

Nature and Extent of Urban-Rural Interaction Between Minna and Selected Rural Settlement in Niger State, Nigeria

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Abstract

This study aims to investigate the increasing rate of interaction in terms of flow of people, goods and services between Minna, Garatu, Beji, Gwada and Tunga-mallam. The study assessed the nature and extent of interaction between Minna and the four rural settlements. A traffic survey of vehicles and volumes of passengers that moved between Minna and the four rural settlements on market and non-market days was carried out. Gravity model was used to calculate the relative strength of interaction of people between Minna and selected rural settlements. One hundred and fifty-six (156) respondents were sampled and administered a structured questionnaire. The result showed that there was a strong interaction between Minna and Garatu compared to other settlements (Beji, Gwada and Tunga-mallam) on market and non-market days. The data also showed that the rural settlements that specialized in providing low-order goods and services are significant market of agricultural products to neighbouring towns especially Minna and that the presence of a variety of agricultural products at cheaper prices in the rural markets encouraged urban-rural interaction. It was also confirmed that goods like agricultural products, clothes, petrol and other services like transport, labour, education were exchanged on the market and non-market days in the study area. Road accidents were the major problems that hindered the interaction. The research therefore recommends adequate support for urban agricultural production to minimize high cost of food in Minna and that road accidents cases should be properly checked to have smooth urban-rural interaction.

Keywords: *Map Analysis, Abaji, Banks, Landscape, Financial systems, Assessment*

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Background to the Study

Among other things, spatial interaction involves the movement of people between places, the flow of goods from one region to another, the diffusion of ideas from a Centre of knowledge to other areas, and the spread of a communicable disease from a group of people living in one area to those living in another (Haynes, and Fotheringham, 2020). Urban-rural interaction refers to linkages across space (such as flow of people, goods, money, information and wastes) and between sector (for example, between agriculture, services and manufacturing). In a broad term, spatial interaction also includes 'rural' activities taking place in urban centres (such as urban agriculture) and activities often classified as 'urban' (such as manufacturing and services taking place in rural settlements (<http://www.lied.org/Hs/themes/ru.html>. 2008).

In Nigeria, neither the resources nor the products of peoples' effort are uniformly distributed. For two or more regions to interact there must be a demand (or deficit) in one region and a supply (or surplus) in the other (Haynes, 2021). It is the complementarity of demand and supply (deficit and surplus) that brings about interaction (movement of flows). The major part of human development process is the exchange of goods and services in such a way that it complies with the principles of comparative advantage as well as flow of labour, goods and services from area of surplus to shortage or deficit. This is in addition to the aspect of comparative advantage which has to do with flow of products especially raw materials, food products and specialized services from where they have advantage or being produced to where such products are not available due to inhibition of physical factors such as climate, soil, among others. This flow promotes development and aid interaction between settlements. This activity is not uncommon in Niger state like other parts of the world. It is not uncommon to see the flow of people from Minna motor parks travelling to neighbouring rural settlements in the state while those in the rural areas also per take in daily trips to Minna, the capital of Niger state. The bases of these movements are often determined by economic, social and political forces.

In Niger state, research studies have shown various forms of interaction between Minna and other surrounding rural settlement. But, the interaction between Minna, Beji, Garatu, Gwada and Tungan-Mallam was obvious during reconnaissance visits that people were curious to know the quantum of the flow of people, reasons and problems of interaction on market and non-market days, types of goods and services exchange between them. Therefore, this curiosity has led to the conduct of this research to examine the extent of the interaction.

Literature Review

The ways in which space is organized and articulated through the circulation of people, goods and ideas between rural and urban areas is fundamental to an understanding of rural-urban relationship (Douglass, 2018). Rural – urban interaction is more than just flow of people, capital and goods but also include exchange of information and technology between rural and urban areas. Realization of the benefits of rural urban interaction rests not only on strengthening these interactions but also eliminating any variable that would mitigate their negative impacts. This chapter discussed the theoretical framework of the research and reviewed some recent works on urban-rural interaction. Such issues like concept of urban-

rural interaction, reasons for urban-rural interaction, rural-urban exchange and regional inequalities were reviewed. Discussion were also made on the inter-dependence between rural and urban settlements, market types, flow of goods, distance and spatial interaction as well as social and economic effects of urban-rural movement.

