ANASSESSMENT OF THE ROLE OF ROAD TRANSPORT IN THE MOVEMENT OF AGRICULTURAL PRODUCE IN MAKARFI LOCAL GOVERNMENT AREAOF KADUNA STATE, NIGERIA

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

DEPARMENT OF GEOGRAPHY AND ENVIRONMENTAL MANAGEMENT,
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NOVEMBER, 2018

DECLARATION

I hereby declare that the work in this dissertation "An examination of the role of road transport in the movement of agricultural products in Makarfi Local Government Area ofKaduna State, Nigeria" was carried out by me,Isa Sani in the Department of Geography and Environmental Management under the supervision of Prof. M. A. Iliya and Dr. A. K. Usman. The information derived from the literature has been duly acknowledged in the text and a list of references provided.

IsaSani		
Name of Student	**Signature**	**Date**

CERTIFICATION

This Dissertation titled "**An examination of the role of road transport in the movement of agricultural production in Makarfi local government area of Kaduna State, Nigeria**" byIsa Sanimeets the regulations governing the award of degree of Masters of Science degree, (Transport Management) of Ahmadu Bello University, Zaria, and is approved for its contribution to knowledge and literacy presentation.

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DEDICATION

This work is dedicated to my parentsfor their encouragement and support during my study.

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ABSTRACT

There is inadequacy in the number of vehicles to convey farm outputs from farms to markets in Nigeria. Roads are generally inadequate and very poor with old vehicles mostly in use. In many communities, donkeys and bicycles are used while other use wheel barrows and canoe. Many people trek long distances to move farms outputs from place to place. The poor state of farm to market roads raises costs and affects delivery of bulk supplies of outputs to the markets. This study evaluated the role of motor vehicles in the movement of agricultural produce in Makarfi Local Government Area of Kaduna State, Nigeria. It examined the types of transportation used in the area, volume of agricultural produce moved, the pattern of movement, the cost and challenges of transportation in the area. Random sampling technique was adopted and247 respondents were selected and interviewed using a structured questionnaire. Interviews were also conducted with vehicle operators and marketers. Data were analyzed using the Statistical Package for Social Science (SPSS) version 20. The study revealed that motorcyclesare the most commonly used means of road transport in the area and that trunk A road account for 66% connectivity to the market in the area. The distance covered by respondents from farm to market was between 3-5km.Rice and maize were the farm produce mostly in circulation and that the volume and type of produce transported determined the means of transportation.Itcost between 1,000-3,000 naira to move any half a metric ton of agricultural produce to the market. The most pressing challenge in transporting agricultural produce in the area as indicated by a majority of the vehicle operators was poor road network. This has resulted to mass losses during transportation. The study recommended that given the large volume of farm produce cultivated in the area, and the challenges with accessibility in the areaall the three tiers of government(federal, state and local)shouldconstruct better quality roadsthat are regularly maintained. Also, storage facilities should be made available to farmers and traders by Makarfi Local Government Authority to enable them store their large volume of agricultural produce in order to prevent damages.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

All over the world, transport is regarded as an important factor involved in agricultural development. It is the only means by which food produced at farm site is moved to different homes as well as markets. Thus, transport creates market for agricultural produce, enhances interaction among geographical and economic regions and opens up new areas to economic focus. Also, adding that transport is a key ingredient in the development of rural areas which provides people with access to various goods and services.

Agricultural production is very important to the economy of developing nations as a whole and Nigeria in particular. It is the major occupation of the inhabitants and people of the country while it provides employment directly or indirectly for at least 60% of the people in Kaduna State. Usman (2008) opined that irrigation farming also contributes to the production of food in MakarfiLocal Government Area (LGA) and beyond. Hence, advising farmers to adopt an intense agricultural production practices in support of the Federal Government's Policies of the seven-point agenda (i.e. eradicating poverty and ensuring surplus availability for food and raw materials for both domestic consumption and exportation purposes). The major agricultural products found in the area are maize, rice, guinea corn, millet, beans, sugar cane, and melon amongst others. These products serve as food for man and raw materials for industries within and outside the state. They provide revenue to farmers and generate foreign exchange to the government.

Despite the fact that Nigeria is basically an agrarian country and the majority of the goods to be transported are mostly agricultural products which are by nature often bulky, low-priced, and highly perishable especially fruits and vegetables. Such produce must however be conveyed from their area of production to their zone of consumption with minimum delay and cost. There is the need therefore for a correspondingly wide-spread transport net-work to take produce from farm to market. It is observed that inadequate supply and high cost of food stuff is as a result of inefficient transportation and distribution. Also, inadequate transport provision leads to the total waste of agricultural foodstuff produced. The role of transport is therefore very crucial such that production process is not complete until the commodity is in the hands of the final consumers. Availability of transport facilities is therefore a key critical investment factor that stimulates economic growth through increased accessibility, its efficiency and effectiveness.

Vehicular modes of moving agricultural goods include tractors, pick-up vans, trucks, car, buses, motorcycle and bicycle with each having its cost and attendant problems. Transportation cost is determined by a number of factors which include, length of haulage, nature of goods, the environment, competition among transporters availability of return haulage among others (Williams, 1985).

Makarfi LGA is situated in the northern part of Nigeria and is predominantly an agricultural area. The dominant means of transportation is by road. The LGA has two major roadsand a number of feeder roads.It is against this background that an attempt is made to examine in depth the role of motor vehicles in the movement of agricultural product in Makarfi LGA.

1.2 Statement of the Research Problem

According to Onwudinjo, Eze and Nzekwe, (2013) there is inadequacy of vehicles to convey farm outputs from farms to markets in Nigeria. Roads are generally inadequate and very poor with old vehicles only be used to the feeder roads. In most communities, donkeys and bicycles are used while other use wheel barrows and canoe. In others, people trek long distances to move farms outputs from place to place. These methods of transportation are usually very slow and burdensome, thereby making agricultural marketing more costly and difficult. The poor state of farm to market roads raises costs or even prevents delivery of bulk supplies of outputs to the markets. A Central Bank of Nigeria report (2003) stated that the poor state of transport system in Nigeria generally, impacts negatively on cost of production and represents, a major trigger of cost push inflation in the country.

A number of studies especially on rural roads in Nigeria and elsewhere point to existing gaps that warrant this study. For instance, Orakwue, Umeghalu and Ngini, (2015) studied the effects of road transport on agricultural productivity in Ayamelum Local Government area of Anambra State, Nigeria. The findings revealed that road transport has both negative and positive effects on agricultural development and general socio-economic status of the communities in the study area.

Tunde and Adeniyi (2012) examined the impact of road transport on agricultural development in Ilorin East L.G.A of Kwara State. It employs the use of both primary and secondary data. One hundred and fifty copies of questionnaire were distributed systematically to the farmers in the study area. Focus group discussion was also used to obtain information on the impact of road transport on rural development as a whole.

Descriptive and analytical statistical methods were both employed to analyze the data gathered. The findings showed that road transport has both positive and negative impact on agricultural development in the study area. However, the bad conditions of the road affect cost of transportation of agricultural produce which in turn affect the rural farmers' income. This study concludes by suggesting that an improvement in road transport system will lead to increased production by farmers. Community participation in road transport development should also be encouraged in the study area.

Ajiboye and Afolayan (2009), examined the impact of transportation on agricultural production in developing countries using Nigeria as case study. The study critically examined the crucial role transportation plays in Colanuts production in Nigeria. A total of 100 respondents were randomly selected and interviewed. This study revealed that an improved transportation will encourage farmers to work harder in the rural areas for increased production, add value to their products, reduce spoilage and wastage and empower farmers as well as having a positive impact on their productivity, income, create employment and reduce poverty level in rural areas.

Dabo (2011) stated that the major arable crops grown in Makarfi LGA include; yam, maize, cassava, rice, sugar-cane and melon to mention a few. These products serve as food for man and raw materials for agro-allied industries both within and outside the state.They also provide revenue to farmers and generate foreign exchange to the government. These agricultural products are expected to be conveyed from their areas of production to zone of consumption with minimum delay and cost, across a wide area and thus require a correspondingly wide-spread of transport network and types to take produce from farm to market as well as to various urban centers. There istherefore the need to

examine the nature of movement of agricultural produce in Makarfi LGA. It is this gap in knowledge that necessitated this study.

1. What are the modes of transport used for the movement of agricultural produce in the Makarfi LGA?
2. What are the types and volume of agricultural produce moved by different modes?
3. What is the movement pattern of agricultural produce in the study area?
4. What is the cost of moving agricultural produce in the study area?
5. What are the challenges encountered by farmers and traders in the use of the different modes for the movement of agricultural produce in the study area?

1.3 Aim and Objectives

The aim of this study is to examine the role of road transport in the movement of agricultural produce in Makarfi Local Government Area of Kaduna State. The specific objectives are to:

i. examine the types of transport used for the movement of agricultural produce in Makarfi LGA;
ii. assess the type and volume of agricultural produce moved by the different types of transport;
iii. determine the pattern of movement of agricultural produce by the various modes;
iv. examine the costs of transporting agricultural produce by the various modes in the study area across the seasons, and
v. assess the challenges associated with the different modes of transporting agricultural produce by the farmers and traders.

1.4 Research Hypothesis

Based on the stated objectives of the study, the hypothesis to be tested is:

Ho 1: There is no significance difference in volume of agricultural produce moved by the different modes of transportation.

1.5 Justification of the Study

deramo and Magaji (2010) noted that transportation constitutes the main avenue through which different parts of the society are linked together. Transport is regarded as an important factor involved in agricultural development all over the world. It is the only means by which food produced at farm site is moved to different homes as well as markets. Transport creates market for agricultural produce, enhances interaction among geographical and economic regions and opens up new areas to economic focus (Tunde and Adeniyi, 2012). Poor transportation in the rural areas has resulted in low productivity, low income and a fall in the standard of living of rural residents and high rate of poverty (Aloba, 1986).

According to Ajiboye (1994) availability of transport facilities is a critical investment factor that stimulates economic growth through increased accessibility. Similarly, Paul, Hyoung-Gun, Liang, and Emily(2009) pointed out that the impacts of road infrastructure on agricultural output and productivity are particularly important in Sub-Saharan Africa for three reasons. First, the agricultural sector accounts for a large share of gross domestic product (GDP) in most Sub-Saharan African Countries. Second, poverty is concentrated in rural areas. Finally, the relatively low levels of road infrastructure and long average travel time's result in high transaction costs for sales of agricultural inputs and

outputs, and this limits agricultural productivity and growth. The question is that how is the transportation situation like in Makarfi LGA of Kaduna State in types, mode and adequacy.

1.6 Significance of the Study

The value of farm outputs is said to increase with improved transportation quality, frequency of transportation services and proximity to commercial centers in an area (Ahmed and Hussin, 1990; Carvero 1992; Barwell, 1996). The findings of this study will reveal the nature and challenges in the movement of agricultural produce and proffer solutions which will improve transportation of agricultural produce, lead to significant increase in agricultural production, non-farm activities, revitalization of economic activities and invariably a rise in income level of the people of Makarfi Local Government Area. It will further provide a reference document for future research on the movement of agricultural produce.

1.8 Scope and Delimitation of Study

The spatial scope of the study covered MakarfiLocal Government Area. The content scope covered all the available modes, their capacities, volume of produce moved, access to the various modes of transport, and the problems associated with the accessibility level. The temporal scope of the study was limited to movement of agricultural produce on market days within a period of at least four months (November to February) as at 2014 which serve as the peak of harvest and movement of farm produce.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In this chapter, a conceptual framework that is relevant was considered. Available literatures were reviewed in line with the subject matter of the research, which are road transport development in Nigeria, role of transportation in development, rural transportation, marketing of agricultural produce, structure of agricultural produce markets and freight transport demand. The review serves as a basis for developing the researcher's ideas on the general concept of the study. The review in addition, aims at providing detailed account of earlier studies in order to identify the gap that exists in the literature, which the present thesis attempted to fill.

