ANALYSIS OF EFFECTS OF RURAL ROAD INFRASTRUCTURE ON SOCIOECONOMIC DEVELOPMENT IN IMO STATE

(A CASE STUDY OF OKIGWE LOCAL GOVENMENT AREA)

BY

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THESIS

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CERTIFICATION

This is to certify that this Research Thesis **"Analysis of Effects of Rural Road Infrastructure on Socioeconomic Development in Imo State using Okigwe Local Government Area as a Case Study"** was carried out by **IROAKAZI MALACHY ONYEJIUWAKA (20194196208)**, in partial fulfillment for the award requirements of award of Degree of Master of Science (M.Sc.) in Project Management Technology, Federal University of Technology, Owerri.

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DEDICATION

This study is wholeheartedly dedicated to Almighty God, for guidance, protection, provision, and sustenance.

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ABSTRACT

This research investigated the effects of rural road infrastructure on socioeconomic development in Imo State using Okigwe Local Government Area as a Case Study with a view to determining the existence of rural road constructions in Okigwe, Imo state, evaluating the effect of rural road constructions on economic diversification and determining the effect of rural road constructions on employment, labour supply and productivity in the study area. Hypothesis was generated to ascertain whether constructing new roads have significant effect on labour, productivity and employment rate in Okigwe, Imo State or not. The study is both descriptive and cross-sectional design with a sample size of eighty (80) respondents comprising of farmers, brick layers and quarry workers who were selected through random sampling. The data used in this study were collected through a well-structured questionnaire and yearly record of activities from the respondents and cooperative societies. The result showcased that all the diversified economic parameters mentioned above were all grossly affected by construction of new roads. But labour supply and level of productivity with mean scores of 4.3 (>3.0) each were greatly affected by construction of new roads. The findings also showed that only NE (0.001) is significant while other parameters quantity produced (QP) (0.674), quantity supplied (QS) (0.504) and labour (LB) (0.195) are insignificant. The result also showed that quantity produced (QP) (0.43), LB (1.33) and number of employee (NE) (4.32) all have positive effect on constructing new roads while only quantity supplied (QS) (-0.69) have negative effect on constructing new roads. This implies that constructing new roads will boost the number of gainful employments in the study area. The study concluded that constructing new roads in the study area led to diversification, increased productivity and boosts the number of gainful employments. This study, therefore recommended that the government and other non-governmental agencies should as a matter of urgency assist the workers with constructing new access road to their various working sites.

Keywords: **Diversification, increased productivity, rural road construction, economic growth, and labour supply**

CHAPTER ONE

INTRODUCTION

1.1 Background Information

Road construction projects play an important role in rural economic development since the outputs of production from all economic activities in the rural environments are transported to the market via these constructed road projects (Starkey, 2018).Rural development is understood primarily in the economic sense as the process of assuring progressive improvement in economic security of people in rural areas. Rural areas are usually defined in terms of maximum population density, with figures varying from 150 to 500 inhabitants per square kilometer, depending on the structure of society (Starkey, 2018). The development of rural areas supports the growth of different sectors in the global economy while the development and modernization of rural economic processes have gained the attention of policy makers and the government at large. This is because majority of the population lives is concentrated within rural areas. Hence, the prospects of most developing countries depend largely on it (WHO, 2019). Ekpe (2018) defined rural development as the provision of physical infrastructure. The rural sector of Nigeria is, very vital in the socio-economic development equation of the nation. Given the contributions of the rural sector to the national economy, enhancing the development of the sector should be central to government and public administration. This is necessary as such would further enhance the ability of the sector for increased contribution to the overall national growth and development.

Rural roads provide basic inputs for all-round socio-economic development of the rural areas (Adewale, 2015). The provision and construction of roads and road links brings multiple socio-economic benefits to the rural areas and results in forming a strong backbone for the agro-based economy (Arnon, 2018). The importance of the rural roads has been emphasized in various plan documents. Moreover, the importance of providing rural roads can hardly be undermined in the context of our economic and social goals (Barnum & Sabot, 2015). The effect of providing rural roads accrue in various ways resulting in numerous economic and social benefits quickly, visible and quantifiable as well as indirect and non- quantifiable (Bennell, 2018).

Roads play an important role for overcoming the isolation of the villages (Brauvan, 2019). It provides a much-needed opportunity for the village population to come in contact with other groups of the society, which in turn inculcates in them a sense of being a part of national main stream in its prosperity and progress. The areas become easy to reach for administrative and welfare agencies particularly in tunes of natural calamities and for relief operations whenever needed. However, with the provision of all-weather road connection the traditional mode of rural transport is replaced by the motorized vehicles; the bus, scooter and truck, etc. The advent of rural roads, the mobility level of the persons is increased and the people are lured to make social visits and recreational journeys to more distant places (Brauvan, 2015). The construction of rural roads result in the speedy movement of men and material between producing centers and market-place. The surplus of the village produce can be conveniently transported at a cheaper Cost of transportation. It also ensures the farmer for the remunerative prices for their products and perishable Commodities like milk, vegetables, eggs, etc. The inhabitants also acquire motor cycle, scooter, tractor, etc.