Theoretical Framework

Basically, there are three types of interaction models. These are the gravity models which measure interaction between all possible location pairs; the potential models which measure interaction between one location and every other location; and the retail model which measures boundary of the market areas between two locations competing over the same market. For the purpose of this study, the gravity model will be used because of its relevance. For decades, social scientists have been using a modified version of Isaac Newton's law of gravitation to predict movement of people, information and commodities between cities and continents (Haynes, 2021).

The gravity model (Reilly, 1978 cited in Joseph and Kuby 2011) seeks to predict the degree of interaction between two (2) places. The words “bodies” and “masses” used by Newton are replaced by “towns” and “population” respectively. The interaction model in Geography therefore, is based upon the idea that as the size of one or both of the towns increase, there will also be an increase in movement between them. The further apart the towns, the less will also be an increase in movement of people between them. This phenomenon is known as distance decay. The model is also used to estimate traffic flow of vehicles or passengers between settlements, migration between cities, and the number of people likely to use one central place, e.g. a shopping area, in preference to a rival central place. It can also be used to determine the sphere of influence of each central place by estimating where the breaking point between two settlements will be, i.e. the point at which customers find it preferable, because of distance, time and expenses considerations to travel to one Centre rather than the other (Fagnant, and Kockelman, 2014).

The gravity model takes into account the population size of two places and their distance. Since larger places attract people, ideas and commodities more than smaller places and places closer together have a greater attraction. The relative strength of the bond between two places is determined by multiplying the population of city A by the population of city B and then dividing the product by the distance between the two cities squared.

The gravity model formula: $Gm = \frac{P_1 \times P_2}{d^2}$ Where P_1 = Population of settlement 1;

P_2 = Population of settlement 2; d_2 = distance between settlement

The gravity model is the most extensively used model for the study of spatial interaction and trip distribution modeling. Reilly stated that two cities (i and j) attract retail trade from any intermediate town or city in the vicinity of the breaking point, approximately in direct proportion to the population of the two cities and inversely proportional to the square of distance from these two settlements to the intermediate town. Reilly's breaking point formula

has been applied to area where retail trade is dominated by well-spaced central spaces and is used to determine whether a given settlement will look up to city A and B as the dominant central place based on the breaking point along a main route. Taylor, et. al. (2006) made the first attempt to apply gravity model to transportation planning too the retail centers in direct proportion to the size of the centers and inversely as the squares of the driving time (distance) from the neighborhood to the retail Centre.

Recently, Matt (2017) used the gravity model to compare the relative strength of interaction between New York and the Los Angeles and between El-Paso (Texas) and Tucson (Arizona) using 1998 population census. The result shows that the bond between New York and Los Angeles is greater than that of El Paso and Tucson (Arizona), and, more people migrate between Los Angeles and New York City than between El Paso and Tucson. In Nigeria, Okoko (2012 and 2016) also used the gravity model in his studies of spatial interaction pattern in the transport system in Akure which resulted that there is always high traffics analysis and design. The analysis shows that private cars, commercial cars, and mini-buses ply highways than big buses and Lorries.

One major criticism if the gravity model is that it lacks a theoretical background in the urban literature. It is based conceptually on Newton's law of universal gravitation and as Schneider (1959:128) observed, "there is no real relationship between a gravitational field and a trip generating system". The absence of a theoretical base for the gravity model in behavioural science makes it only a descriptive device. It describes spatial interaction but does not explain it. In order words, it looks not at what is happening, but at the result of what has happened (Lee, 1977 in Okoko, 2006). However, gravity model is used in this study as a theoretical frame because of its suitability as it predicts the strength of interaction in terms of flow of people between settlements that are relatively closer and interact more with each other.