2.2 Conceptual Framework

2.2.1 The Concept of Road Transport Network

Transportation systems are commonly represented using networks as an analogy for their structure and flows. The term network refers to the framework of routes within a system of locations, identified as nodes. A route is a single link between two nodes that are part of a larger network that can refer to tangible routes such as roads and rails, or less tangible routes such as air and sea corridors (Chapman, 2008). Network is defined as the interconnectivity or linkage of a set of components of a system in to a complete whole to produce a spatial and structured pattern. Network may be either static feature at a point in time or a dynamic phenomenon which is subject to change through time (Chapman, 2008). This means that a road network grow with time. Smith (1977) identified three elements in a

network called by various names. These are nodes, vertices or points, the edge, linkage or route. These nodes, vertices or points refer to the settlements while the edge, linkage or route refers to the roads.

Also, various indices have been developed describing the extent to which a network approaches maximum connectivity, which requires the existence of a direct link between each node (Kansky, 1963). These indices are all based upon the relationship between the number of edges and vertices in a network which is regarded as a topological graph. Thus, the Beta Index, the Gamma Index and Alpha Index were used to determine the change in road connectivity over time.

The Beta Index; β = ... (1)
The Gamma Index; γ = ... (2)
The Alpha Index; α = ... (3)

- The Beta Index expresses the number of edges present in relation to the number of vertices to be connected and therefore, may be viewed as indicating the average number of links leading into or out of each node. When the average of each is considered the period with the highest value indicates the one with maximum connectivity while the one with least indicate least connected.
- Gamma Index is the ratio of the number of edges in a network to the maximum which may exist between specific numbers of vertices. The denominator in the expression reflects the fact that the addition of a single vertex necessarily increases the number of possible edges by 3. In an event of comparing the various periods, the network with the highest percentage indicates the period with the highest connectivity while the one with the least percentage is least connected.

- Alpha Index is a ratio based on the number of circuits in a network rather than the number of edges. Alpha index is closely related to gamma index. A circuit is defined as a path through a network which begins and ends at the same node without passing over any edge more than once. This implies that when a traveler is faced with a network with α=0 it means he/she can only proceed along a single path while several options exist in the case of a network with α=1. This therefore means that the period with the highest connectivity is the one with the highest ratio.

To describe the degree of network accessibility, using topological maps. Nodes or vertices and edges or links were counted; this was achieved through devising a matrix, from which the Shortest Path Matrix, the Associated Number Index and the Shimbel index were calculated for each of the periods under study.

The Shortest Path Matrix; refers to the number of arcs used in the shortest path between all possible pairs of nodes. Using topological map, the lowest possible numbers of arcs that can be used from one node to the other are counted. The value obtained is written in the matrix box of the row against column. The totals of each row were added up and the lowest total indicates the town which is most accessible while the highest number or total connotes the least accessible.

The Associated Number is the number of arcs needed to connect a node to the most distant node from it. It is the highest number in each row. The highest number among all the numbers of the row for each town under consideration is the associate number. The row with the least associated number value indicates the most accessible while the row with the highest value indicates the least accessible.

The Shimbel Index highlights the total value for each row in the matrix table. It indicates the number of arcs needed to connect any node with all other nodes in the network by the shortest path matrix. The numbers of each row is added for each town. The town that has least total among all the rows is the most accessible while the highest total among the entire rows is the least accessible.

Inyang (1993), in a study of the road network in Ondo State, discovered that towns like IkereEkiti, Ado Ekiti and IseEkiti have the highest accessibility in the state. The shortest path matrix analysis revealed the need for proper maintenance of the Ado Ekiti – Ikere, Ekiti – Akure road. Foin (2002) carried out a study on the effect of road transportation on agricultural produce marketing in Giwa L.G.A. of Kaduna state. The author found that road transport network alone without the provision of other farm inputs cannot bring any good yield in agricultural activities. The study also shows that although road network has increased over the years, it has not influenced agricultural produce marketing much. The author added that the efficiency and quality of road network is very important in any economic activity of the study area.

2.3 Role of Transportation in Development

Transport is regarded as an important factor involved in agricultural development all over the world. It is the only means by which food produced at farm site is moved to different homes as well as markets. Transport creates market for agricultural produce, enhances interaction among geographical and economic regions and opens up new areas to economic focus. There are complex relationships that vary both spatially and over time between transport and development.

Ogunsanya (1981) observed that there are three types of routes in the rural areas viz; bush paths, unsurfaced rural roads and surfaced rural roads. However, the bush path is very common but the least developed of all the routes. Bush paths link villages with farmsteads and they are usually narrow, winding and sometimes overgrown by weeds especially during the rainy season. In a study by Filani (1993) in south west Nigeria, it was observed that where motorable roads exist they are mostly of unpaved surface, narrow width, circuitous alignment and with low quality bridges. In most cases, they are either clad with potholes or characterized by depressions and sagging. Such surfaced roads are hardly passable during the rainy season when vehicles get stuck in mud or when the improvised bridges of cut-free trunks get swept away by flood. In another study carried out by Ogunsanya (1988) on relationship between transportation, underdevelopment and rurality, the author observed that the greater the degree of rurality, the lower the level of transport development.

Aderamo and Magaji (2010) noted that transportation constitutes the main avenue through which different parts of the society are linked together. Jegede (1992) cited by Ajiboye and Afolayan (2009) noted that road transport is the most common and complex network. It covers a wide range, physically convenient, highly flexible and usually the most operationally suitable and readily available means of movement of goods and passenger traffic over short, medium and long distances.

Availability of transport facilities is a critical investment factor that stimulates economic growth through increased accessibility (Ajiboye, 2004). The impacts of road infrastructure on agricultural output and productivity are particularly important in Sub-Saharan Africa for three reasons. First, the agricultural sector accounts for a large share of

gross domestic product (GDP) in most Sub-Saharan countries (Paul *et.al* 2009). Second, poverty is concentrated in rural areas. Finally, the relatively low levels of road infrastructure and long average travel time's result in high transaction costs for sales of agricultural inputs and outputs, and this limits agricultural productivity and growth.

According to Mabogunje (1971), some of the variables that determine the level of development in a given environment are easy accessibility and mobility. Transport affects agricultural marketing because it is the only means by which farmers can transport their produce to the market. Poor transportation in the rural areas has resulted in low productivity, low income and a fall in the standard of living of rural residents and high rate of poverty (Aloba, 2006). A strong relationship between transportation, underdevelopment and rurality was identified by Ogunsanya (2008). The study stressed further that the greater the degree of rurality, the lower the level of transport development. When the distance of farm to the market is far and the road is rough perishable crops may be destroyed and farmers may run at a loss (Swindell and Iliya, 2012).

2.4 Road Transport Development in Nigeria

Transportation is concerned with movement of people or goods for some particular purpose. It forms the cornerstone upon which a country's development revolves (Hodder, 1973; Gourou, 1975). Thus, the importance of transport to a nation cannot be overemphasized as efficient transport infrastructure facilitates and acts as catalyst for development. The major road transport infrastructure in Nigeria consists of 32,000 kilo meters of Federal highways including seven major bridges across the Niger and Benue Rivers, the Lagos Ring Road, the Third Mainland Axial Bridge; 30,500 km state roads; and

13,000 km of local roads (Buhari, 2000). Buhari further stated that as at June 1996, only 50% of the federal roads and 20% of the state roads were in reasonable good condition, and that only 5% of the local roads were freely motorable.

A nation-wide survey conducted by the CBN(2002) revealed that the road network as at December 2002, estimated that 194,000 kilometers were mostly in bad condition. According to Olamola (2003), inadequate provision of transport infrastructure and services provide a basis for explaining the incidence of poverty across various Nigerian communities in both urban and rural areas. Transport sector in Nigeria is characterized with bad roads, fuel problem, traffic congestion, inadequate high passenger capacity / mass transit vehicles and overloading, high cost and shortage of spare parts, poor vehicle maintenance, and old vehicles.

It has been observed that improvement of transport facilities perhaps is the most viable single contribution towards economic, social and political development. In early stages of the economic life of a country where subsistence agriculture is important like in Nigeria, transport plays a key role to development: although fertilizers, improved strains of seed, education, and other objects are all of great importance, the need for transport is prior to all these (Clark and Haswell, 2004). Hence, transport is seen as " sine qua non " in development of agriculture because no matter how land is fertile for agricultural activities or how stocked a market is with products but they are inaccessible and too distant from markets and ports, the products are of less economic value (Anya, 1982).

Road transport in Nigeria today accounts for more than 90% of the country's goods and passenger movement (Filani, 2002; Oni, 2004). This shows the importance of road

transportation to the economy of the country. Harrison (1987) also posited that probably no other issue has greater effect on the ability of the average developing country farmers or marketers to profitably market their produce than the availability of an effective transport link to places where buyers congregate.

Thus, in Nigeria, the distribution of the agricultural produce is hindered by either lack of good roads in the rural areas or poorly maintained roads in few areas where they exist. This has affected the contribution of agriculture to the gross domestic product (GDP) in Nigeria (Ogbulafor, 2003). It is not disputable the fact that poverty level is higher in rural areas than in urban areas, and yet, the rural settlers who supply all the food and raw materials needed by the wheels of the local industries to rotate have no access to good road transport system thus resulting in high cost of transportation of goods and services and which eventually translate to high cost of goods and services (Nwuba, 1979). Ruseva (1983). Clark and Haswell (2004) posited that human porterage is some nine to ten times as expensive as transport by water, motor vehicle, or rail; forms of transport at present is available to the bulk of developing countries like Nigeria. This is so costly that produce are often only carried over a limited distance.

Gourou (1966) stated that the average figure is 50 km a day at an average load of 40 kg. The implication of this point for economic development are obvious, as the choice of crop is often determined at least partly by references to costs of available transport facilities. Thus, high cost of agricultural inputs will definitely result to high cost of outputs which will limit agricultural productivity. Anya (1982) experience has shown that often the poor resource farmer abandons his farm produce, especially perishable goods like vegetables and tomatoes, alongside of the road or at the farms for lack of transport. The

conclusion is that there is no point in a farmer having a new crop variety or fertilizers, which enable him to increase his food production very substantially and immediately, if at the same time his form of transport is so costly or the demand for extra produce is so uncertain as to make such an increase worthless. This will discourage farmers to increase their production during the next cropping season.

Transport facilities also encourage and facilitate the geographical specialization of agricultural production. Improved transport facilities may make possible the intensification of agricultural production with all the improvements in techniques this implies; it is useless, for instance to try to encourage the use manures or cultivated fodder on fields far distant from the farmstead where the farmer has no means of transporting in other than by head porterage (Hodder,1973).

2.5 Rural Transportation

Rural transport demand relates mainly to the movement of people and goods. These goods referred in this work are agricultural produce brought into the market. The World Bank (1976) observed that because few farms and markets in rural areas are served directly by roads, off-farm transport i---s required to move agricultural produce between the farm and the roadside as well as along the road to or from the market. The quantity of goods to be moved, the distance, the frequency and the timing of transport depend on the type of production and the organization of the market, but even with subsistence farming there is often a need to transport substantial quantities of goods .in both directions. Olatunbosun (1975) noted that in Nigeria, rural roads were constructed basically to provide adequate linkages to rich agricultural and mineral producing areas. The rail system provided by the colonialists was further connected by the rural roads to serve as collectors to railways.

The provision of adequate transport facilities in rural areas will go a very long way in the transformation of the lives of rural majority in Nigeria. According to an assessment programme carried out by the World Bank (1996), Nigeria has one of the least rural road densities for a nation with high rural population. The report went further to state that 70% of the rural road network was in poor or very poor conditions, even with the road construction projects carried out by the Petroleum (special) Trust Fund which achieved considerable change. Although, more effort would be required to achieve greater impact in the rural areas since road constructions are more within the urban centers.

Idachaba, (2005), emphasized on the provision of rural roads to rural agricultural economic zones to further increase agricultural output. He noted that apart from the benefit it derived from increase agricultural output, the availability of rural roads also positively affect ease in getting to rural markets, medical centres and schools among others. Leman (1985) itemized the rural transport demand into five categories as trips to and from farm to perform operations, trips for acquiring farm inputs, trips to and from markets to sell crops or purchases items to supplement self-produced crops, trips to meet other domestic needs such as collection of firewood and building materials for processing agricultural products and trips for social, recreational and religions activities.

Providing good motorable roads in rural areas will cheapen transport cost and provide access to numerous productive areas and markets. Morton, (1972) added that transport availability allows for the free exchange of goods between rural areas and urban centers whereby it becomes possible for the income position of the farmer to rise above subsistence level. Chapiu (1976) is also convinced that cheapening transport cost fuses markets, which brings additional buyers thereby' increasing demand and supply. This

possibility of rising above poverty, unemployment and inequality can be nothing else but development. This explains why Owen (1964) regards immobility as a barrier to development.