The construction of rural road connections in its wake changes the life patterns also by bringing awareness of the modern means of living like cooking, dressing, recreation, etc. It infuses new ideas regarding the latest technological development in methods of farming; agro-industries, health care, etc (Fadyomi, 2018).It also results in better understanding of each and thus brings a change in attitudes. The construction of rural roads connections creates opportunity for exchange of ideas and brings qualitative change in the pattern of living (Fadyomi, 2018). The connection of the villages to the road network results in setting up more schools both at primary and middle level and increases the educational standard of the inhabitants of rural community. Not only the village students find it easier to go to their place of education, but good and efficient teaching staff is also attracted to these village schools and thus the literacy level is increased and educational standards are improved (Fadyomi, 2018).

Construction of rural roads to connect the villages with the highway and nearby towns provides facilities to establish more health centers and dispensaries where the staff can function more effectively and attend to more number of persons by increasing their area of operation (FAO, 2015). This better health standard increases the production and creates better appreciation of family planning programme. On the other hand, with good connection of roads, more efficient and qualified doctors are also lured to work in the rural areas (Ijere, 2019). The cultivators in the village will be able to produce more agricultural produce by way of generated incentives for marketing their produce at low transportation cost and importing the fertilizer, manures and seeds at cheaper rate due to; the reduced cost of transportation to the village. Thus, the productivity of agriculture which is a dominant sector of our economy is increased (FAO, 2015). All weather road connection also reduces the time of transporting the perishable products like milk,

vegetables, poultry products, etc. and ensures a remunerative price for such commodities throughout the year to the producer and a regular supply to the consumers. The availability of road links provides opportunity to the entrepreneurs for setting up industrial units particularly the agro-industries which are based on the locally available raw materials. It reduces the cost of transportation of raw materials from the outside and marketing of finished products. It reduces the cost of production and an entrepreneur can draw better return on the investment (Ijere, 2019). The production of finished products is increased and the same can be available at a comparatively cheaper rate to the consumer also. Good road connection also helps industries in getting other factors of production like labour, capital, etc. at a cheaper rate and in time. Besides increase in the industrial production, more development opportunity is provided to the local population as well as to the society.

Effects of rural roads construction is also felt in the public life as it helps the government in providing more effective public security by way of access to administrative law machineries and welfare organizations. Another major effect of rural roads manifests in providing employment (Ijere, 2019). The construction and maintenance of roads is itself employment oriented. It generates employment within its own sector i.e., road and road transport, it also opens new avenues within the rural area by setting up more' and new industrial units, and other infrastructural facilities like irrigation, electrification, other utility services. Another outcome of this effect is reflected in the check of migration of rural folk to towns and cities and thus relieving the population pressure in urban areas. The development of roads breaks the cultural barriers among the communities by bringing them together more frequently for interaction, understanding and exchange of ideas, Thus the cultural reservations are broken, and acculturation takes place.

Stone quarrying is one of the key economic activities in Okigwe, supplying the bulk of stone of varying aggregates to the construction industry within the district and beyond. Rural roads has been proved very efficient in strengthening the rural economy (Starkey, 2018).

Making of mud bricks is an essential economic activity in Okigwe. Mud bricks are made by mixing earth with water, placing the mixture into moulds and drying the bricks in the open air (Stommes and Brown, 2020). Straw or other fibres that are strong in tension are often added to the bricks to help reduce cracking. The most effective use of mud bricks in building healthy and environmentally responsible housing comes from understanding their merits and accepting their limitations. Although the use of earth construction is well established in energy efficient housing and is one of the oldest known building materials, much about its properties and potentials still remain undeveloped and poorly researched. However, with thick enough walls, mud brick can create load bearing structures to several floors high. The appearance of mud bricks reflects the material they are made from. They are thus earthy, with colours of clays and sands. In order to achieve the objective of this study, this study will therefore provide answers to these questions;

i. What are indicators of socio-economic development of rural communities under study?
ii. What are the contributions of rural road infrastructure on trade developments, agricultural productivity and increase in general rural employment opportunities?

iii. What are the effects of rural roads infrastructure on the development and living standards of the community and individuals in Okigwe local Government in Imo state?

