

# Township Road Expansion and Upgrading: A Case Study of Gwale Local Govt. Area of Kano State

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*Abstract- Urban transportation and Human activities, particularly in the developing world are continuously crucial issues of global change in the 21st century affecting the physical dimension of cities (Bala Rabi Hashidu and M.K. Adamu, 2018). Road networks are observed in terms of its component of accessibility, connectivity, and traffic density, level of services, compactness, and thickness of particular roads. Level of service is a measure by which the quality of service on transportation devices or infrastructure is determined. It is a holistic approach considering several factors regarded as measures of traffic density and congestion rather than the overall speed of the journey (Mannering, Walter, and Scott, 2004).*

## I. INTRODUCTION

Urban transportation and Human activities, particularly in developing world is a continuous crucial issues of global change in the 21st century affecting the physical dimension of cities (Bala Rabi Hashidu and M.K. Adamu, 2018). Road network are observed in terms of its component of accessibility, connectivity, and traffic density, level of services, compactness, and density of particular roads. Level of service is a measure by which the quality of service on transportation devices or infrastructure is determined, and it is a holistic approach considering several factors regarded as measure of traffic density and congestion rather than overall speed of the journey (Mannering, Walter and Scott, 2004).

Road network system and routes have greatly influenced both how and where people live. Reliable road network allows a population to expand throughout a country's territory and to live comfortably in remote areas far from factory and farms. (Twelde, Gebre and Berhanu, G. )

Effective road network is an essential interest of every developing country and it acts as a means of interconnectivity between different parts and regions within and outside the country (Miller and Shaw, 2001).

Gwale is a local government Area in Kano state and also among the local government that makes the Kano metropolis is an important administrative commercial as well as transportation centre in Kano state. The present road system of Gwale was developed in stages, with the basic structure of the system shifting along with the changing of direction of growth of the areas which provided the primary access to the built up town on both side of the road. However the Concentration of activities attracted consumers and ancillary service providers. This partly caused traffic congestion along the old and newly constructed road networks in Gwale.

It on this premise that this study seeks to address is the range of problems associated with the increase in the diversity and volume of vehicles on roads in Gwale area of Kano, despite all efforts by the state government in the area of road development.

## II. MATERIALS AND METHODS

Gwale is a Local Government Area in Kano State, Nigeria within Greater population and surface area at the centre of the Kano city. Its headquarters are in the suburb of Gwale around the Kofar Na'isa Area. It has an area of 18 km<sup>2</sup> and a population of 362,059 at the 2006 census.(Census, 2006). The latitude of Gwale is 11, 9862. The longitude of Gwale is 11, 985103, The postal code of the area is 700234. Gwale has many inhabitants, especially Islamic scholars (Nipost, 2009)

- Climate of Gwale is the same as that of Kano metropolis which is classified as tropical wet and

dry,(koppen,1923). It is characterized by four distinct seasons, namely; the dry and cool season, which last from mid-November to February and marked by occasional dust harmattan haze, a dry and hot transitional period between the harmattan season and warm season follows the hot season and last from march till September, and lastly the dry and warm takes over till mid-November (Essiet and Tudun wada, 1999: 56)

- Rainfall is a very critical weather element in Gwale and most part of metropolitan Kano. This is because of its deficiency during the dry season. The rainfall occur during 29 summer months which starts mostly from May and ends in October with rain days ranging between 150-200, and an annual rainfall of over 1000mm.

Amount, duration, and frequency of rainfall vary widely from one year to another. Highest amount of rainfall is received usually from July ending and through August every year. Rainfall is characterized by strong wind, thunder and lightening. Showers are intense and last for short periods (IAR, 2012). Over the years the rainy season is characterized by late annuals, early cessations and long spells of drought of up to 21 days (NIMET, 2012).

- Temperatures of Kano Metropolis range between 260C and 340C. Unlike the rainfall, there is little variation in temperature from one year to another, but the mean temperature value could be as low as 200C during the harmattan period especially at night and up to 400C + in April – May. (IAR, 2012).