The impact of transportation on development process results in direct productive activities. Transport encourages movement and provides the basis for economic growth and access to agricultural land and rural resources. Sumaila (2009), agrees that when areas are well connected it will facilitate the flow of goods and services and enhance interaction within the communities. Smith (2005) Observed in Uganda that income generated from cotton increased tremendously between 1948 and 1956 as a result of improvement in accessibility of the area. The improvement in road network increased both the levelof productivity and the income level of the farmers. Ward (2009) in his study conducted on Rigo in Papua New Guinea, claims that the construction of the road to Rigo stimulated a wide range of agricultural activities and production. Also, Resender (2003), observed in Brazil that road investment has promoted both the social and economic development of the people.

Cunniagham (1981) in a study conducted in Liberia on rural roads observed that with improvement in accessibility agrarian rural production has increased access to markets. Improved Provision of transport in rural areas will provide employment opportunities through new market center and small businesses that are encouraged by improved accessibility as well as the operation of transport services and associated services. It will also facilitate the promotion .and development of tourism in areas of picturesque scenery and historic cultural and economic advantage (Leman, 1985).

Leman (1986) believes that provision of roads in the rural area will enable dwellers to identify and exploit rural resources as well as opening remote resource areas. It will attract rural settlers and farmers closer to the roads, which would now make it possible for the creation of markets for productive activities as well as extending the size of such markets. Transport eases movement and access to the administrative seats of government in rural area thereby enhancing communication and interaction between rural constituencies and government. These facilitate the execution of various political and administrative projects such as the conduct of household's surveys, censuses, elections and publicity of government activities.

Where physical interaction is not possible because of distance, the availability of good motorable transport along all-weather roads will facilitate safe, convenient and regular exchange of mails among rural people. Good motorable roads facilitate the fast flow of information into rural areas by means of newspaper circulation, diffusion of government plans, mobile cinemas, libraries etc. It is this diffusion of information about variety of things that can help to educate rural farmers and lead to changes in attitudes and life styles and thereby releases their creative energies and potentials for development, Ullman (2007).

2.6 Marketing of Agricultural Produce

The organizational structure for the marketing of agricultural produce is often very similar to different crops. Although there will always be certain variation with respect to some produce that will not fit into any general framework.Narteh (2012), defines a market as a group of buyers and sellers with facilities for trading with each other. In this sense the simplest form of marketing takes place at house-holds level or at some exchange point such

as a roadside station. The next most complex form of marketing occurs where people meet periodically in some organized manner to buy and sell goods to satisfy their heeds as well as exchange information with relatives, friends, and strangers. Each village or cluster of small villages has a market which meets once or twice a week. Beyond the rural markets are the large markets which meet daily and are found in large urban areas. The rural markets can be classified into isolated and accessible markets, according to their accessibility by road transport (Ajiboye and Afolayan, 2009).

Markets are not in any theoretical sense a place, but rather they are people and goods. Perhaps it can be put more accurately as streams of people and goods which changes direction, trajectory and velocity of movement as a result of meeting at particular point in space and time. Nothing about a market is fixed except in the short term (Tunde and Adeniyi, 2012). The pattern of agricultural produce marketing is strongly influenced by the nature of transport services. Many developing countries suffer from monopolistic, low volume and high cost transport and marketing systems. Economies of scale are present in both transport and marketing operations (Orakwue, Umeghalu and Ngini, 2015). The present study considered transport costs, the impact of the roads on rural development, and access to markets.

However, transport charges and costs (per tonne/km) by conventional vehicles are not uniform. Not only are there large differences in costs between different countries for the same type of transport (particularly between Africa and Asia), there are large difference in rural short term transport (usually carried out by pick-ups or small trucks) and long distance inter urban transport that is more often carried out by heavy vehicles and trailer (Adekoya, 2005).

The importance of an efficient and competitive marketing system has been stressed as a complement to rural transport service infrastructure in promoting development. However, the presence of markets also constitutes a means by which the effective demand for transport can be increased. A market acts as a point where goods and people are amalgamated together and thereby concentrating the demand for transport (Narteh, 2012).

According to Adekoya (2005), one of the most effective ways that farmers have in getting the best price for their produce is for them to sell it themselves directly to consumers at rural or urban markets, and thus bypass the normal marketing system. Although farmers do not have the economies of scale of traveling wholesalers, it is often recognized by urban dwellers that the keenest prices are often provided by the farmers. Farmers bringing their own produce to market represent a very important way of limiting the power of the marketing cartels.

However, there is usually little support by the authorities for this type of "unofficial" trading as farmers are frequently harassed as they attempt to sell. As far as possible farmers need facilities at urban markets, at minimum cost, so that they can sell their own produce without being disadvantaged or harassed in the process.Whether farmers rely on traveling wholesalers, traders, parastatals or large private marketing companies they all reduce the farmer's bargaining power, and critically, the demand for transport services and the supply of vehicles available for rural people.

2.7 Structure of Agricultural Produce Markets

The traditional agricultural marketing system encourages the participation of a large number of individuals at the various types of markets and exchange points where the marketing services of assembling, storage, transportation and break-of-bulk are performed.

The processes are highly dependent upon the nature of production, which is characterized by many widely scattered small individual farmers that have small quantities to market. The marketing system is required to assemble produce into larger bulks for onward transport to urban areas where the reverse process takes place (Owusu, 2005). Most of these markets are located in the rural areas and are considered rural periodic markets. A common example is Makarfi Central Market even though it operates on daily bases.

Tumbuan, Kawet and Shiratake (2006) in their study on significance of traditional markets and super markets functions for local farmers and consumers in Saga, Indonesia, stated that rural markets serve mostly village and local community needs. The most common modes of transport to these markets are foot, and bicycles. This does not mean they are not well-attended, for there were 1,200-1,500 people in attendance on an average market day in the isolated study of the market with about 30% coming from within a km radius of the market and 13% from over 10km away. These people bring any produce they have for sale and usually make some purchases. These transactions are accomplished through the use of village retailers that bring buyers and sellers together. In addition there are iterant traders selling non-agricultural goods that travel to the markets usually by bicycles and motorcycles, to display their wares on market days. In general, most of the agricultural commodities are moved from these markets to the urban centers.

Accessible rural markets again serve the village and local community but in addition are located on or near a motorable road. The rural markets serve as focal points for collecting products to be transported to urban areas. It is through these markets that most produce moves to the urban population (Swindell, Iliya and Mamman, 1999). These types of markets will draw farmers and local traders together in most cases from a distances of

about 10km. A typical day at an accessible rural market will find producers, local assemblers, transporters and village retailers all actively participating in agricultural produce exchange in addition to accessibility by road. These markets are also distinguished from the isolated market by a large number of buyers and sellers. Producers in the isolated rural markets are linked through these accessible rural markets to urban centers (Tumbuan, Kawet and Shiratake, 2006; Narteh, 2012).

2.8 Freight Transport Demand

The question of Intermodal allocations was the earliest issue in the Nigeria freight transport scene. The transport allocation issue became noticeable between 1925 and 1940 as soon as the first phase of the road network enabled road transport to intensify the competition already beginning between it and rail transport particularly in the Western and Eastern provinces (Hay, 1968).

The superior competitive advantage of road transport was remarkable. Initially, it was the building of roads, ferries and bridges which made the superiority apparent, but specific advantages of road transport soon became evident in different ways. The advantage of flexibility was the most important. Flexibility of routing enabled road, transport to respond quickly to the gradual growth of the transport demand mostly dispersed throughout the country.

While road transport was actually expanding immediately after the world wars, the railway was stagnating in Nigeria. First, the railway was neglected to the extent that it was allowed to run down up to a point from which it could not completely recover before the Nigeria Civil War was set in to bring another round of neglect. As funds were being

diverted to other areas during the wars, the railways was starved of funds, short of skilled manpower and left overburdened with obsolete equipment and poor conditions.

Apart from these, the increased tempo of road development programmers' in the successive plan periods since 1962 has been at the expense of rail transport, and the other modes. It should be noted that the 1978/80Third National Development Plan (Nigeria, 1981) spent nearly three quarters of the total allocations to the transport section on roads (Ogwude, 1983). Consequently, by 1980, the country's highways had increased from 15, 758 kilometers in 1969 'to nearly 30,000 kilometers in 1980 (Federal Department of Rural Roads 1984). The question of what should be the basis for re-allocating the shares of traffic between rail and road transport motivated the entire sections on freight transport in the Stanford Research Institute's (1961). The study followed Meyer (1959) work in arguing from the classical view-point of comparative cost advantage. The comparative cost approach to intermodal allocations states that the costs for moving a particular class of freight are less for rail than for road transport. The report (Stanford Research Institute) then claimed that if the Nigerian railway was allowed to rationalize its operations so as to avoid highly uneconomic services and follow a pricing policy related marginal cost, there would probably be a substantial diversion of traffic from road transport to rail transport. Similar conclusions were reached earlier by Bridgeman (1955) and Ijewere (1958).

Ogunsanya (1979), observed the spatial pattern of intra-urban freight transportation in Lagos using detailed data from a comprehensive field survey. The study identified three basic types of freight movement associated with urban settlements such as the Lagos metropolis. These include; the metro-imports comprising shipments of consumer goods into an area; secondly the metro-transit movements which are essentially traffic and finally

the intra-metropolitan freight which is the collection, distribution and local shipment in which both the vehicles and the goods have their origin and destination within the same area. The author therefore stated that the volume of freight and the intensity of interaction of a traffic zone determine the demand for some transport facilities.

Ogwude (1997), in a study of the Wukari-Numan road in former Adamawa State (Nigeria), assessed the impact of the road on farming, trading/Marketing, traffic flow, travel time saving, vehicle operating cost, settlement pattern and migration. The study used the household perception survey to gain insight into the changes that take place. The most significant impact of the road according to his findings are on farm, trading/marketing and travel time saving.

Ogwude (1997) addressed the subject of freight transport demand of industry in Nigeria. From the methodological point of view, the approach taken was to focus the analysis on an identifiable economic unit consistent with a consumer oriented study. Among the factors shaping the transport demand of the Industries the most important are vehicle ownership, transport arrangement with outside transporters and the distribution strategy adopted. It is apparent that freight charges have a significant influence on modal choice.

Kassali, Ayanwale, Idowu and Williams (2012), evaluated the influence of Intermediary Mode of Transportation (IMT) on food farmer's productivity. A random sample of 230 respondents was selected and data collected on their socio-economic and farm specific characteristics. Descriptive statistics, Herfindhal Index and Technical Efficiency Approach were used to analyse the data. The results indicate that majority of

food farmers were in their middle age with mean age of 50 years and most of them used one plot at a location between 5 and 10km to their village of residence. They acquired land by inheritance and practiced intensive crop diversification as risk management strategy. The transportation modes used in addition to walking include bicycle, motorcycle, and car with increasing trend in the use of motorcycle. The mean Technical Efficiency (TE) of food farmers was 0.82 with significant inefficiency effects. The inefficiency analysis indicates positive effect of distance, crop diversification and un-tarred type of road on farmer's productivity, while poor level of education among farmers, use of bicycle; trekking and weekly working time negatively affect farmer's efficiency. The negative effect of trekking and use of bicycle and the excess working time suggest the adoption of more IMT of motorized type to optimize farming time and increase farmer's productivity.

Idah, Ajisegiri and Yisa (2007) researched on effect of vehicles on the movement of perishable commodities in Niger state, Nigeria revealed that the major types of vehicles used in transportation of fruits and vegetables were motor vehicles such as Mercedes 911, articulated truck. Fule tanker, pick-up-van usually rented at the market where the goods are purchased. The study further shows that the major problem normally encountered is the non-availability of the vehicle when most needed which buyers in order not to lose their produce, resort to the use of any kind of available vehicle even passenger buses. This has resulted to some of their produce being transported using fuel tankers and other articulated vehicles which are highly susceptible to accidental during the course of transportation thus leading to losses.