1.2 Problem Statement

Road infrastructure development has long been championed as the cure for poverty, unemployment, and poor productivity in rural areas. The direct effect of poor road networks on rural economic development in Nigeria especially in Okigwe Local Government Area, Abia State has not been established. Numerous studies have been conducted by researchers attempting to measure the economic benefits of road network investments in many countries including Nigeria, but these studies were limited in scope and in the availability of relevant data, and did not touch on the direct economic effects of roads infrastructure in Okigwe L.G.A.

However, most economic activities have suffered serious setbacks within the rural areas due to poor execution of road construction projects. Furthermore, several road networks within the rural environment are so much in deplorable condition that it becomes extremely difficult for any form of successful economic activity to be carried out. . It is against this backdrop that this study tries to address the effect of the lack of investment in road infrastructure in the form of road networks on economic development and living standard of people in Okigwe L.G.A, Imo State.

1.3 Objectives of the Study

The main objective of this study is to investigate the effects of rural road infrastructure on socio-economic development in Okigwe LGA, Imo State using Okigwe L.G.A as a case study.

The specific objectives are to;

i. identify rural roads infrastructure under construction in Okigwe, Imo State.
ii. identify the indicators of socio-economic development of rural communities under study.
iii. assess the effects of rural road infrastructure on the development and living standards of the community and individuals in Okigwe, Imo State.

1.4 Research Questions

The study was guided by the following research questions;

1. What are the rural roads infrastructure under construction in Okigwe, Imo State?
2. What are the indicators of socio-economic development of rural communities under study?
3. What are the effect of rural road infrastructure on the development and living standards of the communities and individuals in Okigwe, Imo State?

1.5 Research hypotheses

From the research questions, the following hypotheses were generated.

H_0: Existing rural road infrastructures have no significant effect on development and living standards of the communities and individuals in Okigwe, Imo State.

H_1: Existing rural road infrastructures have significant effect on development and living standards of the communities and individuals in Okigwe, Imo State.

1.6 Justification of the study

The effects of road networks include easy mobility, location of industries, residential settlement, and the remuneration that comes from agricultural sales, such as food stands and bus service, as well as the location of education facilities such as secondary schools and colleges.

The study created awareness on the effect of functional rural road infrastructures on rural economic development and living standards in Okigwe, Imo. Thus, economic planners and decision makers can use the result for proper planning and management of projects.

This study will contribute to social change by demonstrating that construction of good road infrastructure will serve public interest by increasing the standard of living, reducing traveling time, and decreasing the amount spent on transportation.

This study will also contribute to the field of management by providing new insights into the management dimension of economic development planning and policy decisions regarding road transportation infrastructure investment in Nigeria.

The study will show the effect of good roads networks on transportation cost, driving time, and other factors contributing to a nation's economic development.

The findings of this study will serve as a source of useful information for future researchers on this very topic or related topics.

1.6 Scope of the study

This study is limited to Okigwe Local Government Area, in Imo state. The study was carried out in some selected communities (Ihube, Amor and Ezinachi) within

the local government where agricultural, quarrying and brick production activities takes place, the study considered Umuokara and Umuopara roads which connects the two villages in Ihube, Umuayo and Umuokele roads, and Agbobu road. However, this study is expected to last for 6 months starting from February 2021 to August 2021.

1.7 Limitation of the Study

This study was carried out at a time when there was high level of insurgency in the study area, also transportation cost was very high. Transportation to the remote communities almost on daily basis cost a lot of money and due to lack of money at some stage, the study was delayed to a very high extent.

Another major limitation of the study was difficulty to examine all the rural road construction projects in detail in a single study.

The weather as at the time of this study was fierce. The rise in dust particles due to the harmattan prevented me from accessing most of the quarry sites where dust is paramount.

CHAPTER TWO

LITERATURE REVIEW

2.1 CONCEPTUAL REVIEW

2.1.1 Perspective of Rural Transportation

Many governments and donor efforts to improve access to rural transport have focused on expanding road networks, giving little attention to sustainability, the development of transport means and services on the roads, or the needs and views of transport users, especially the rural poor as a result. Despite massive spending on road construction, the interventions have not met the transport needs of rural women and men for a wide variety of subsistence, social, and economic activities to maximize their livelihoods. Moreover, the market has not provided transport services to areas with low demand and to the poorest and least mobile segments of the community. Many rural people, especially women, walk long distances every day carrying heavy loads of water, firewood, grains, as well as agricultural produce and goods for marketing. (Starkey, 2018).

In recent years, however, recognition has been growing that without an integrated approach to transport infrastructure and services, investment in transport is unlikely to bring commensurate economic and social benefits. As a result, countries in Africa,

Asia, and Latin America are giving more attention to smaller roads, paths, and tracks and to the use of intermediate means of transport.