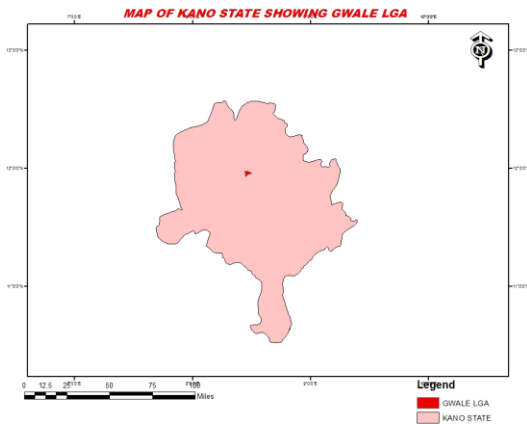
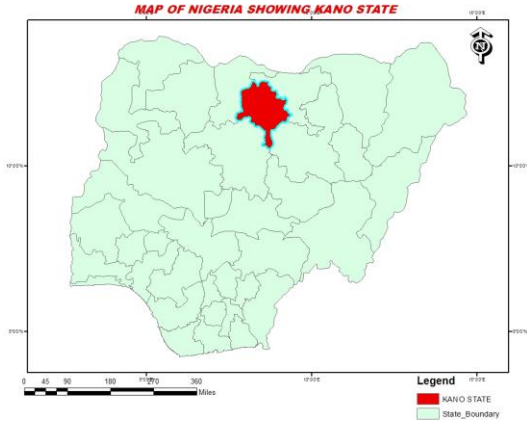
The soil of Gwale been among the metropolis have mostly Ferruginous tropical soils and aerosols derived from the Basement complex rocks. Most of the soils have undergone prolonged weathering to produce fairly deep profiles, which have been subjected to lateralization in some cases (Okeagu, *et al.*, 2004: 19).

- Administratively Gwale local government is structured into 10 wards which are; DISO, DORAYI, DANDAGO, GWALE, GADAN KAYA, GALADANCHI, GORON-DUTSE, KABUGA, MANDAWARI, SANI MAI NAGGE. However, six of those wards fall under

Gwale township, namely; Diso, Gwale, Galadanchi, Gadan kaya, Mandawari, Dandago, each of those wards has their respective ward heads recognized by the Local Government authority. It is acknowledge that at the current rate of expansion, the other 4 wards might soon be fully engulfed into the urban stream.

Two sources of data were utilized in the course of carrying out this research work. These include: the road life and traffic studies; Road inventory, Traffic analysis and Household traffic survey; occupational status, income level, Household size, Trip purpose, means of transportation, vehicular ownership and safety/comfortability. Information were also acquired through reconnaissance survey, questionnaire, personal interviews, and the researcher's observations thesis, projects materials, publications, journals and internet. There are thirteen (13) major Roads in Gwanle; in which six(6) of the Roads are District Roads while three(3) of the Roads are local Roads and four of the Roads are primary Roads. The traffic survey were conducted on eight(8) census station on some selected major arteries which include; Disco-Emirs palace road, Tal udu, Kubuga road(Murtalla Mohammad way), Kabuga-BUK road, Gadan kaya-Goron Dutse road(Aminu Kano Way), Kofar Naisa-Galadanchi road, Kofar Famto-FCE road.

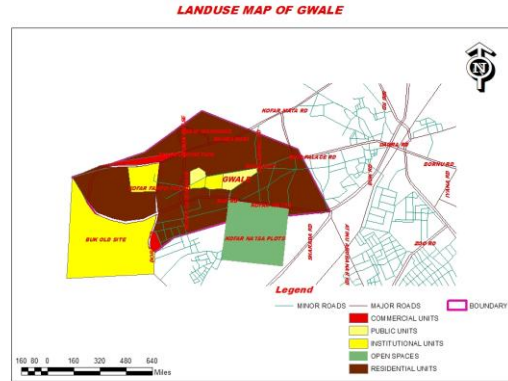
Two sources of data were utilized in the course of carrying out this research work. These include: Primary sources; information acquired through reconnaissance survey, questionnaire, personal interviews, and the researcher's observations. Secondary sources; information acquired through the use of textbooks, thesis, projects materials, publications, journals and internet.