Dominic (2009) studied freight flow pattern and volume of agricultural commodities in Kagarko local government area of Kaduna state, Nigeria. The study

revealed that ginger, cassava flour and sugar cane were the major produce freighted into and out of Kubacha. in Jere market, maize and yamwere the most freighted while in Kenyi market; groundnut and achawere the most freighted. The study further indicated that motorcycle and buses were mostly used for the movement of agricultural produce. Haruna (2011) analyzed the flow problems of inter-regional movement of agricultural commodities in Zaria. The result revealed the movement pattern to include within Kaduna State and outside to places such as Imo, Bauchi, Lagos and Ondostates. It further highlighted that the challenges with transportation of agricultural commodities in the area include mechanical problems,security men harassment, high cost and the poor nature of road in the area.

Filani (1976) in a study of periodic markets in Ibarapa Division in the old Western State of Nigeria revealed the pattern of goods and people's movement through the marketing system. The author also examined the market situation and road network and recommended for improvement in the construction of stalls and access roads. Also, Gana (1976) examined some principles of organization behind the location and operation of rural markets in Zaria Division. The study demonstrated that the scheduling of markets is integrated with their locational spacing and that there is a close relationship between market provision and population density.

In all these studies on Intermodal allocations, emphasis was placed on the measurement of marginal costs and no thought was given to the estimation of the economic value of service quality. Such an approach is probably justifiable from the view-point of macroeconomic planning in. which it has become the conventional wisdom to use aggregative data. From the behavioural point of view, modal allocations are the results of modal choice decisions taken by micro-economic units whose actions may be more heavily

influenced by non-monetary cost considerations. So it is clear that studies based on comparative costs are missing a very important part of the problems. Morton, (1972) Cunningham, (1981) stated that the most significant aspects of the study pertains to quality dimensions of modal attributes. These indeed tend to stress modal service qualities relative to cost, understandably, because while service failures are quite bad for business and the effect of increased freight expenses are less obvious. Transportation planners and analysts in local or municipal agencies are often interested in predicting the impacts of new facilities, commercial development and other establishment on the volume and spatial distribution of freight traffic in their respective jurisdictions.

CHAPTER THREE

STUDY AREA AND METHODOLOGY

3.1 The Study Area

3.1.1 Location and Extent

Makarfi LGA is situated between Latitude 7˚ 25' 00"E to 7˚ 25' 09"and Longitude 11˚ 15'00"N to 11˚ 15' 04"N. The area is located on the Hausa high plains of central Northern Nigeria at a height of about 650m above sea level. Makarfi is located on the centre of Northern guinea savannah with a land size of 562.39 km^2. The area is bounded by Rogo Local Government Area (LGA) of Kano State to the northwest, Ikara LGA to the northeast, Likoro and Kudan LGA to the southwest and Soba LGA to the southeast (Nomau, 2004) (See Figure 3.1)

3.1.2 Climate

MakarfiLGA has two distinct seasons, the rainy and the dry season. The dry season begins in early November and last till April when the wet season starts. The rainy season starts inMay and ends in October, while the mean annual rainfall is about 1,100mm per annum (Usman, 2012). The temperature of the area is high throughout the year. The mean daily maximum temperature rises gradually from January (35°C) and shows a major maximum temperature in April (40°C).Atmospheric humidity is generally low to about (15°C) especially in the dry season. The highest humidity is always experienced during the wet season, about 65 percent and above for most of the days (Kowal and Kassim, 1977:9). The climatic conditions inform the suitability of the area for cultivation of both food and cash crops in commercial quantities.

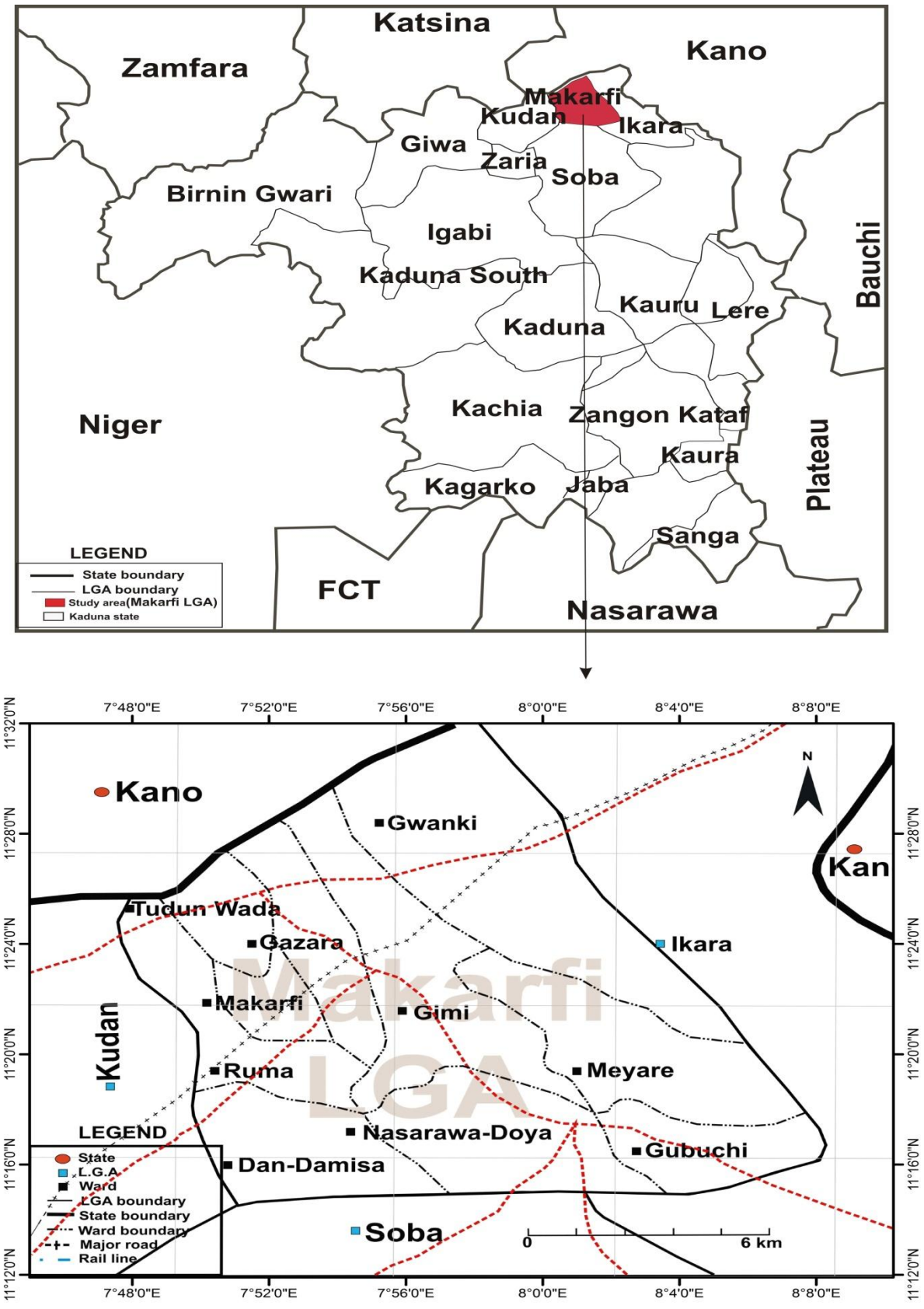


Figure 3.1: The Study Area (Makarfi LGA)
Source: Adapted from the Administrative Map of Kaduna State.

3.1.3 Drainage

River Makarfi, which is a major tributary of River Galma, is the main drainage system in Makarfi LGA. There is also, river Gubuchi called KoginGubuchi, which is the only perennial river while others are completely dried up during the dry season or contains only small pools along their courses. The drainage of Makarfi is generally dendritic in nature with tributaries like River RuwanRana, River GadanJerinje, River Saba'una and River Gubichi (Kaduna State Government Development Strategies on Fadama II, 2002:9). The presence of these rivers makes irrigation farming possible in Makarfi LGA with large volume of farm produce generated.

3.1.4 Relief

MakarfiLGA is situated on gentle rolling undulating plains of the Hausa land, which extends almost unbroken from the Sokoto Plain to the Tuguddi near Agades in Niger Republic. The plain varies in height from 545 to 715m above sea level; however, variations occur in some areas where hills occur or due to the presence of valley (Mortimore, 1970:10).

3.1.5 Population and People

Makarfi LGA had a population of 146,574 of which 73,282 were females while 73,292 were males (NPC, 2009). The area is predominantly occupied by Hausas with other ethnic groups like Bajju, Igbo, Tiv, Idoma, and Yoruba as minorities. Islam and Christianity are the major religions practiced in the area but one still finds a number of traditional worshippers (2%). Given the population size, the cost of labor for agricultural activities is said to be relatively cheap.

3.1.6 Economic Activities

The people are actively engaged in agriculture which is their major economic activity. They engage in both crop production and animal husbandry. The major crops grown are maize, sorghum, guinea corn, beans, pepper, onion, groundnut, rice and millet. However, the area is also known for sugarcane production and cultivation of tomatoes. Both upland (mostly during the rainy season) and lowland through irrigation mainly known as Fadama are widely practiced by farmers in the area.

Animal rearing of cattle, sheep and goats is common with about 10 to 15 percent of the population engaged in it. Makarfi has a periodic market which holds every Wednesday (Jumare, 2006). The market has encouraged many people in the area to be involved in one form of trade or the other as well as attracting people within and outside the region for purchase of agricultural commodities., With the creation of Makarfi LGA in 1976 and the improvement in educational sector through the construction of schools such as ShehuIdris College of Health and Science Technology, there are now civil servants in the area who have taken up farming in a large scale.

3.1.7 Transportation

Makarfi LGA is mainly served with Truck “B” and “C” type of road network. Also the Nigerian Railway Track passes through the area (See Figure 3.2). The railway has enhanced the movement of people, goods and services within and outside the region but has declined since the late 1980s although there are efforts to revamp it. Other means of transportation include animals, bicycles, motorcycles, buses and cars used to facilitate the movement of goods and people. These means of transportation have enhanced the

movement of agricultural produce from the farms to the markets and other parts of the country.

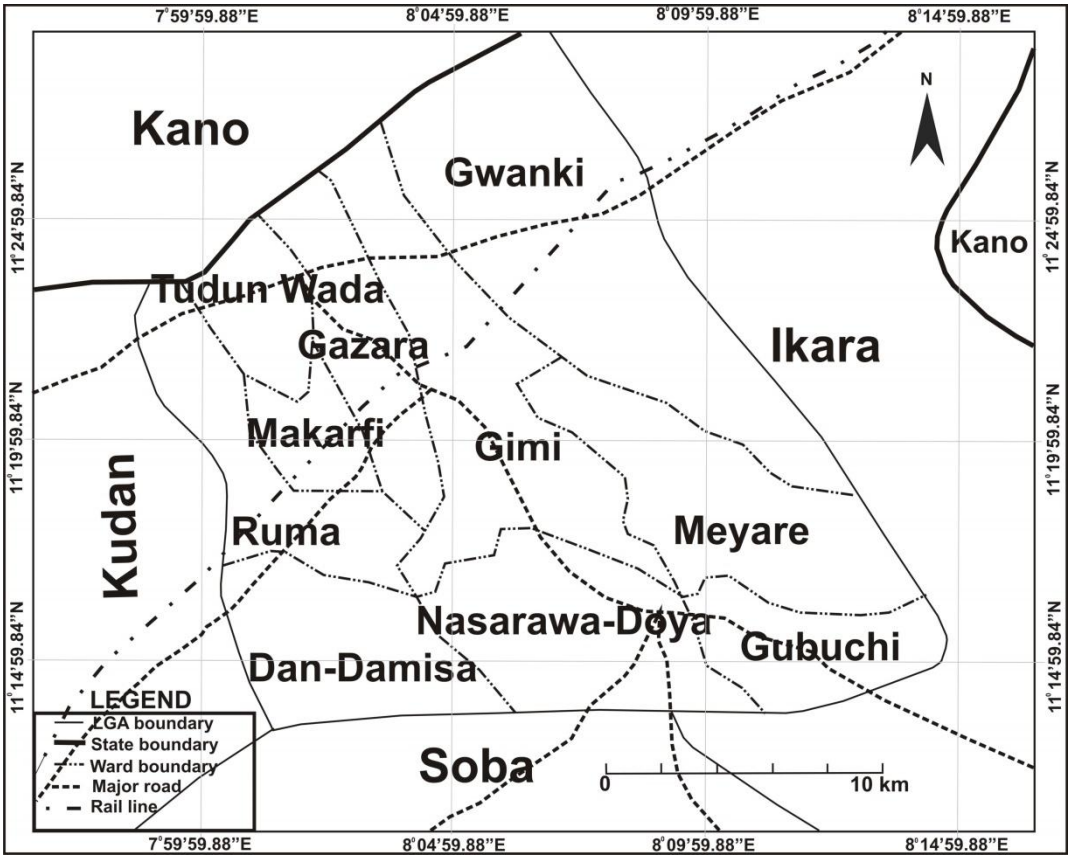


Figure 3.2: Road Network in Makarfi LGA

Source: Adapted from the administrative Map of Kaduna State.