Several studies by Starkey 2018 have stressed the importance of local transport solutions, with complementary infrastructure and transport services. Governments in developing countries are being encouraged to create favorable policies and operating environments, enabling the private sector and non-governmental organizations (NGOs) to play important roles in new rural transport initiatives. From the global perspective the researcher will further compare the Rural American transportation and African situation before narrowing to Kenya.

2.1.1.1 Transportation Issues in Rural Areas

The issues facing rural transportation are many and complex in rural areas. Some can be classified as demand-oriented issues that concern the needs and expectations of the users of these systems; many others are supply-oriented issues that relate to the availability, performance, and capacity of transportation systems. Together these provide a picture of the adequacy of the system, and some indications of where payoffs from investments are likely to be the greatest (Twaddell & Emerine, 2018). Expectations of the nation's public transportation system are high, and certainly no less so in rural America. These are reflected in the Federal Highway Administration's (FHWA) own vision:

"The quality of life and economy in rural America depends on an efficient, effective, comprehensive, and coordinated multimodal transportation system that provides choices for the movement of people and goods and allows quick transfers between modes when and where they are needed". (http://www.fhwa.dot.gov/)

The need to maintain transportation linkages between rural and urban area is very important to the economy, public health and safety, and the social structure of rural America. (Stommes& Brown, 2020)

In practice, demands and expectations differ according to the social, economic, and geographic circumstances of the user. People with low incomes, the elderly, and those living with disabilities in rural communities need transport options that allow them to access job and educational opportunities, medical facilities, and normal day-to-day interaction with friends and family. Yet Federal statistics show that more than 1.6 million rural households do not have access to a car, and that households in the lowest 20 percentile income bracket spent 42 percent of income on transportation. Moreover, 38 percent of rural residents live in areas with no public transport (Stommes & Brown, 2020).

Research commissioned by the Transportation Research Board (Twaddell &Emerine, 2018), which involved focus groups, surveys and case studies, confirmed that accessibility to jobs, shops, services, education, and healthcare was the number one issue for rural communities. However, there were geographical differences depending on the proximity to or remoteness from large urban centers. Communities in exurban areas are primarily concerned with access to jobs in adjacent cities; tourist destination communities focus on welcoming visitors and opening up access to tourist attractions; communities engaged in agriculture, mining or forestry tend to be more interested in access to markets, and in attracting new economic activity to diversify their economies.

The same research also highlighted that in areas of growth, demands for improved access were tempered by some of the possible consequences, such as encroachment on agricultural land, scenic views and cultural or historic resources, as well as pollution, sprawl, changing community character and values, loss of sense of place,

and competition for traditional, small businesses from large chain stores being (Chester & Neelameghan, 2019).

As noted by Stommes &Brown (2020), "In the last 25 years, transportation in rural America has been transformed by deregulation, devolution of Federal responsibilities to state and local governments, and traffic growth created by the booming economy of the 1990s. All forms of rural transportation - highways, passenger service (transit, intercity bus, and passenger rail service), trucking, inland waterways, rail freight service and passenger air service - have been affected"

2.1.1.2 Rural Transport in Nigeria.

Transport Research Laboratory (2020) reported that roads in rural Africa, in particular gravel roads are vital to the socio-economic wellbeing of local communities. They provide access to schools, clinics, jobs, markets, neighboring communities, and a link to the higher order road network. Therefore, whilst these roads tend to carry relatively low levels of traffic, they play a very important role in the development of rural areas, and it is vital that they remain open to traffic throughout the year, including the wet season. One possible method of achieving this is to seal the gravel running surface with a thin bituminous surfacing.

Socio-economic development and subsequent economic growth on the African continent is hampered by several limiting factors, including the lack of adequate roads infrastructure. Investment in transport infrastructure in Africa plays a significant role in stimulating develop

Rural communities in Africa constitutes the larger percentage of the population whose information and developmental needs are not adequately met and consequently they have not been able to productively participate in the development process and enjoy the benefits thereof (Chester &Neelameghan, 2019). Equity and

justice require that any programme for socio- economic development, whether general or in a specific sector, should cover and benefit all sections of the society, irrespective of race, caste, color, religion, culture and other social, economic or political differences.

For long, history has shown that rural communities' in Africa have suffered from not enjoying any meaningful development largely because of policy implementation gap artificially created by the African governments and leaders. The consequence of these neglect resulted in rural communities Jacking access to basic needs such as water, food, education, health care, sanitation, information and security, leading to low life expectancy and high infant mortality (Chester & Neelameghan, 2019). These conditions considered harsh by the majority of the rural dwellers, which result to their massive migration into urban areas to look for greener pasture, and often in search of formal employment, as the only option for survival.