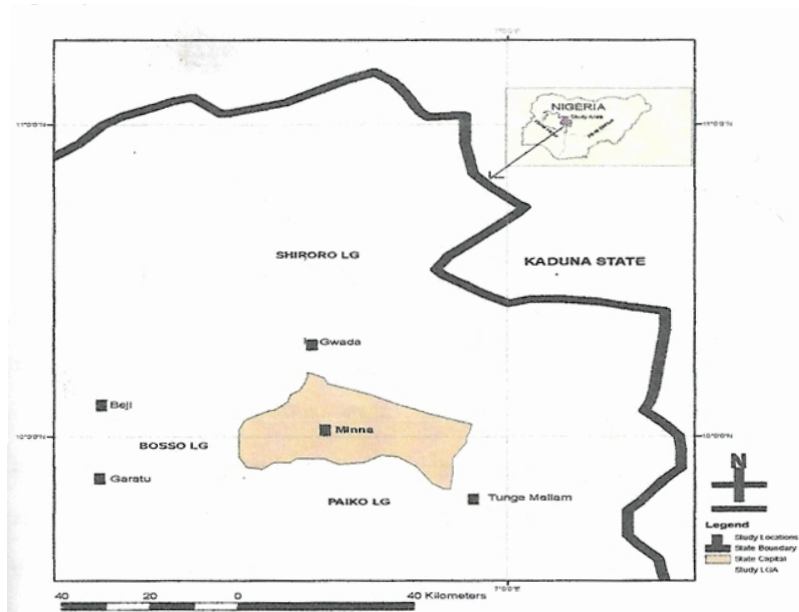
Research Methodology

The Study Area

Historical Background of Niger State

Niger state was created out of defunct north western state in February, 1976. The state lies between latitudes 8°20' and 11°30'N and longitude 3°30' and 7° 30'E, and covers a land area of about 86,000km² (or about 8.6million bectares) representing about 9.3% of the total land area of Nigeria (Figure 3.1). it is located in the North Central Geo-political zone where it shares borders with the Republic of Benin (west), Zamfara (North), Kebbi (North-East), Kogi (South), Kwara (South-West), Kaduna (North-East) and FCT (South-East). The state has 25 local government areas with Minna as state capital (NSG, 2017).

Fig. 1: Nigeria showing Niger State and the study area



Source: Fieldwork, 2021

Research Data and Method of Analysis

The data used for this study were acquired from one extensive field work. The data were obtained from traffic survey carried out at the four (4) motor parks of Garatu, Beji, Gwada and Tungan Mallam to determine the volume of passengers that move to and from the rural settlements on market and non-market days. The market days of Garatu is on Thursdays, Beji is on Wednesday, while Gwada is Fridays and Tunga Mallam is on Tuesdays. The survey was carried out simultaneously from the four (4) motor parks of the selected settlements with the help of research assistants to save time. The in and out flow data were collected by modes within a duration of sixteen (16) market and non-market days. The data were analyzed using frequency tables and line graphs. Structured interview schedule was used to elicit information from the respondents on the following parameter; the socio-economic background, type of goods and services exchange, reasons and problems of urban-rural interaction. Gravity model application was also used in the study as it seeks to predict the quantum or degree of interaction between two or more places. The secondary sources were obtained from books, journals, magazines, internets, maps, etc.