3.2 Methodology

3.2.1 Reconnaissance Survey

A reconnaissance survey was carried out by the researcher to be properly acquainted with the study area and to seek the cooperation of the farmers, loaders and vehicle operators for the success of the research. During the survey data from Makarfi LGA Secretariat revealed that 300 vehicle operators and 150 marketers were registered and 200 hundred farmers were registered with the Farmers' Cooperative society.

3.2.2 Types of Data Utilized

Data types required for this study include;

i. Administrative map showing road network
ii. Socio-economic characteristics of farmers and traders
iii. Available modes of transportation,capacity and volume of agricultural produce moved by different modes, trip origins and destinations
iv. Trip demand factors (safety, reliability, cost, carrying capacity, distance.)
v. Challenges in using different modes of transport by the farmers and traders

3.2.3The Sources of Data

Data for the study were collected from primary sources.

3.2.3.1 Primary Source of Data

The research employed the use of questionnaire in eliciting information on socio-economic data types, motor vehicles used by the farmers and marketers. Also data on the number of motor vehicle used on every market day, as well as data about vehicles used for moving harvested produce by farmers to their homes and market were collected. Other means of transportation were also explored.

3.2.4 Method of Data Collection

Farmers, marketers and vehicle operators were interviewed for the purpose of getting their socio-economic attributes, transport modes used in the movement of agricultural produce, volume of produce conveyed as well as challenges. Six (6) field assistants who are conversant with the indigenous language were used in administering the questionnaires to sample farmers, marketers and vehicle operators in the area. The study

relied on data collected on the socioeconomic benefits or limitations that have resulted from the movement of these agricultural produce.

3.2.5 Sample Size and Sampling Technique

A number of models have been developed to estimate sample size. Yet, Yamane (1967) provides a simplified formula to calculate sample size with 95% confidence level and 5% sampling error assumption as follows.

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

Where,
n= Sample size
N= Study population size
e= Level of significance (set at 0.05 for this study)

The study used the above formula with a study population of 650 consisting the vehicle operators, registered farmers and marketers to obtain a total of 247 respondents for questionnaire administration. To determine the proportion of the respondents for each group, Yamane (1967) sampling method for determination of respondents was also used i.e. See Table 3.1

Where:Sample size per group of respondent =Group Population x Sample Size

Total Group Population

Table 3.1: Sample size of Respondents

Group	Population	Number of Respondents
Vehicle Operators	300	114
Farmers	200	76
Marketers	150	57
Total	650	247

Source: Compiled from Author Reconnaissance Survey, 2015

The sampling frame for this research consists of registered farmers, marketers and Cooperative list of motor vehicle operators (NURTW) in Makarfi Local Government Area

of Kaduna State. The researcher adopted a random sampling technique for the farmers, marketers and motor vehicle operators in the area.

3.2.6 Data Analysis Technique

Both descriptive and inferential statistics were used in analyzing the data for this study. All statistical analysis were carried out using SPSS version 20 statistical package and Microsoft Excel 2007. The statistics to be used in achieving the objectives of the study is as follows:

Objective i: Modes of Transport used for the Movement of Agricultural Produce.

Data sourced from questionnaire survey was analyzed descriptively and presented in tables to show the different modes of transport used in the movement of agricultural produce in the study area. Charts were also used where necessary.

Objective ii: Pattern of Movement by the Various Modes and

Data sourced from questionnaire survey was analyzed descriptively and presented in tables and charts to show the pattern of the movement of agricultural produce in the study area.

Objective iii: Costs of Transporting Agricultural Produce by the various Modes in the Study Area.

Data sourced from questionnaire survey was analyzed descriptively and presented in tables and charts to show the cost of moving agricultural produce by different modes in the study area.

Objective iv: Type and Volume of Agricultural Produce Moved by the Different Modes of Transport.

Descriptive statistics such as mean and standard deviation was used to summarize the different modes used for the transportation of agricultural produce by farmers and marketers in the study area as well as the volume-capacity of agricultural produce.

Objective v: The Challenges associated with the different modes of transportation.

This was achieved through the use of descriptive statistics to determine the challenges faced by both farmers and marketers most and was presented in tables. The Mann-Whitney test was used to test the hypothesis for differences in volume of farm produce transported by the various means of transport available in the area.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter presents the findings and discussion of results obtained from the analysis of the survey conducted in Makarfi LGA. It includes the socio-economic characteristics of the respondents, modes of transport used for transporting agricultural produce, types and volume of the produce and pattern of movement of the produce. The chapter further presents the cost of transporting agricultural produce by different modes and the challenges associated to the different modes of transport available for transporting agricultural produce in the area. Only 235 copies of questionnaire were returned as valid having 95% response rate.

4.2 Socio-Economic Characteristics of Respondents

The socio-economic characteristics considered include; sex, age, marital status, educational qualification, occupation and income level of the respondents.

4.2.1 Sex, Age and Marital Status of Respondents

The sex, age and marital status of the respondents are shown in Table 4.1. It revealed that 65% of respondents are male and only 35% are female. In the northern part of Nigeria as a whole, culture as well as religious practices, limit to a great extent what a woman should do and can do.

Catering for the household for instance is the sole responsibility of the man both from the religious and cultural point of view. As such going to the market by mainly men in Makarfi LGA should not be a surprise as it is located in the part of Nigeria that culture and religion outline duties according to sex. Another reason for this unequal distribution

could be because the questionnaire was administered on the Wednesday market day which is dominantly for the male while the Thursday market is dominantly for women as it is called in Hausa "*Kasuwan Mata"*.

Table 4.1: Sex, Age and Marital Status of Respondents

Sex	Frequency	Percentage
Male	153	65.0
Female	82	35.0
Total	**235**	**100.0**
Age		
18-28years	63	27.0
29-39years	77	33.0
40-50years	48	20.0
51-61years	28	12.0
Above 61	19	8.0
Total	**235**	**100**
Marital status		
Single	89	38
Married	117	50
Divorced	17	7
Widowed	12	5
Total	**235**	**100**

ource; Author's Field work, 2016

Table 4.1 further reveals that about 60% respondents fell between the age groups 18-28years and 29-39years. This implies that most of the respondents were in their youthful age. This means that a good number of youths in the area do go to the market to make earnings. This could be because a lot of market activities require agile youth especially the loading and offloading of farm produce. As such the elderly may not really fit in to these activities of the market. This therefore confirmed Adekoya (2005) position that market activities especially a market which dominantly deals with agricultural produce, generally requires men with sufficient physical strength.

Regarding marital status, it revealed that 50% of respondents are married while only 5% are widowed. This implies that a good proportion of the respondents were married. Although, Dabo (2011) noted a sign of early marriage in this area, which was portrayed in this study in cognizance to the norm in northern Nigeria. The marital status portrays that a high number of household which may require welfare upkeep which will consequently make the people to engage in marketing/farming activities to cater for family.

4.2.2 Educational Qualification, Occupation and Income Level of Respondents

The educational qualification and occupation of respondents are shown in Table 4.2.

Table 4.2: Educational Qualification, Occupation and Income of Respondents

Level of education	Frequency	Percentage
No formal education	60	26
Qur'anic	90	38
Primary	47	20
Secondary	27	11
Tertiary	11	5
Total	**235**	**100**
Occupation		
Farming	66	28
Trading	87	37
Driving	56	24
Civil servant	11	5
Others	15	6
Total	**235**	**100**
Monthly Income (Naira)		
No fixed income	49	21
Less than 10,000	12	5
11,000-20,000	21	9
21,000-30,000	16	7
31,000-40,000	28	12
41,000-50,000	45	19
Above 50,000	64	27
Total	**235**	**100**

Source; Author's Field work, 2016

It revealed that 38%, of respondents had quranic education and only 5% had tertiary education. This implies that majority of the respondents had no formal education. This could be as a result of the fact that literary level in the area is generally low as postulated by Nomau (2004) and that market does not require any significant level of literacy especially the physical activity of the market in which most respondents are involved.

Table 4.2 also revealed that 37% of respondents are traders, 28% are farmers while only 5% are civil servants. The low proportion of respondents who are civil servants could be a reflection of the literacy level of the respondents because to be a civil servant, a level of formal educational attainment is required. Also, high proportion of traders in the area could be because the survey was majorly conducted in the market place and as such only few people who came to make purchase in the market agreed to respond to questions. But sellers who are stationed in one position easily attend to questions.

Table 4.2 further showed the distribution of respondents according to level of income. It reveals that only 27% of respondents earn above 50,000 naira as income. This implies that income is generally low among respondents. This could be because most of the respondents contacted were engaged in menial jobs in the market such as loading and offloading of farm produce. Even those who are traders were found to be in small scale jobs and as such low income is expected. This therefore could mean that the standard of living of most of the respondents is expected to be poor when rated in terms of income.

4.3 Modes of Transport Used for the Movement of Agricultural Produce in Makarfi

In determining the modes of transport used in moving agricultural produce in Makarfi LGA, consideration was given to the modes of transport in the area. Also,

considered were the types of road available, distance of farm to market, mode of transport used for moving agricultural produce and condition of road to the farm.

4.3.1 Modes of Transport Available in Makarfi

The modes of transport available in the area are shown in Table 4.3. It revealed that the most common mode of transport in the area is the use of motorcycle which makes up 34.0% of total respondents.

Table 4.3: Modes of Transport Available in the Study Area

Means of Transport	Frequency	Percentage
Trekking	54	23
Bicycle	69	29
Donkey	17	8
Motorcycle	81	34
Others	14	6
Total	**235**	**100**

Source; Author's Field work, 2016

This may be as a result of inaccessibility or bad road condition between farms, markets and homes. The absence of tarred on motor able roads by implication means that large volume of farm produce cannot be moved easily both within and outside the area. This corroborates the findings of Foin (2002) who revealed that accessibility is the backbone of agricultural development especially in rural communities. Also, Ogundele (2007) found that most rural roads in western Nigeria are not tarred and as such makes transportation of agricultural produce from such areas difficult and more costly.

4.3.2 Road Connectivity to the Market in Makarfi

Table 4.4 shows the road connectivity to market based on the different groups of the respondents. It revealed that trunk A road has the highest connectivity to the market in the area with 37.0% respondents accessing it and basically used by vehicle operators (66.0%), followed by trunk B with 27.6% respondent accessing the road while footpath had

only 17.4% respondents accessing it to market which are dominantly close by farmers (61.0%). This implies that federal government road is highly accessible to the market by most respondents from their homes.

Table 4.4: Road connectivity to the market

Group	**Road Type**								**Total**
	Footpath		Trunk A		Trunk B		Trunk C		
	Freq	%	Freq	%	Freq	%	Freq	%	
Vehicle operators	5	12.0	57	66.0	35	54.0	11	26.0	108
Farmers	25	61.0	9	10.0	17	26.0	22	52.0	73
Marketers	11	27.0	21	24.0	13	20.0	9	22.0	54
Total	**41**	**100.0**	**87**	**100.0**	**65**	**100.0**	**42**	**100.0**	**235**

Source; Author's Field work, 2016

This is because the market is very close to the Kano-Kaduna express road and as such most respondents make use of the road in the process of connecting to the market. This finding contradicts the assertion of Mohammed (2006) who asserted that most markets in northern Nigeria are mainly connected to marketers by Trunk B roads.

4.3.3 Distance from Farm to Market

The distance covered by respondent from farm to the market is shown in Table 4.4. It revealed that the most common distance covered by respondents from farm to market is 3-5km. This may be due to the fact that majority of respondent live within the area and are indigenes of the area. The least common distance covered by the respondents is above 10km. This means that very few of the farm holders come from outside the area. This could

be a function of questionnaire administration in which most of the respondents contacted were familiar faces.