According to Hine, (2019), rural transport depends on appropriate infrastructure, where rural infrastructure consists mainly of rural roads, tracks, trails, and footpaths. These may vary in quality, depending on weather, season, construction, and maintenance. As rural households, and in particular African women, spend a large amount of time and effort on transport activities to fulfill their basic needs, they are very often severely hampered by the lack of an adequate rural roads network. As a result of this significant limitations of growth and development of rural communities in Africa have been experienced in the past and are also being experienced today.

Hine (2019) added that poverty is very often far worse in Africa rural areas than in urban centers, because of lack of integration with urban centers due to lack of adequate accessibility and mobility, and local roads and tracks are often impassable, thereby making it very difficult and in some cases nearly impossible for rural families to have access to the local rural economy. Because rural communities could potentially play a considerable role in the economic growth and development of a

country, and also for purposes of own socio-economic growth and development, it is important that investment in rural roads be supported to provide sustainable rural roads infrastructure network over the long term (Hine, 2019).

Patterns of transport demand and supply are often linked to population density and income levels in three broad categories. The first is low transport density in low-income areas, with few motorized vehicles or intermediate means of transport. A vicious circle of insufficient transport, users, and services impedes development. Such patterns are found in remote rural areas in Sub- Saharan Africa.

The second category has higher transport density in low-to medium-income areas and is associated with medium to high population density, irrigated agriculture, cash crops, efficient marketing systems, and nonagricultural employment. In such areas transport services have achieved a critical mass, making it easy to buy and maintain various means of transport. Such patterns are found in higher-income rural and peri urban Sub-Saharan and North Africa, much of rural South and Southeast Asia and some rural areas in Latin America (Riverson & Carapetis, 2018).

The third category has low to medium transport density in high-income rural areas. Transport infrastructure is mostly good, and people use motorized transport regularly to go to work, clinics and hospitals, and markets; to visit friends and relatives; and to participate in social events and religious functions. Such patterns are found in peri-urban areas around the world and in rural areas in the better-off countries of the Americas, Asia, Australasia, and Europe (Riverson & Carapetis, 2018).

Rural transpiration in America and that of African has a major difference as shown from the above literature review. In America which gives the picture of developed countries transportation is classified in terms of demand-orientation and supply-oriented. While in Africa, patterns of transport demand and supply are often linked to population density and income.

2.1.2 Elements of rural transport

In general, rural transport can be described in three integral elements. These are Rural Transport services (RTS) and Intermediate Means of Transport (IMT), Location and Quality of facilities, Rural Transport Infrastructure.

2.1.2.1 Rural Transport Services (RTS) and Intermediate Means of Transport (IMT)

Donnges, et al, 2018 said that the availability and affordability of rural transport services and intermediate means of transport are very crucial; to rural development. The single pick-up truck that arrives once a week with essential supplies for health center and school, as well as agricultural inputs can be of immeasurable importance to a local community.

Successful approaches to improving transport services must deal with issues related to low population density and transport demand in rural areas. They should be cost effective and use flexible technology. Few poor rural dwellers own IMT such as bicycles and animal drawn carts, let alone motorized means of transport (Donnges, et al., 2018). Most of the rural population walk and carry their loads. While the slightly better-off make use of IMT and RTS for the transportation of their products and themselves. For distances up to five Kilometers and even as far as to 20 Kilometers in some circumstances, walking is by far the most common mode of transportation in rural areas of developing countries. Where RTS are provided they usually consist of (a) privately provided transport services often pick-ups of both

passengers and freight and (b) for hire non-motorized services such as bicycles, rickshaws, donkey carts, and so forth (Donnges, et al., 2018).

Transport services between villages, market hubs and district centers in many developing countries are provided by 'rural taxis' (minibuses, 4x4s, pickups) and intermediate means of transport (motorcycles, bicycles, animals). Motorcycles are increasingly important. They are now the most numerous vehicles on some rural spokes in Colombia. Indonesia, Nepal and Timor- Leste. Motorcycles can operate on poor roads. Passing roadblocks caused by mud, water, or landslides. Rural motorcycle taxis carry men, women and children, and their goods, to link poorly served villages to conventional transport services on main roads (Starkey, 2018). Motorcycle taxis in rural communities' benefit women, children and disadvantaged people through emergency and routine transport to health care and other services. Motorcycle taxi passenger fares and freight tariffs are significantly higher per kilometer than rural taxis (Starkey, 2018). Their comparative advantage is their availability and flexibility as they transport passengers immediately to their destinations.

Starkey (2018) conclude that the profitability of motorcycle services led to similar private financing systems in Cameroon, Colombia, Rwanda and Tanzania. These systems allow all to benefit - the owners (often urban-based traders and civil servants), the operators (who rent the motorcycles), the passengers and the support services. This creates a critical mass and builds the momentum for rapid adoption of motorcycles and supporting services. The funding system allows private urban capital to fund rural transport improvements.