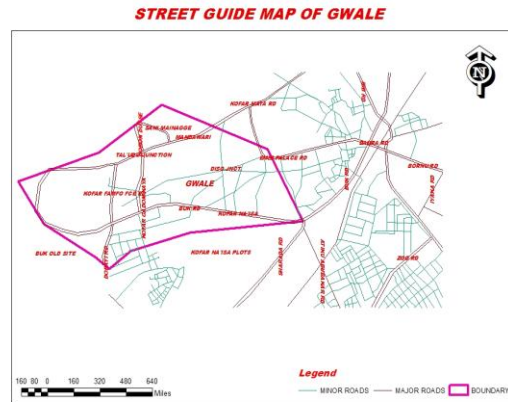
**GWALE TOWN**

Gwale town, which is a local government headquarters, is an important administrative, commercial, and transportation center in Kano state, is currently playing the role of satellite town to the Emirs palace. A large number of workers in the public and private employment sectors in different part on Kano reside in Gwale and commute daily to work. Gwale is one of the six local government areas that make up the Kano metropolis and is inhabited predominantly by hausa/fulani. The settlement pattern of Gwale is of two types, the first type is Traditional nucleated pattern, which is prevalent within the central area. Houses are irregular in shape because some are round, while others are either rectangular or square in shape. Some of these houses are roofed with mud. Streets are inter-connected but very narrow and this causes problem of space for parking vehicles within the central area.

The Second type of settlement patterns found within Gwale is the modern type of nucleated settlement. Diso to Kofar Na, isa is one of such area with this type of settlement pattern is Sabon Gari. Sabon gari is a high density modern settlement, although the streets are wide.



Source: Authors field work



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**III. RESULTS AND DISCUSSION**

**• TABLE ROAD INVENTORY**

The table below shows that despite the fact that most of the township roads are tarred but in bad shape due to encroachment as commercial activities thereby is constituting hindrances to the safe movement of vehicles. As such can be deduced from the analysis that over 45% of the township roads are in bad state, causing difficulty of accessibility within the township

S / N	NAM E OF ROAD	CL AS S OF ROAD S	WI DT H OF ROAD S	NA TU RE OF ROAD S	CON DITI ON	ROAD ENCRO ACHME NT IN (M)
1	Diso – Emir s palac e	Dis tric t	7m	Tarr ed	Good	2M
2	Kofar na,isa – Diso	Dis tric t	7m	Tarr ed	Good	2.5M
3	Diso _Gal adanc hi	Loc al	6m	Tarr ed	Fair	2.5M
4	Diso – Gada n kaya	Loc al	6m	Tarr ed	Bad	2.5M
5	Kofar na,isa – kabu ga (BU K)	Pri mar y	15 m	Tarr ed	Good	-
6	Kofar famf o _FCE	Dis tric t	7m	Tarr ed	Bad	1.5M
7	Sani mai nagg e	Loc al	5m	Un tarred	Bad	1.5M
8	Talud u _kab uga	Pri mar y	15 m	Tarr ed	Good	-
9	Gada n kaya	Pri mar y	15 m	Tarr ed	Fair	-

	– Goro dutse					
10	Mand awari	Dis tric t	7m	Tarr ed	fair	
11	Dand ago	Dis tric t	7m	Tarr ed	Good	
12	Gwal e	Dis tric t	6m	Tarr ed	Bad	2M
13	Dora yi	Pri mar y	15 m	Tarr ed	fair	-

**AVERAGE WEEKLY TRAFFIC COUNT IN P.C.U KOFAR NAISA \_DISO ROAD (INNER CORDON)**

Traffic volume in Kofar-Disco Road rises from the start of the day and stabilizes at mid day, however there is a decline on the volume traffic between 1-2pm., this is as a result of observance of afternoon prayers by the Muslims who dominate the town. The peak hours of the traffic flow is at 8am, 10am, and 5pm. The major mode of transport on this road is through cars, because the road is an inter town route.

**DORAYI ROAD (OUTER CORDON)**

The peak flow of traffic at Dorayi road (outer cordon) is mostly at 9am, 10am, after which the traffic begin to decline till 1pm and then begin to rise till 6pm. This road is a commercial road and used for intra-township movement which is why account for the highest volume of traffic motorcycle.

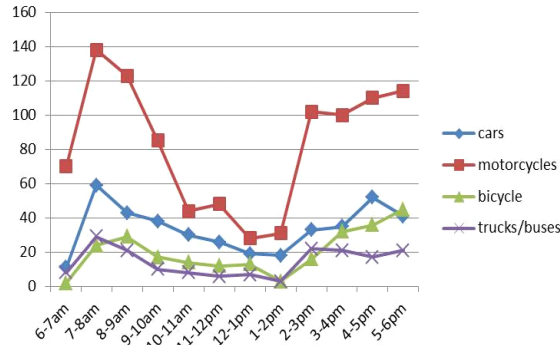
**DANDAGO ROAD (INNER CORDON)**

The peaks flow of the traffic on this road is at 7am, 8am, and 12pm, when workers and students are transiting to work place and schools, and at 5pm, when commuters are returning to their residencies. The dominant mode of transportation on this road is via motorcycles.