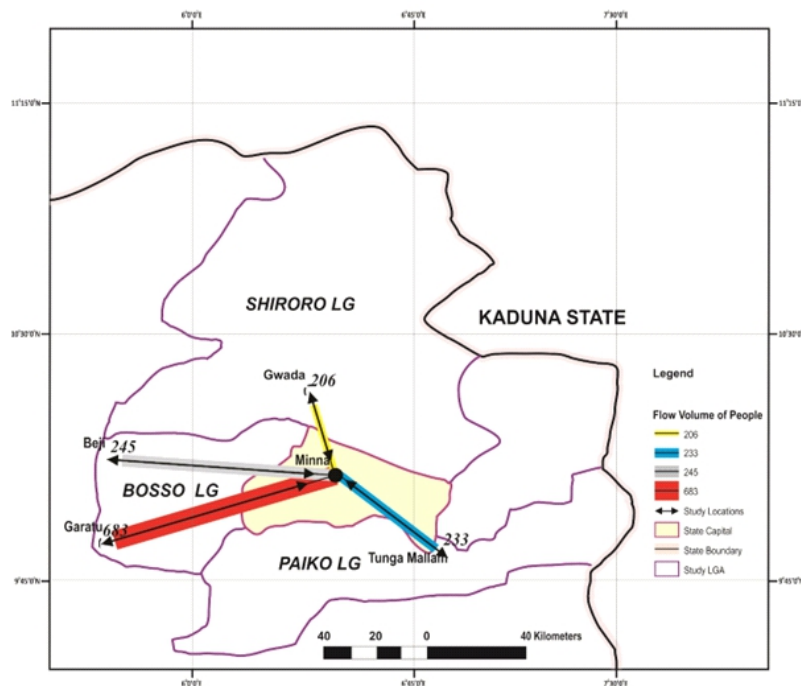
Two sets of data collected from the field were analyzed and discussed in this chapter. First, the traffic survey of the number of vehicles and the passengers that moved to and from the selected rural settlements on market and non-market days. Second, the questionnaires administered on the 156 respondents. Variable that was analyzed and discussed from the questionnaires included; the demographic characteristics of the respondents' differences in the type of goods and services exchanged on market and non-market days, reasons and problems of urban-rural interaction between Minna and selected rural settlements. The data utilized in this research

were obtained from a sample of 156 respondents drawn from four purposively selected settlements around Minna.

Results and Discussions

The Strength of Interaction between Minna, Beji, Garatu, Gwada and Tungan-Mallam on Market Days

Fig.2: Flow map showing strength of interaction between Minna the four rural settlements studied on market days.