Table 4.5 Perceived Distances from Farm to Markets

Group	**Distance**										**Total**
	Less than 1km		1-2km		3-5km		6-10km		Above 10km		
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	
Vehicle operators	16	48	23	43	31	38	28	68	10	40	108
Farmers	12	36	17	31	28	34	10	24	6	24	73
Marketers	5	16	14	26	23	28	3	8	9	36	54
Total	**33**	**100**	**54**	**100**	**82**	**100**	**41**	**100**	**25**	**100**	**235**

Source; Author's Field work, 2016

These findings contradict those byOgundele (2007) who found that in western Nigeria, most marketers travel more than 10km to access major markets. On the other hand, Mohammed (2006) found that most rural markets are actually not far from the marketers and as such most marketers travel on a short distance and in some cases workable distance.

4.3.3 Transport Means used to Move Farm Produce to Market in Makarfi

The various means in which respondents use to transport their farm produce to the market is shown in Figure 4.1. It revealed that 22% of the respondents transport their farm produce to the market using bus. This is followed by 20% respondents who use motorcycle to transport their farm produce to the market. Only 6% of the respondents make use of donkey to move their farm produce to the market. This implies that despite most of the

road to the farm are not tarred, yet they are still to an extent motor-able. This also implies that most of the farmers are not commercial farmers as bus and motorcycle can only convey small volume of farm produce unlike lorry and truck.

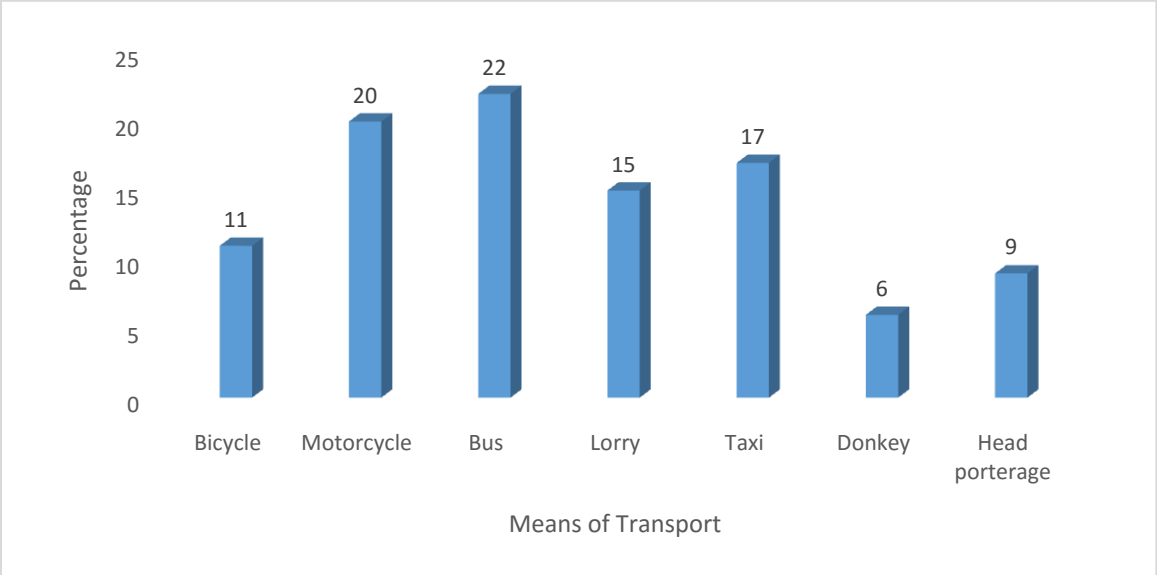


Fig 4.1: Means of transport used to move produce to market by the respondent
Source; Author's Field work, 2016

Also, the dominant use of buses could be because they are more economically viable to the farmers as they can convey both people and goods and also tends to more secured than peak ups. Hence, majority of the people in the study area prefers to use buses than other vehicles. On the other hand, the use of donkey could be attributed to the subsistent nature of most of the farmers as revealed by Nomau (2004) and Dabo (2011). This therefore corroborates the findings of Vandi (2009) who revealed that in Ganye are of Adamawa state, most of the farmers cultivate basically for consumption of the household and a little for commercial purposes.

4.3.4 Road Condition to Farmer's Farm

The condition of roads to farmers' farm based on the respondent's attestation is shown in Figure 4.2. It revealed that 55% of the respondents attested that the road to their farm is not motor-able while 45% attested that the road to their farm is motor-able.

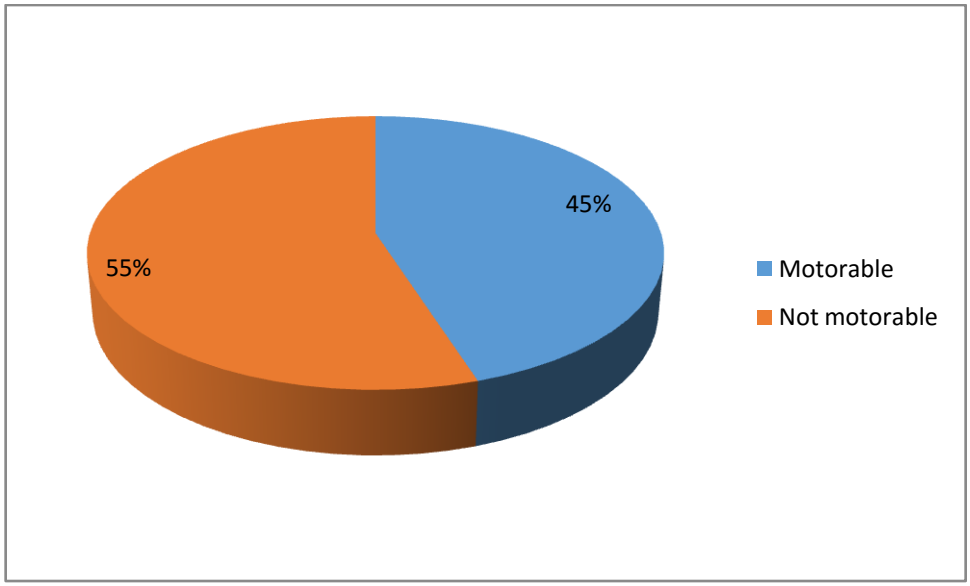


Figure 4.2: Condition of Road to the Farm
Source; Author's Field work, 2016

This implies that there is negligence of responsibility from the local government authority. This therefore can limit the volume of agricultural produce transported to the market. This finding is in line with that of Vandi (2009) who also pointed that most roads leading to farms in Ganye LGA of Adamawa State are not motor-able.

4.4 Types and Volume of Agricultural Produce Moved in Makarfi

This section made an effort to examine the types and volume of agricultural produce transported in Makarfi. In this quest, special consideration was given to the types of agricultural produced transported in the area, the volume transported by different means of transport. Also, emphasis was laid on means of storage, type of trading activity,

respondent's patronage of market, duration of respondent in business and type of agricultural produce purchased by respondent.

4.4.1 Means of storage of farm produce

The means of farm produce storage by farmers is shown in Table 4.6. It revealed that 41% of the respondents store their farm produce in the house. About 24% store in market, 20% store in warehouse while only 13% kept produce in the farm.

Table 4.6: Results on the storage of farm produce by the respondent

Means of storage used	Frequency	Percentage
Kept on farm	9	13
House	27	41
Market	16	24
Warehouse	13	20
Others	1	2
Total	**66**	**100**

Source: Author's Field work, 2016

This implies that majority of the farmers cultivate at subsistent scale and have no or less mega storage facilities to store their produce after harvest. On the other hand, the small proportion of farmers who store farm produce in the farm implies that other better storage methods of farm produce are now available and used in the area as against the ancient and rudimentary method of farm storage. This agrees with the findings of Olukoye (2002) who revealed that in Enugu State, most farmers store farm produce at home simply because the produce in totality is not much as it is cultivated dominantly for household consumption.

4.4.2 Types of Trading Activities Engaged by the Respondents

Most of the respondents are engaged in different levels of trading activity. Figure 4.3 shows the distribution of traders based on their level of trading activity in the area.

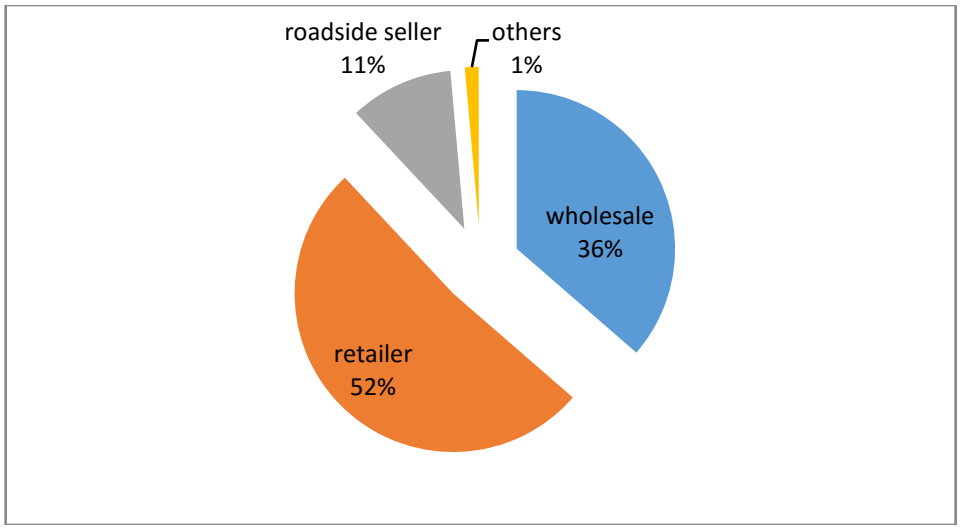


Figure 4.3: Types of Trading Activity Engaged by the Marketers
Source: Author's Field work, 2016

It revealed that more than half of the marketers which constitute 52% are retailers. It also shows that 36% of the marketers are wholesalers while roadside sellers make up only 11%. This could still be attributed to the fact that farming in the area is subsistence in nature and as such farmers produce to sell only a little of their produce.

4.4.3 Market Patronage by the Respondents

Table 4.7 shows the distribution of respondents according to their frequency of market patronage in the area. It reveals that 36% of respondents go to market on a weekly basis.

Table 4.7: Frequency of Market Patronage by the Respondent

Market patronage	Frequency	Percentage
Monthly	67	29
2 weeks	49	21
Weekly	84	36
Daily	35	14
Total	**235**	**100**

Source: Author's Field work, 2016

This implies that most of the respondents patronize every market day since the market day is every Wednesday. It also reveals that 29% go to market on a monthly basis while only 14% go to the market on a daily basis. This implies that markets in the area are periodic in nature which only allows patronage at intervals as many of the marketers do not have a stationed and fix shop in the Makarfi market.

4.4.4 Time Spent in the Business by the Respondent

The duration of respondent in business is given consideration here as shown in Figure 4.4. It revealed that most of the respondents which make up 40% of the total respondents have been in the business for 11-15 years.

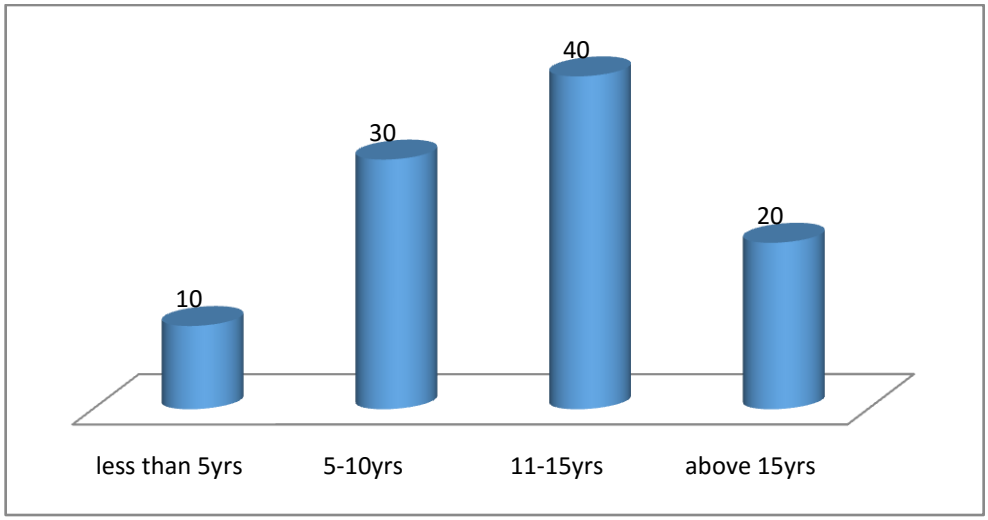


Figure 4.4: Time Spent in the Business by the traders
Source: Author's Field work, 2016

This implies that for most of the respondents, this business is their major means of livelihood. On the other hand, the least distributions of the respondents are those whom spent less than 5 years in the business bearing exactly 10%. This implies that some respondents are still young in the business while some are old. This could mean that the business is paying well as most of the respondents have been it the business for long.

