: How BNSF Balances Infrastructure and Operations, Railway Age, Feb-01, 2005.

Wolmar, C. (2000), ' *creating the passenger rail franchises' in all change Britain Railway Privatisation*, Freeman, R. & Shaw, J., Ed. London: MacGraw- Hill, p.140.

World Development Indicators (2008), World Bank Survey of Railway Performance." Developing Railways 1993:5-13.

APPENDIX A

QUESTIONNAIRE FOR PASSENGERS

DEPARTMENT OF GEOGRAPHY, AHMADU BELLO UNIVERSITY ZARIA, NIGERIA

Dear Passenger/ Respondent,

This questionnaire is designed to obtain information for a research study title: **operational traffic characteristics of Kano- Nguru railway transport service, Nigeria.**

I solicit your support to provide adequate and accurate information as all information provided will be used for academic purpose and treated confidential.

Thanks for your assistance.

Please tick your response or write as appropriate.

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENT

1. Name of respondent: …….
2. Sex: Male ( ) Female ( )
3. Marital Status: married ( ) Single ( ) Divorced ( ) Never married ( )
4. Age: < 20 ( ) 20-39 ( ) 40-59 ( ) 60 > ( )
5. Educational Background: No formal education ( ) Primary education ( )
   Secondary education ( ) Tertiary education ( ) Others' (specify)……
6. Occupation: Farmer ( ) Civil service ( ) Politician ( ) Trader ( )
   Others' (specify)……..
7. Name of Community ……District……..

SECTION B

This section consisted of questions that seek to collect information about passenger perception on Kano-Nguru railway transport service.

1. What is the purpose of your trip?
   a) Business (b) leisure (c) Visitation (d) Work

2. How often do you board the train?
   a) Very often b) Often c) Rarely d) Not at all

3. While waiting to board the train, are there facilities at the railway station? (public Convenient, water, shopping center e.t.c) (a) Yes (b) No

4. How will you assess the railway station?
   a) Very clean (b) Clean (c) Dirty (d) Very dirty

5. Why do you choose to travel with rail than road?
   a) Cheapness b) Safety c) Reliability d) Because of high volume of freight

6. How punctual is the train at departure?
   a) Very punctual (b) Punctual (c) Fairly punctual (d) Not punctual

7. How punctual is the train at arrival?
   a) Very punctual (b) Punctual (c) Fairly punctual (d) Not punctual

8. Have you ever experience any form of delay en-route?
   a) Yes (b) No

9. If yes, how often is the delay?
   a) Very often (b) Often (c) Rarely often (d) Not at all

10. What is usually the cause of delay?
    a) Mechanical (engine failure) (b) Unnecessary stoppage en-route
    c) Derailment (d) Prolong loading/uploading of goods

11. How do you assess the fare of your trip?
    a) Very cheap (b) cheap (c) Expensive

12. How do you assess the facilities available at the railway stations and inside the train? (toilet, air condition canteen, fan, television e.t.c.)
    a) Very good (b) Good (c) Poor (d) Very Poor

13. Have you ever witness any case of theft / robbery at the station or en-route?
    a) Yes (b) No
14. How do you rate security personnel at the railway station and en-route?
    a) High (b) Very high (c) Low (d) Very low

15. How do you assess your trip?
    a) Interesting (b) Very interesting (c) Dull(d) Very dull

APPENDIX B

QUESTIONNAIRE FOR STAFF OF NRC

DEPARTMENT OF GEOGRAPHY, AHMADU BELLO UNIVERSITY ZARIA, NIGERIA

Dear Respondent,

This questionnaire is designed to obtain information for a research study title: **operational traffic characteristics of Kano- Nguru railway transport service, Nigeria.**

I solicit your support to provide adequate and accurate information as all information provided will be used for academic purpose and treated confidential.

Thanks for your assistance.

Please tick your response or write as appropriate.

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENT

1. Name of respondent: …….
2. Gender: Male ( ) Female ( )
3. Marital Status: Married ( ) Single ( ) Divorced ( ) Never married ( )
4. Age: : < 20 ( ) 20-39 ( ) 40-59 ( ) 60 > ( )
5. Educational Background: Non formal education ( ) Primary education ( ) Secondary education ( ) Tertiary education ( ) Others' (specify)……
6. Department: Civil ( ) Mechanical ( ) Operation And Communication ( ) Admin ( ) Others' (specify)……
7. Staff cadre: Senior staff ( ) Junior staff ( )
8. Years in service: 1-9 ( )10-19 ( ) 20-29 ( ) 30 > ( )

SECTION B

This section consisted of questions that seek to collect information about staff perception on Kano-Nguru railway transport service.

1. How often does the train run?
   a) Very often b) Often c) Rarely

2. How punctual is the train at departure?
   a) Very punctual (b) Punctual (c) Fairly punctual (d) Not punctual

3. How punctual is the train at arrival?
   a) Punctual (b) Very punctual (c) Fairly punctual (d) Not punctual

4. Is the train filled to capacity at departure?
   a) Yes (b) No

5. Generally, how do you describe the volume of traffic of Kano-Nguru train?
   a) Very high (b) High (c) Low (d) Very low

6. What do you think is the major problem of the train?
   a) Fuel (b) Locomotive (c) Track (d) Corruption

7. As a staff, how do you describe your working condition?
   a) Very conducive (b) Conducive (c) Not conducive

8. Are there measures put in place to ensure the safety of passengers and their goods?
   a) Yes (b) No

9. Is the Kano-Nguru train the only running train in Northern district?
   a) Yes (b) No

10. Is the train the major source of revenue to Northern district?
    a) Yes (b) No

11. What do you think is the reason why Kano-Nguru train was still running even when trains at the major corridors stopped running?
    a) Political reason (b) High volume of traffic (c) Other reasons

12. Does the train encounter any form of delay en-route?
    a) Yes (b) No

13. If yes, how frequent is the delay?
    a) Very often (b) Often (c) Rarely often (d) Not at all

14. What is usually the cause of delay?
    a) Mechanical (engine failure) (b) Unnecessary stoppage en-route
    c) Derailment (d) Prolong loading/uploading of goods