**GWALE \_GADAN KAYA (INNER CORDON)**

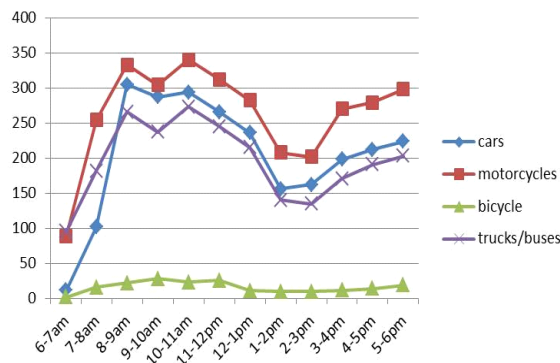
The peaks flows of traffic on this road are at 8am, 10am, and 5pm. The dominant mode of transportation is via motorcycles. This is used for

inter and intra town transit, linking area of mix land uses.



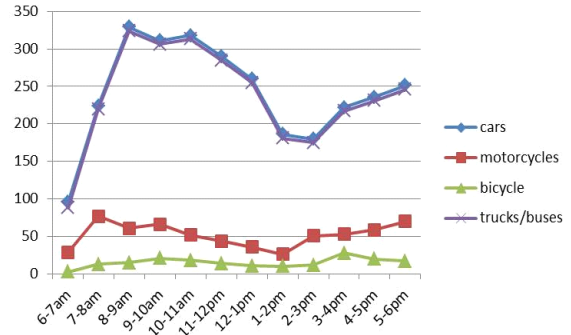
**GALADANCHI –MANDAWARI (INNER CORDON)**

The peaks flows of traffic on this road are at 8am, 10am, and at 6pm. The dominant mode of transport is via motorcycles. This road is used for inter and intra town transit, linking areas of mix land uses.



**GADAN KAYA\_TALUDU ROAD (OUTER CORDON)**

This road is busiest in the town accounting for 8556 P.C.U. the traffic flow is consistent between the hours of 8am, 10am, and at 6am the predominant mode of transit on this road is by cars, trucks and buses.

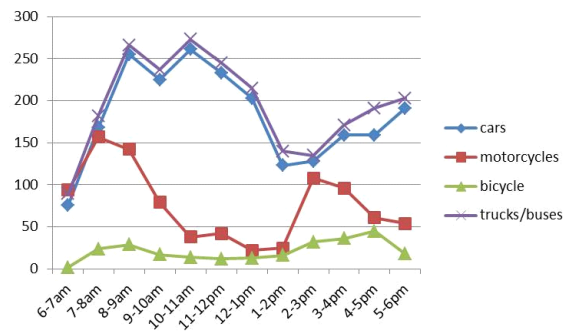


**TALUDU\_KABUGA (OUTER CORDON)**

The peaks flow of traffic on this road are at 8am, 10am, and 6pm. The predominant mode of transit are by cars and buses because the road is mostly in intra town transport.

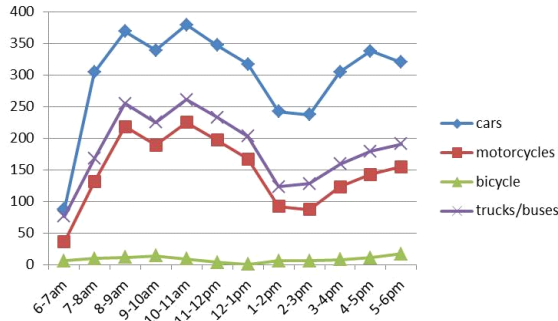
**TALUDU\_MANDAWARI (OUTER CORDON)**

The peaks flows of traffic is at 8am, 12pm, and 6pm. This road is a major entry and exit route of Gwale town. The dominant mode of transport is by buses and cars. Most traffic originate and terminated at mix land uses.