Starkey (2018) further noted that motorized three-wheelers also benefit rural communities, although most provide urban and peri-urban transport. They have greater load-carrying capacity than motorcycles and are safer (particularly when transporting more than one passenger). They are not, however, as maneuverable as

motorcycles for crossing rivers or skirting landslides. In some countries, including Colombia and Cambodia, motorcycles with trailers (four wheels in total) provide transport services but these are rare compared to motorcycle and three- wheeler services.

As noted from the above literature, the RTS and IMT in Kenya and specifically South Asia are quite similar. The rural dwellers who can afford use motorcycles, bicycles and taxis to commute from one point to another. While the others walk to the market and other places to access their basic needs since the cost of transport is high.

2.1.2.2 Location and Quality of Facilities

The distance from households to facilities such as wells, forests, grinding mills, schools, and health centers determine the amount of time rural dwellers spend on transport activities. Numerous studies on rural transport have shown that rural households and particularly women spend a substantial amount of time and effort on transport activities (Barwell, 2019). The bulks of these efforts are required for domestic subsistence activities, especially collection of water and fire wood. and trips to grinding mills. In view of planners, this time is unproductive and wasted, and drains on potentially productive labor-the principle economic resource for most rural households (Geoff, 2018). Therefore, improved quality and better locations of facilities are important to consider when examining alternative access improvements.

Since the majority of time rural households spend on transport for domestic activities, the most effective transport-reducing interventions are usually related to better provision of water (such as well construction) and energy-supply facilities and the provision of grinding mills near households. Most countries have policies of providing primary social services (for example primary schools and dispensaries) at

the village level, while secondary level units are provided at more central places. For social services, improving quality is often a more serious concern than improving location (World Bank, 2018).

The researcher agrees with what World Bank, (2018) concluded. The issue in Imo State is more on improving both quality and the location of the facilities. This is because the basic facilities such as clinics do not have all the facilities and the rural dwellers must travel close to 15 to 30 km to access better medical facilities such as Chogoria Hospital in Chogoria (Kenya), St. Ann Nursing home in lgoji, St. Consolata Hospital at Nkubu (Kenya) among others.

2.1.2.3 Rural Transport Infrastructure

Rural transport infrastructure (RTI) is the rural road. Track and path network on which the rural population performs its transport activities, which includes walking, transport by non-motorized and motorized vehicles, haulage and transport of people and animals. RTI includes the intra- and near- village transport network, as well as the infrastructure that provides access to higher levels of the road network (Donnges, Edmonds, Johannessen, 2018).

In many developing countries, rural transport infrastructure-the local roads, tracks, footpaths, and bridges used to access farms, markets, water supplies, schools, and clinics-is often in poor condition for some or all of the year. Transport services, both large-scale motorized means such as trucks. Buses, pickups, and cars, and intermediate means such as handcarts, bicycles, motorcycles, and animal-drawn carts, are often inadequate and too expensive for rural inhabitants (Connerley & Schroeder, 2019). In many areas village transport primarily means people walking and carrying. While cost constrains the use of transport services, a lack of concentrated demand constrains the development of cheaper, more efficient services. Improving rural mobility to reduce poverty thus requires a combination of

appropriate transport infrastructure and better transport services using affordable means of transport (Connerley & Schroeder, 2019).

According to Barwell, (2019), efficient rural transport systems involve complementary large- and small-scale transport modes. Intermediate means of transport are important for on-farm, within -village and village-to market transport, and short trips within cities and peri-urban areas. Larger motorized vehicles are needed on routes with high demand, such as rural-urban links. Trucks and buses depend on local feeder transport for consolidation and dispersal of passengers and goods, notably transport hubs (markets, village terminals, and truck parks).

According to World Bank technical paper No. 496, 2019 there is a growing body of evidence that rural transport infrastructure (RTI) is an essential, but not sufficient ingredient of rural development and sustained poverty reduction. Additional building blocks for rural development include complementary public and private investment, such as water and energy supply, productive activities and social and economic services.

The majority of rural transport infrastructure in developing countries carries traffic of less than 50 motorized four-wheeled vehicles per day (VPD) and often a substantial number of Intermediate Means of Transport (IMT), such as bicycles and animals drawn carts. The appropriate standard for these are single- lane, spot improved earth or gravel roads provided with low cost drainage structures such as drifts and single lane bridges. The spot improvement approach is the key to the least cost-design (World Bank, 2018).

Establishing the priorities of rural transport infrastructure interventions requires a selection process of all combination of screening and ranking procedures. Screening is carried out, for example through targeting of disadvantaged communities based on poverty indexes or elimination of low priority links from the list according to agreed criteria. The balance is then ranked according to priority (World Bank, 2018).