4.4.5 Type of Agricultural Produce Purchase by the Respondent

Table 4.8 shows the various types of agricultural produce purchased by respondents in the area. It revealed that most respondents which constitute 29% purchase maize. This shows that most of the produce cultivated in the area are cereal crops.

Table 4.8: Type of Agricultural Produce Purchased by traders

Agricultural Produce	Frequency	Percentage
Maize	25	29
Sugarcane	8	9
Sorghum	6	7
Millet	12	14
Rice/beans	16	18
Other	20	23
Total	**87**	**100**

Source: Author's Field work, 2016

On the other hand, only 7% of respondents purchase sorghum. This is could be due to the market demand factor in the study area. This corroborates the findings of Mohammed (2006) which reveals that in most part of northern Nigeria, the most cultivated crops are cereal. These include maize, sorghum; millet among others and as such parades most of the rural markets of the region.

4.4.6 Type of Crop and Means of Transportation used to Move Produce

The crop type cultivated in the study area and the means of transportation used in moving the produce is shown in Table 4.9. It revealed that 43.4% of produced sweet potatoes in the area are transported using bicycle. This could be because cultivation of sweet potatoes in the area is not on a large scale and most of the farmers cultivate the crop for family consumption as such can easily move cultivated potatoes to their homes using bicycle. For 27.3%, they attested that motorcycle is dominantly used to move rice from farm to homes. This could be because paddy rice in terms of weight is relatively light and

as such can easily be carried using motorcycle which can carry even more than a bag. It also reveals that bus is also used mostly to move rice, lorry is used mostly to carry heavy crops like sorghum (21.3%), maize (19.0%), and rice (18.0%) while taxi is mostly used to transport rice as attested by 47.0% of the espondents. On the other hand, 27.7% respondents affirmed that donkey is used mostly to move sweet potatoes while 23.7% attested it is used mostly to move millet.

Table 4.9: Type of Crop Cultivated Versus Means of Transportation to the Market

Crop type	**Means of Transportation**					
	Bicycle	Motorcycle	Bus	Lorry	Taxi	Donkey
	%	%	%	%	%	%
Maize	11.2	15.2	15.2	19.0	9.0	8.3
Millet	6.7	13.1	9.2	14.0	10.0	23.7
Sorghum	13.9	23.1	16.1	21.3	12.0	18.3
Beans	10.6	9.2	11.2	14.4	17.0	17.0
Rice	13.0	27.3	40.1	18.0	47.0	3.3
Sugar cane	1.2	2.1	1.5	11.3	1.0	1.7
Sweet potatoes	43.4	10.0	6.7	2.0	4.0	27.7
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source; Author's Field Survey, 2016

These results imply that virtually all the outlined transportation means in the study area, are used for the movement of agricultural produce either from farm to homes or to market. The result revealed the weight of a farm produce determine the type of transportation means used to move the produce. These findings agrees with the opinion of

Ako*et al*, (2014) who pointed that most farm produce are been transported to markets by different means of transport pending on nature of the produce.

4.4.7 Volume of Crop and Means of Transportation

The volume of crop and the means of transportation used in moving the produce is shown in Table 4.10. It revealed that 87.3% of respondents affirmed that crops of less than 1bag volume is mostly transported using bicycle. This could be because the carrying capacity of bicycle cannot go beyond a bag. For 63.3%, they attested that motorcycle is dominantly used to move crops of 1-5bags from farm to homes or market. This could be because motorcycle have the capacity of carrying up to 2bags and more for professional bikers. It also reveals that bus is mostly used to move crops ranging from 1-20bags and even more in rare cases. Taxi is mostly used to transport crops of 1-15bags as attested by over 70% of respondents.

Table 4.10: Volume of Produce VersusMeans of transportation

Crop volume in bags (100kg)	**Means of Transportation**					
	Bicycle	Motorcycle	Bus	Lorry	Taxi	Donkey
	%	%	%	%	%	%
Less than 1bag	87.3	36.7	2.3	0.0	3.3	36.3
1-5bags	12.7	63.3	7.7	0.0	10.0	63.7
6-10bags	0.0	0.0	22.9	3.3	54.1	0.0
11-15bags	0.0	0.0	19.0	13.4	21.0	0.0
16-20bags	0.0	0.0	41.4	30.8	11.6	0.0
Above 20bags	0.0	0.0	6.7	52.5	0.0	0.0
Total	**100**	**100**	**100**	**100**	**100**	**100**

Source; Author's Field Survey, 2016

On the other hand, majority of the respondents affirmed that donkey is mostly used to transport farm produce of less than 5bags.

This result shows that the volume of crops transported goes in accordance to the size and power of the means of transport. This could mean that there is a relationship between volume of crops transported and the means of transportation. This is because it appeared that the volume of produce determines the type and means of transportation to be used. This result corroborates Ross (2001) who asserted that about 80% of heavy and voluminous agricultural produce are being transported by trucks (Lorries).

4.5 Movement Pattern of Agricultural Produce from Makarfi Market

This section makes an effort to examine the movement pattern of agricultural produce from Makarfi market. In this quest, consideration was given to the destination of purchased agricultural produced and means of transporting the produce to its destination. Also, emphasis was laid on ownership of means of the transport used by respondents.

4.5.1 Destination of Agricultural Produce Purchase by the Respondent

Table 4.11 shows the distribution of respondents based on the destination of their purchased agricultural produce from Makarfi market. It revealed that most respondents which make up 40% of the total respondents purchase agricultural produce from Makarfi to take other markets.

Table 4.11: Destination of Agricultural Produce Purchase by the Respondent

Destination	No. of respondent	Percentage
Home	64	27
Market	93	40
Industries	35	15
Other	43	18
Total	**235**	**100**

Source: Author's Field work, 2016

This showed that most purchased agricultural produce are transported or moved to the markets for further exchange. Moreover, the destination with least outlet for of produce are industries bearing only 15% of the entire percentage distribution in the study area. This highlights that industries are less effective in the utilization of most of the agricultural produce. This could be due to power failure of the country in general which makes most initially active industries to be inactive or absence of agro allied industries that can utilize the agricultural commodities. This could also mean that most of the buyers are retailers who purchase and sell in nearby markets for any little profit.

4.5.2 Means of Transporting Agricultural Produce to the Market

Table 4.12 showed the utility percentage distribution of various means used to transport produce away from Makarfi market. It revealed that most buyers make use of lorry to move the purchased produce to other places as it is attested by 35% of the total respondents.

Table 4.12: Means of Transporting Agricultural Produce from Makarfi

Means of Transporting	No. of respondent	Percentage
Bicycle	24	10
Motorcycle	37	16
Bus/taxi	47	20
Lorry	82	35
Donkey	16	7
Head porterage	29	12
Total	**235**	**100**

Source: Author's Field work, 2016

This could be because most respondents purchase in bulk and as such may require bigger vehicles to convey their goods. Also, in some cases more than one person can put together their purchased goods to board one bigger vehicle so as to reduce cost. It also reveals that 20% of the respondents make use of bus/taxi. This could be because busses are

highly economical and commercially viable while taxis seem to be used due to its availability in the area. This is in line with the assertion of Vandi (2009) who pointed that the most farm produce are brought to the market in smaller vehicles as compared to the vehicles used in moving them out of the market.

4.5.3 Ownership of means of transport used

Figure 4.5 showed the distribution of respondents based on ownership of means of transport used to transport purchased agricultural produce from Makarfi.

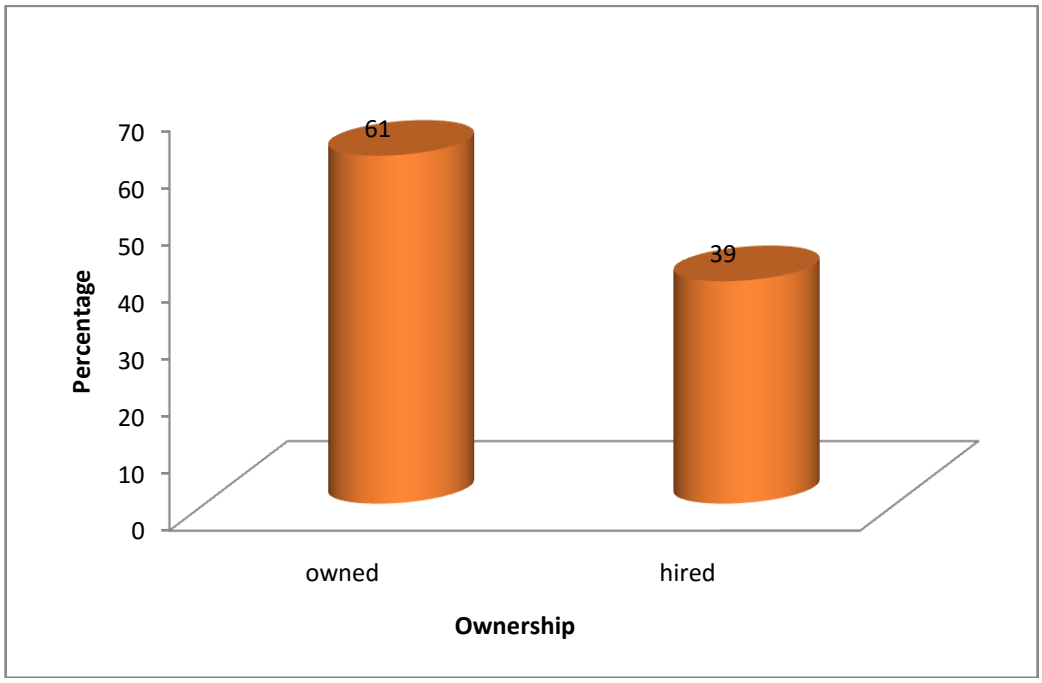


Figure 4.5: Ownership of Means of Transport used by Respondents
Source: Author's Field works, 2016

It revealed that majority of the respondents (61%) claimed ownership of the means of transportation they use. Only 39% of the respondents claimed they hire the vehicle. This means that majority of the respondent are capable of purchasing a vehicle (most commonly motorcycle or bicycle) as determined by their level of income. The respondents that engaged in hiring of vehicle commonly hired vehicles such as buses,taxis and lorry. This

indicated that a good number of the respondents purchase a reasonable volume of agricultural produce and yet hire vehicles to convey their goods.

4.6 Cost of Transporting Agricultural Produce to Market in Makarfi

This section examines the cost of transporting agricultural produce to the market in Makarfi LGA. The section considers the amount paid for moving agricultural produce to the market, purchase of the produce and terms of hiring vehicles.

4.6.1 Amount Paid to Move Agricultural Produce to the Market by the Respondent

Table 4.13 showed the distribution of respondents based on the amount paid to move produce to market. It revealed that 37% of the total respondents pay 1,000-3,000 naira to move agricultural produce to the market. This is followed by 26% who pays 3,000-5,000 naira, while only 15% respondents pay less than 1,000 naira for this purpose.

Table 4.13: Cost of Moving Agricultural Produce to the Market

Amount Paid (₦)	No. of respondent	Percentage
Less than1,000	10	15
1,000-3,000	24	37
3,000-5,000	17	26
Above 5,000	16	22
Total	**66**	**100**

Source: Field work, 2016

This implied that the cost of transporting agricultural produce in the area is generally high. This could be as a result of the recent increase in fuel price in the country which inflates virtually every aspect of human life. It could also be due to the monopolistic nature of road transport in the area. Furthermore, this could be due to the nature of the rural roads in the area which was found to be bad for motor vehicles. This therefore supports the opinion of Musa (2012) who opined that due to the poor nature of most rural roads in Nigeria, the cost of transporting agricultural produce from farm to market or home is progressively increasing.