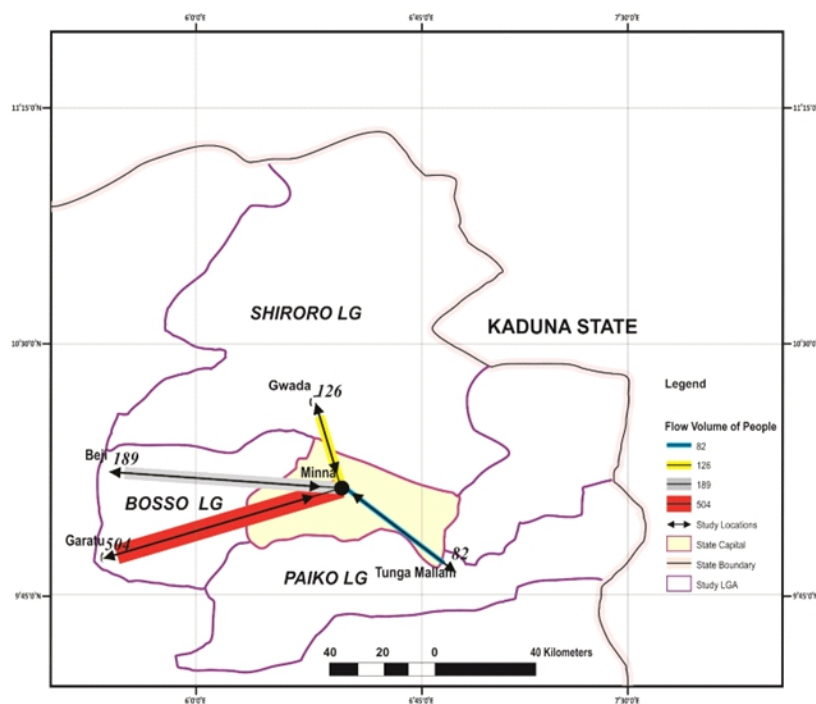
Sources: Fieldwork, 2021

Figure 2 shows the relative strength of interaction in terms of flow of people between Minna and selected rural settlements on market days using gravity model. In the flow map, the strength of interaction is expressed by the value and width of the arrow that connects the settlements. Therefore, Minna to Garatu which has the highest value and wider arrow indicates higher relative strength of interaction, which Minna to Gwada indicates low relative strength of interaction. Minna to Beji and Tungan-Mallam have the same strength of interaction. At a glance, it is deducible that Minna to Garatu have the highest relative strength of interaction of people due to distance effect and the fact that Minna has high economic activities. There is always a greater human interaction over short distance than long distances. Gettis (2003) said that, distance has a retarding effect on human interaction, because there are increasing penalties in time and cost associated with longer distances, more expensive interchanges. Therefore, the principle of distance decay, coupled with good transport network

and booming economics activities linking Minna and Garatu, calls for the high flow movement. Minna to Gwada which indicates lower relative strength of interaction was also due to distance. Gwada is a bit far from Minna, cost and longer-distance affected the flow of people.

The Strength of Interaction between Minna, Beji, Garatu, Gwada and Tungan-Mallam on Non-Market Days Sources: Fieldwork, 2021

Fig.3: Flow map showing strength of interaction between Minna and the four rural settlements studied on non-market days



Source: Fieldwork, 2021

Figure 3 shows the relative strength of interaction in terms of flow of people between Minna and selected rural settlements on non-market days. The distance between Minna and Garatu still has the highest value and wider arrow which signifies highest strength of interaction on non-market days. This was because of its proximity to Minna and daily increase in economic activities that attracted the movement. Minna to Beji followed with relative strength of interaction on non-market days due to availability of daily yam market (Kasuwa-doya) at Beji which attracted more people. However, the distance between Minna and Tungan-Mallam has the lowest strength of interaction on non-market days due to lack of economic activities in the settlement.

Table 1: Goods Exchanged on Market Days

Types of Goods	Frequency	Percent
Agricultural Products	76	48.7
Building Materials	28	17.9
Petrol	9	5.8
Clothes	31	19.9
Others	12	7.7
Total	156	100.0

Sources: Fieldwork, 2021

Some 49% of the sampled respondents said agricultural products are the major goods exchanged on the market days (Table 1). In the study area, agriculture was an important economic activity; it absorbed a large number of people and many other economic activities revolved around it. This agreed with Falola et al. (2017) who asserted that agriculture made it possible to create, accumulate and appropriate wealth in forms of foodstuffs and cash crops. In rural communities, the market place is the major institution for local economic activities and exchange, which Ukwu (1983), pointed out that the market could be the focus of intense interaction and the principal point through which the rural communities is integrated in the national economy. Thus, the movement of farm products from distant farms to the local market places is an important part of agricultural production activity. Therefore, the rural market places serve as a Centre where varieties of farm products at cheaper rate are marketed. This and ever-increasing cost of foodstuffs in Minna led to the high patronage of rural markets for the purchase of the agricultural productions.

Table 2: Goods Exchanged on Non-Market Days

Types of Goods	Frequency	Percent
Agricultural Products	26	16.7
Building Materials	43	27.6
Petrol	47	30.1
Clothes	32	20.5
Others	8	5.1
Total	156	100.0