RTI is the local access infrastructure that is normally owned by local governments and communities. Local government roads usually have formally defined ownership arrangement. Community RTI is usually undesignated or not part of the formally recognized transport network (Donnges, et al., 2018).

In the absence of a respective legal framework, community RTI belongs to communities, who take responsibility for their maintenance; however, the capacity of the community to own and take care of RTI is limited usually to the intra- and near-village network and to short links to the main road networks (Donnges. et al., 2018).

International Road Federation (2018) noted that investment on infrastructure development can stimulate growth by injecting needed cash into local economy and creating employment. Infrastructure investment in Kenya is being increasingly used to address social imbalances and create opportunities for historically disadvantaged community groups and as an interim employment-based social protection mechanism. This is through Employment Intensive Technology (EIT), which involves reorientation of public sector expenditure towards infrastructure such as road. The other maintenance programme that Kenya has employed is Roads 2000 maintenance concept. Roads 2000 maintenance programme represents the country's principal implementation strategy for road maintenance. This concept has since been adopted in vision 2030 national development policy and acknowledged as a vehicle for employment creation and poverty reduction, particularly in relation to road infrastructure delivery (International Road Federation (IRF), 2018).

2.1.3 Effects of Rural Road Construction Project On Social Economic Development Of Rural Dwellers

Investment in transport sector affects agriculture basic service provision, trade and development and accessing of employment opportunities.

2.1.3.1 Rural Transport and Sustainable Agriculture

Even though the Millennium Development Goals (MDGs) failed to explicitly refer to transport, a wealth of evidence underlines transport's potential as a key catalyst in the delivery of MDGs. (Czuczman, 2018). Unfortunately, as bilateral donors have shifted their priorities in line with the MDGs, investment in transport has decreased and with it the potential for human and economic development achievements that transport can bring. Evidence suggests that lack of investment has led to large road focused projects being favored over broader initiatives more likely to benefit the poor. (Czuczman, 2018).

Nigeria like other Sub-Saharan Countries depends heavily on agricultural sector therefore the growth and development of the sector is crucial for faster socio-economic development. The sector contributes 26% the GDP and further 27% through linkage with other sectors. About 80% of the population live in the rural areas and depend mainly on agriculture and natural resources for their livelihood. Furthermore 87% of all poor households live in rural areas where their main activities are anchored in agriculture, environment and natural resources. It is widely recognized that sustainable agricultural development is an engine to economic growth and in Low Income Countries (including almost all countries in Sub Saharan Africa) agriculture accounts for an average of32 percent of growth in Gross Domestic Product. (World Bank, FAO, /FAD. 2018)

Transport plays a critical role in achieving sustainable agricultural development, however, the need to foster appropriate and sustainable transport solutions and address issues of accessibility and mobility to reach this goal, is frequently overlooked. Lack of physical access to markets, agricultural inputs and affordable modes of transport can dramatically inhibit the agricultural productivity of small scale and isolated farmers. This leads to poverty, insecure livelihoods and limitations to the cumulative effects of socio-economic development and economic growth, through sub-regional, regional, national and international trade.

Communities are often endowed with highly productive crops; yet high transport costs and exploitation by middlemen in a poorly structured and commercialized sector limit income generation and exacerbate poverty. Appropriate rural transport interventions can greatly improve the agricultural productivity of individuals, families and communities, resulting in poverty reduction, improved livelihood security and human development. In this way rural transport interventions can make a vital contribution to sustainable and equitable socioeconomic development. (World Bank, 2018).

The specific transport needs of vulnerable groups must be taken into account if rural transport interventions are to support sustainable agricultural development and economic growth. In Low Income Countries women make up a substantial majority of the agricultural work force, produce most of the food that is consumed locally and are the principal agents in food security and household welfare in rural areas. (World Bank, 2018).

As seen from the above literature if rural roads are well developed, and then there would be sustainable agriculture. Farming inputs would be able to reach the rural dwellers with ease and at reasonable cost. On the other hand, the farmers would be able to market their products more than when rural roads are poorly maintained. The researcher will investigate the effects of rural roads on agricultural production in Imo state.

2.1.3.2 Effects of Rural Road Construction Projects on Basic Service Provisions

ADB. (2020) noted that a well-functioning transportation system will increase safety and convenience reduce environmental effects and improve access to public and private services (education. health, entertainment, retail. government). It can also contribute to healthy lifestyles by encouraging walking, biking, and other outdoor activities.