4.6.2 Purchase of Agricultural Produce by the Respondents

Table 4.14 showed the distributions of respondents based on their purchase rates of agricultural produce. It revealed that most (33%) of the buyers purchase agricultural produce at wholesale scale.

Table 4.14: Purchase of Agricultural Produce by the Respondent

Purchase	No. of respondent	Percentage
Farmers	63	27
Retailer	59	25
Wholesale	77	33
Others	36	15
Total	**235**	**100**

Source: Author's Field work, 2016

This means that majority of the marketing activities commonly attributed to final consumers. On the other hand, the lowest purchasers are others (industries) which makes up 15%. This means that industries have the least participation in the marketing activities.

4.7 Challenges of Transporting Agricultural Produce in Makarfi LGA

This section examines the challenges associated with transporting agricultural produce in Makarfi LGA. The section considers the major challenge facing the movement of farm produce, the effect of these challenges and the appropriate measures to be taken to handle the challenges in the area.

4.7.1 Challenges to the Movement of Agricultural Produce in Makarfi LGA

Table 4.15 shows the distribution of respondents based on their opinion on the major challenges facing the movement of agricultural produce in the area. It revealed that 35% of the total respondents opined that the most pressing challenge is poor condition of most of the roads in the area. This is perceived mostly by vehicle operators (68%) in the area. This is followed by 23% respondents who opined that high cost of transportation is

the major challenge in the area. This challenge is mostly felt by farmers who accounted for 43%.

Table 4.15: Challenges in the Movement of Agricultural Produce by the Respondent

Group	**Challenge**										**Total**
	Insufficient transport means		High cost of transport		Poor road condition		Poor road network		Revenue collectors		
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	
Vehicle operators	16	48	17	31	31	38	28	68	10	40	108
Farmers	12	36	23	43	28	34	10	24	6	24	73
Marketers	5	16	14	26	23	28	3	8	9	36	54
Total	**33**	**100**	**54**	**100**	**82**	**100**	**41**	**100**	**25**	**100**	**235**

Source: Author's Field work, 2016

This could result to damaging of produce, increase in travel time, and increase in fuel consumption in the area. This is similar to the findings of Kolawole (2009) which revealed that in the rural areas of Kwara state, poor road condition and insufficient vehicles were outlined as the most pressing problems of transporting agricultural produce especially from the farm to the market.

4.7.2 Suggested Measures for solving the challenges of Transportation in Makarfi

Table 4.16 showed the challenges and solutions of road transportation in the area.

It revealed that most respondents suggested that challenges such as insufficient transport means can be solved by the provision of more vehicles by union of road transport workers in the area.

Also, high cost of transportation was said can be solved by providing subsidized vehicles for the transportation of agricultural produce in the area. On the other hand, poor road condition and poor road network can be taken care off by constructing new roads and maintaining the old ones. Finally, respondents suggest that union of road transport workers and local government authority should review the amount collected as revenue from vehicle operators in the area.

Table 4.16: Challenges and Solutions of road transportation in Makarfi LGA

Challenges	Solution
Insufficient transport means	Union of road transport workers should purchase vehicles and make available for use at a subsidized rate
High cost of transport	Stakeholders should intervene on the transport cost
Poor road condition	Regular road maintenance should be carried out by local government authority
Poor road network	More roads should be constructed in the area to connect other rural areas
Revenue collectors	Union of road transport workers should review the amounts collected by revenue collectors in the market

Source: Author's Field work, 2016

4.8 Test of Hypothesis

Table 4.17 showed variation in volume of crops produce transported by the various means of transportation in study area;

Table 4.17: Mann-Whitney Test Statistics

	Means of transport	N	Mean Rank	Sum of Ranks
Volume of farm produce	Bicycle	12	19.04	188.00
	Motorcycle	25	36.96	325.00
	Bus	52	67.34	6536.50
	Lorry	103	195.43	7491.50
	Taxi	41	53.67	542.50
	Donkey	2	3.09	87.50
	Total	**235**		

Z test result = -1.156, Asymp. Sig. (2-tailed) = 0.014

Source; Author's Field Survey, 2016

it still revealed that the result of the Mann-Whitney test to see if the differences in volume of farm produce transported by the various means of transportation is significant.

The table reveals a mean rank of 19.04 for bicycle, 36.96 for motorcycle, 67.34 for bus, 195.43 for Lorry, 53.67 for taxi and 3.09 for donkey. The result showed a Z-value of -1.156 and significant level of 0.014. Thus, since the significant level is below 0.05 level of significance it therefore means that the null hypothesis is rejected. Thus, it is concluded that there is a significant difference in the volume of farm produce transported by the various means of transportation available in the study area. This is similar to the findings of Kitula (2005) who also revealed that there is a significant difference in the volume of farm produce moved by different modes of transportation in Tanzania.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of major findings of the study, the conclusion drawn from the findings and the recommendations made. All these were derived from the findings of the research.

5.2Summary

The study established that males between the age groups 18-28years (27%) and 29-39years (33%) and aremostly married were the ones mainly engaged in farming, marketing and transportation of agricultural produce. They earn on the average an income of above

50,000 naira monthly (27%). It was found that motorcycles are the most commonly used means of road transport in the area. The trunk A road that passes through the Local Government area has the highest connectivity to the market as most respondents (87%) are able to access it.The distance covered by respondents from farm to market was found to be 3-5km (82%).

Maize was found to be the mostly purchased produce by buyers from Makarfi to other markets. It was discovered that buyers make use of lorries to move the purchased produce to other places andthat the volume and type of produce to be transported determined the means of transportation to be used. It was found that crops like sugar cane even when they are in small quantity, are not being conveyed by bicycle or head porterage. It was established that the most pressing challenge of transporting agricultural produce in the area was the poor condition of roads. This has resulted in the damage of farm produce during transportation. Agood number of respondents suggested that the state government should intervene to repair or construct new roads as a mitigation measure.

5.3 Conclusion

This study has revealed that distance of farms to market in Makarfi LGA is generally short and buses are the most available means of transporting farm produce to market. Also, cereal crops are the dominant crops cultivated in the area. The study therefore concludes that large volume of farm produce is transported from Makarfi market and as such implies that large volume of farm produce is cultivated in the area. The study found that accessibility in the area is poor especially to farms and as such cost of transportation is increased in the area. The study proved that the volume of agricultural produce conveyed by the different means of transportation is not the same. This means that the volume of agricultural produce conveyed by a lorry is higher than that conveyed by a

car which is also higher than that conveyed by a motorcycle. It is therefore concluded that road transport is the only means of transporting agricultural produce in Makarfi LGA and yet have a lot of faults that requires immediate attention of stakeholders.

5.4Recommendations

Based on the findings above, the following recommendations are made:

i. Local Government should construct more quality roads, and regularly maintain existing roads. Also, inaccessible areas should be connected to closer roads to facilitate the movement of agricultural produce more frequently. This will ameliorate the nature of the road and high transport cost complained by farmers.

ii. The National Union of Road Transport workers should enact a standard price for agricultural goods relative to the distance to regulate transport cost.

iii. Parking spaces should be provided by the state or local government authority for motor vehicles like trailers, canters, pickups, vans buses and taxis in order to reduce congestion within the market. This will surely assist by easing loading and off-loading of agricultural produces and also reduce congestion problems especially on market days.

iv. The roles of low enforcement agencies should be properly defined in order to prevent interference with the responsibilities of one another. Efforts should also be made to avoid extortions and unnecessary harassment of marketers.

v. Regarding the issue of revenue collection, the local government authority should educate drivers via workshops and mandated to comply with the traffic rules and regulations respectively.

Suggestion for further studies

i. Further studies should be carried out on the nature of roads in the area so as to find out the condition of the road and how to improve the present condition if it is bad.

ii. A study should be embarked upon in other neighboring LGA so as to come up with a comprehensive data on the subject matter in the state at large.

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APPENDIX I1

DEPARTMENT OF GEOGRAPHY

FACULTY OF SCIENCE

AHMADU BELLO UNIVERSITY, ZARIA

Dear respondent,

I am a post-graduate student of Geography Department in the above named University. I am currently undertaking a research on "an assessment of the movement of agricultural produce in Makarfi Local Government Area of Kaduna State, Nigeria" and I am seeking information on the movement of agricultural goods in Makarfi. I assure you that all the information here will be treated confidentially and would be used only for this purpose. Thank you for your cooperation.

SECTION A: SOCIO-ECONOMIC CHARACTERISTICS OF RESPONDENT

1. Sex: Male [ ] Female [ ]
2. Age (in years)
   18-28 [ ] 29-39 [ ] 40-50 [ ] 51-61 [ ] Above 61[ ]
3. Marital Status
   Single [ ] Married [ ] Divorced [ ] Widowed [ ]

4. Educational Qualification attained

   No Formal Education [ ] Quranic [ ] Primary [ ] Secondary [ ]Tertiary [ ]

5. Major means of livelihood

   Farming [ ] Trading [ ] Trading and Farming [ ] Driving [ ] Artisan [ ] Civil Service [ ]

6. Income per Month

   No Fixed Income [ ] Less than N10, 000 [ ] N11, 000-20,000 [ ] N21, 000-30,000 [ ]

   N31, 000-40,000 [ ]N41, 000-50,000 [ ] Above 50,000 [ ]

FARMERS

7. Mode of transport used to the farm

   Trekking [ ] Bicycle [ ] Donkey [ ] Motorcycle [ ]

   Others ……

8. After harvest where are produce taken to immediately to

   Kept in the farm [ ] House [ ] Market [ ] Warehouse [ ] Others……..

9. What type of road connect where produce are kept to the market

   Footpath [ ] Truck A [ ] Truck B [ ] Truck C [ ]

10. What is the nature of the road

    Tarred [ ] Not tarred [ ]

11. What is the condition of the road?

    Motorable [ ] Not Motorable [ ]

12. What mode of transport is used to move produce to the market?

    Bicycle [ ] Motorcycle [ ] Bus [ ] Lorry [ ] Taxi [ ] Donkey [ ]

    Head porterage [ ]

13. Amount paid to move 5000kg of produce to the market

    Less than #1,000 [ ] #1,000-#3,000 [ ] #3,000-#5,000 [ ] Above #5,000 [ ]

14. What is the distance from where your produce is kept to the market?

    Less than 500m [ ] 500m-1km [ ] 1-2km [ ] Above 2km [ ]

15. What is the major challenge in the movement of agricultural produce?

    Unavailability of modes of transport [ ] High cost of transportation [ ]

    Bad condition of road [ ] Poor road network [ ]

Others ……

16. What are the effects of these challenges on movement of agricultural produce

Effect	Agree	Disagree	Undecided
Limited market network			
Reduced sales			
Damage of agricultural produce			
Increased cost of agricultural produce			
Reduction in quantity of produce in the market			

MARKETERS/TRADERS

17. What type of trader are you?

    Wholesaler [ ] Retailer [ ] Roadside seller [ ] Others …….

18. How long have you been in this business?

    Less than 5 years [ ] 5-10 years [ ] 11-15 years [ ] Above 15 years [ ]

19. How often do you come to this market weekly?

    Once [ ] Twice [ ] Thrice [ ] Everyday [

    Others ……

20. Who do you buy agricultural produce from?

    Farmers [ ] Retailers [ ] Wholesalers [ ] Others …….

21. Mention type of agricultural produce purchased most …….

22. Where do you take the agricultural produce purchased to …….

23. How much does it cost you to transport the produce to your destination ……?

24. What are the challenges you face in the movement of agricultural produce

……

……

……

TRANSPORTERS/DRIVERS

25. Kind of means you have

    Canter [ ] Van [ ] Trailer [ ] Motor car [ ] Pick up [ ] Others ……

26. How long have you been driving?

    Less than 5years [ ] 6-10years [ ] 11-15years [ ] Above 15years [ ]

27. Do you have a valid driving license?

    Yes [ ] No [ ]

28. Information on the movement of agricultural produce

Type of goods	Volume of goods (tons)	Destination	Time spent to reach destination	Amount per trip

29. Challenges faced in the movement of agricultural produce

Challenge	Agree	Disagree	Undecided
Poor condition of roads			

Harassment from road unions			
Bad vehicle			
Undue interference by law enforcement agencies like Police, VIO, etc.			
Return trip load scarcity			
Fuel scarcity			
Poor fare charges			
Multiple taxes			
Others			

30. Suggest how these challenges could be solved

……

……

……

……