Sources: Fieldwork, 2021

Petroleum products are important in any form of transaction involving movement of people, goods and services, between places. In line with this, Table 4 shows that 30% of the sampled respondents said petroleum products are the major goods exchanged on non-market days between Minna and these rural settlements. This was due to the high rate of fuel scarcity experienced as at the time this research was carried out. Most of the vehicles carried Jerri cans containing petroleum products bought from Minna on non-market days to be sold on their market days due to the expected higher demands of petrol by the drivers. On the other hand, no matter the intensity of the fuel scarcity in Minna, these rural settlements do have petrol either in the officially approved filling stations or in the black markets. This agreed with Chinado (2019) that Paiko unlike other Nigeria rural hinterlands that specialize in providing lower order goods, serve as a significant market of petroleum products to the neighbouring towns specifically Minna no matter the scarcity. Some 28% of the respondents also said building materials were also exchanged on non-market days as shelter is very important in every settlement without which people may find it difficult to live in their homes. This was because Minna as an urban Centre have large markets where varieties of building materials are sold at cheaper prices. This attracted rural dwellers to Minna in non-market days to purchase such materials immediately after their products are sold off in their rural markets.

Table 3 Services on Market Days

Services	Frequency	Percent
Transport	57	36.6
Labour	39	25.0
Educational	32	20.5
Health	21	13.5
Communication	6	3.8
Others	1	0.6
Total	156	100.0

Sources: Fieldwork, 2021

Transportation is a factor in transaction relations. It links systems in different modes. It is an agent of communication, dissemination of social activities, extension of kinship ties, exchange mechanism, etc. Without which movement of people, goods and services cannot not take place. In view of this, as many as 38% of the sampled respondents said that transport is the most common services observed on market days in the study area (Table 3). Transportation is very important fort the movement of people, goods and services to and from the rural market. This conforms with Garba (2018) who said, transportation is the key influence without which no contact in space and time at desire will be possible. Road transportation network used in the study area was the commercial and public transport provided by Niger State Transport Authority (N.S.T.A). It was also physically observed that there is denser flow of vehicles on market days than other days of the week. Some 25% of the respondents said services like labour (middlemen, touts, truck pushers) were also observed on market days. This was because market activities cannot be carried out without the services of the above mentioned labourers. These people are responsible for the carrying of goods from one place to another and ensuring effectives transaction in the market places.

Table 4 Services on Non-Markets Days

Services	Frequency	Percent
Transport	29	18.6
Labour	26	16.7
Educational	34	21.8
Health	38	24.4
Communication	15	9.6
Others	14	9.0
Total	156	100.0

Sources: Fieldwork, 2021

The existing health facilities in the selected rural settlements are inadequate, primary health centers do not have qualified medical personnel and better drugs, as a result do not attend to complex diseases or illnesses. In line with this, 24% of the respondents said they travel to Minna on non-market days to visit public, private hospitals or better primary health centres for the treatment of complex disease, immunization, vaccination, maternal care and first aid treatments. They normally travel on non-market days of the week in Minna public hospitals. It has earlier been confirmed by NSMH, (2013) that residents in rural areas travel to Minna to obtain medical services because the existing primary health care centres do not attend to complex diseases. It was on rare that Minna residents travel to these rural settlements for traditional medicines.

Table 5: Analysis on reasons for patronizing markets in rural settlements

Reasons	Frequency	Percent
Demand for greater variety of goods	58	37.2
Cheaper goods on market days	47	30.1
Good road network	22	14.0
Easier access to banking facilities	24	15.4
Easier access to better healthcare	5	3.2
Total	156	100.0

Source: Fieldwork, 2021

Reasons for Patronizing Markets in Rural Settlements

The results of data analysis of the reasons adduced by respondents for patronizing markets in rural settlements were reported in Table 5. The dominant reason advanced was the demand for variety of goods available on market days where 37.2% of all respondents reported, while easier access to healthcare was the least frequently preferred reason (3.2%). Demand and supply are the determining factor because farming activities were the major occupation of the rural dwellers surrounding Minna coupled with the abundant farmland, different types of agricultural products were produced, such as yam, beans, guinea corn, maize, etc. especially on market days at a very subsidized rate. So, demand for such agricultural products has led to high patronage from Minna to these rural markets, while on the other hand, farmers also prefer to supply their products to Minna where demand for a particular product is high with maximum profit. However, cheaper means of transportation and good transport network that

link Minna with these rural settlements also attract the farmers to carry their products to Minna. This phenomenon has led to high urban-rural interaction in the study area.