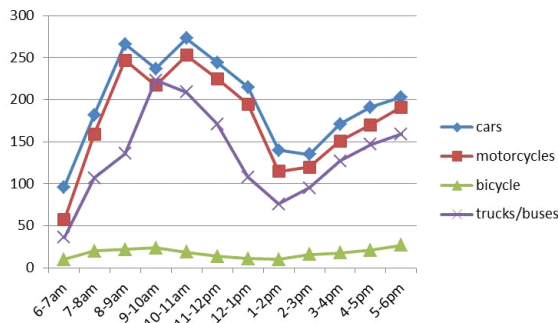


**KABUGA\_KOFAR NAISA (BUK ROAD) {OUTER CORDON}**

The peaks flows of traffic are at 9am 12pm and at 6pm. The traffic on this road is not as severe as other roads, because it is attributed to the size of the road which is the largest and the busiest. Bicycles do not use the road often.



KOFAR FAMFO\_FCE ROAD (OUTER CORDON) the peaks flows of traffic on this road is 8am, 10am, and 6pm the traffic flow is numeral between the hours of 10am, to 1pm this is because the road is predominantly used by the residential and schools with no commercial or industrial activities taken place. The dominant mode of transport is by cars, motorcycles and buses.



IV. SUMMARY OF FINDINGS

- The research reveals that 63% of the township roads are in the bad state, that the roads are not adequately connected, having a low connected index of 46%. This is further stressed by the low degree accessibility of the existing road network, where only six of the roads enjoy high degree of accessibility.
- Except for BUK kabuga all other roads is below their design capacities.
- Most of the respondent in the household travel survey conducted are traders and civil servants constituting 39% and 34% respectively.
- 51% of the respondents commute with motorcycle for their daily journeys while 41% use cars or buses.

- Also revealed in the course of the research is that 34% of the respondents spend above 40 minutes on route to their places of work or business as a result of the incessant holdups.
- The bus service operating in the town those not cater adequately for passengers at Kofar Famfo\_FCE, Taludu\_Mandawari.
- Furthermore, the research revealed that residential land-use generate the highest and attracts the least trips while commercial and mix land-uses attract the highest number of trips
- Conclusively, these findings have physical planning implications because the basic factors of complementarity, transferability, and intervening opportunities which influence spatial interaction could be threatened.

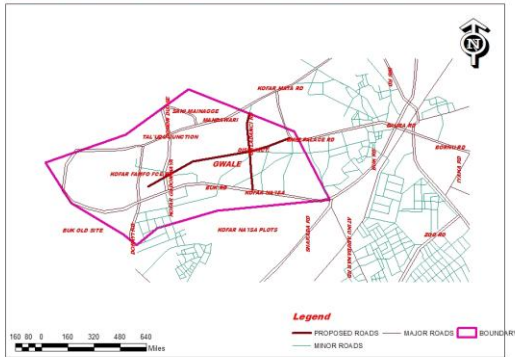
PROPORSAL, RECOMMENDATION AND CONCLUSION

This research analysed the road network system of Gwale town and its implication to the urban development of the town. The socio-economic characteristic of the dwellers ware assessed in relation to the household travel pattern.

The road life information was obtained from the designated government agency responsible for the maintenance of township roads,(Kano state ministry of works housing and transport)

Hence, this chapter provides possible solution and proffer physical planning suggestions and recommendation in respect to the identified problems in the research, so as to maximize and enhance the potentials of Gwale town in other to attain an urban developed Gwale town. This research also highlights major conclusion drawn from the study.

STREET GUIDE MAP OF GWALE SHOWING PROPOSED ROADS FOR EXPANSION



. (Bala Rabi Hashidu and Muhammad K. Adamu, 2018)[https://www.researchgate.net/publication/338517157\\_EFFECTS\\_OF\\_ROAD\\_DEVELOPMENT\\_ON\\_COMMERCIAL\\_ACTIVITIES\\_IN\\_GOMBE\\_CITY\\_GOMBE\\_STATE\\_NIGERIA](https://www.researchgate.net/publication/338517157_EFFECTS_OF_ROAD_DEVELOPMENT_ON_COMMERCIAL_ACTIVITIES_IN_GOMBE_CITY_GOMBE_STATE_NIGERIA)

(miller and Shaw 2001)Geographic Information Systems for Transportation in the 21st Century: GIS-T in the 21st Century

(Mannering, Walter and Scott, 2004). Principles of Highway Engineering and Traffic Analysis 3rd Edition

(Twelde, Gebre and Dr. Berhanu Gebremedhin)<https://www.sciencedirect.com/science/article/pii/S235198941930143X#!>The mutual benefits of promoting rural-urban interdependence through linked ecosystem services

"Post Offices- with map of LGA". NIPOST. Archived from the original on 2012-11-26. Retrieved 2009-10-20.