Discussion of Results

Traffic Survey of Movements on Markets and Non-market days

From the results of data analysis, the interaction is shown in the flow of people as well as different types of goods and services exchanged on market days between Minna and the selected rural settlements. The passengers comprise are such that more cars and mini buses ply most of the routes between Minna and these rural settlements compared to other means of transportation. This was because cars and mini buses are faster, as such passengers always preferred to travel by them. It was observed that the distance from Minna to Garatu has the highest relative strength of interactions on terms of flow of people compare to their settlements. This was because of their proximity and ever increasing economic activities that exist between them.

It was also observed that the movement of people normally reaches a peak in the morning and evening hours of the market days. This finding conforms with Junaidu (2004:78) who observed that “it is common to see a heavy traffic into Abuja (the FCT) in the early hours of the day (between 5.00-11.00am) and a reversed flow in the evening hours (between 3.00pm-9.00pm) when people en-masse move out of the city to different satellite settlements”. Moreover, based on the result of the findings, it is obvious that there is a significant difference in the number of people that travel on market days compared to non-market days.

Reasons for Patronizing Markets in Rural Settlements

From the findings of the study, about 37.2% of the respondents patronized markets in the rural areas because of the availability of greater variety of goods, 30% due to availability of cheaper goods on the market as observed by the respondents. As such, more people patronized these rural settlements markets for the demand of variety of goods and cheaper rate of goods are compared to Minna patronage which is urban Centre. This goes contrary to Meagher and Mustapha (2019) that in northern Nigeria. The high cost of food peripheral villages which shows a strong involvement in the urban food market, a high proportion of non-farm employment, a substantial increase in agricultural wages, labour force and burgeoning land market. Demand and supply are the major determining factors that make people to interact between urban and rural settlements. The demand for variety of agricultural products at cheaper rate by Minna residents has led to the high urban-rural interaction between Minna and the four selected settlements. On the other hand, farmers prefer to supply their farm products to Minna where the demand for them is very high so as to maximize profit.

Conclusion and Recommendations

From the data analysis and discussion on the nature and extent of interaction of the study area, variables such as marital status, gender, age, occupation and educational status greatly influence the condition under which people interact. Based on the summary of the findings, the following conclusions are made. Thus; Since farming and trading are the pre-occupations of the majority of the people in the study area, the research work concluded that there are

abundant varieties of agricultural products sold at cheaper prices in the rural markets. As such, these places will continue to attract people from Minna and henceforth urban-rural interaction continues. Since the higher relative strength of interaction is between Minna and Garatu because of their proximity and high economic activities, the research concludes that people patronize shorter distant areas with high economic activities than longer distant areas. It can therefore be concluded that there are more people that ply the route linking Minna and these rural settlements for various activities (social and economic) on market days than other days of the week which signifies high interaction on market days than on non-market days in the study area.

Based on the conclusion of the research findings, the following recommendations are made:

1. Government should take advantages of the diverse agricultural resources in settlements around Minna town to guarantee food security, reduce rural poverty and accelerate economic development of these rural areas and the state.
2. In view of the high density of traffic flow especially on market days, public enlightenment campaign and adequate supervision of vehicles by men of the Federal Road Safety Commission (FRSC) should be intensified to reduce reported cases of road accidents so as to ensure safe and free flow of vehicles between rural and urban areas.
3. As at the time research was conducted, high rate of fuel (petrol) scarcity was experienced. Proper monitoring of fuel prices and government built filling stations should be pursued in rural settlements around Minna so as to avoid the risk of travelling with petroleum products in the commercial vehicles.
4. Urban or peri-urban agricultural should be encouraged by the government so as to reduce the problems of high cost of food items in the urban centres like Minna. This will no doubt create income earning activities for the low and medium income earners.
5. The volume of traffic is very between Minna and surrounding settlement, the state government should therefore provide traffic regulations so as to check out the traffic congestion especially on market days.

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