Access to basic facilities can often be made easier by improving paths or water crossings which already exist, where these are close to the rural population. Intermediate means of transport (IMT) such as bicycles and carts, which can be used on rural paths, are often a useful means to eliminate the length of travelling time for all basic needs. However, Dawson and Barwell (2013) have highlighted the limited availability of IMTs (especially to women) and their technical unit ability for collection of water from many natural sources. Using IMTs can reduce the burden of firewood collection, but there is a significant risk that this will exacerbate deforestation by encouraging increased consumption.

Rural road transport depends on appropriate infrastructure, where rural infrastructure consists mainly of rural roads, tracks, trails and footpaths. These may vary in quality, depending on weather, season, construction and maintenance. As rural households, and in particular women spend a large amount of time and effort on transport activities to fulfill their basic needs, they are very often severely hampered by the lack of an adequate rural roads network. As a result of this significant limitations of growth and development of rural communities have been experienced in the past and are also being experienced today. Poverty is very often far worse in rural areas than in urban centers, as a result of lack of integration with urban centers due to lack of adequate accessibility and mobility, and local roads and tracks are often impassable, thereby proving it very difficult and in some cases nearly impossible for rural families to have access to the local rural economy (World Bank, 2018).

Basic service provision for poor rural people is not only a fundamental human right but is essential to achieving equitable and sustainable socio-economic development and economic growth. The benefits of improved access to water, health, education and sanitation services are multifaceted and cumulative. Improved access to these services not only results directly in human development and improved quality of lives, but also enhances productivity that in turn serves to further facilitate human

development. For example, increased income generating opportunities brought about by improved education: increased opportunities to engage in productive activities brought about by a reduction in female time wastage and increased productivity as a result of improved health. Research points to findings in a number of facets of quality of life as outlined below.

Attendance levels at schools are affected by the lack of access to schools - both for pupils and teachers. Teachers are not attracted because of the remoteness and associated difficulties of many poor areas. A study of Zambia (Hine, et al., 2018) found "examples.... where the construction of a road bridge enabled school children to get to school all through the year where previously this was not the case. The difficulty of collecting water and wood also affected girls disproportionately, as women bear most of the responsibility for these activities in many societies studied. Collecting basic needs can take up to 25% of every day, and this will often take priority over girls' education.

Rural residents travel greater distances to access medical care. Spatial inequalities in rural health care are in part a function of transportation challenges and limited options for rural residents. The availability of public transport is critical for the elderly, people with disabilities and those on low incomes (Starkey, 2008). Lack of options for travel on foot or bike in dispersed settlements contributes to obesity in rural youth; conversely more transport options may reduce health care costs.

A study in Kenya (Airey & Cundill, 2018) showed that health provision was an overriding concern for groups of all income levels. The study area was a 50km road linking two regional centers, one of which had a good hospital. Analysis of the purpose of people's use of the road showed a robust correlation between income and journey frequency, except in the case of health. The pattern seemed to be that once lower-income groups began to use the hospital, they did not use it any less (during the economic downturn which occurred during the second part of the study). Instead,

they devoted larger proportions of their income to it. Better roads also increase the ease of use of mobile health centers. Many rural populations are extremely scattered. And if one health center was provided for a district it would still be many miles from many villages. Mobile health centers can get around this problem.

World Bank, (2019) noted that distances to health services are limited, inappropriate and expensive. Transport services should compromise factors that are conducive to good maternal and child health care. And long slow journeys act as a deterrent to healthcare seeking behavior by enforcing breaks in subsistence activities and loss of wages. The specific transport needs of vulnerable groups must be taken into account if rural transport interventions are to effectively improve accessibility to basic services. Prioritizing Gender appropriate interventions aimed at improving physical access to services such as water, education and health services can directly achieve human development benefits, but also have the important effect of reducing the time poverty of women and girls, and in so doing, allow them to extend their engagement in productive activities and spend more time using services.

In addition, Gender considerations in the planning and implementation of transport interventions must consider the fact that the nature of rural transport infrastructure, and modes of transport and transport services available, can also significantly determine women's physical accessibility to basic services. For example, use of certain public transport services, can render women and girls susceptible to sexual harassment and abuse, leading to avoidance of these methods of transportation and the benefits they can bring. (World Bank, 2019).

Experience from many countries has shown that girl's school enrollment is dependent on the transport and infrastructure available. A survey of a rural roads improvement program in four areas in Morocco found that women and girls especially benefit from providing all-weather road access. Not only did the better roads make delivery of butane more affordable and reduce the need for women to

collect firewood, freeing up as much as two hours daily, but the new roads brought about an increase in the number of girls enrolled in primary school. The new roads made travel to school safer and encouraged parents to send their daughters to school. Primary school education enrolments in the study areas reached 68 percent, compared to 28 percent prior to the improvements, and the enrolment of girls ' more than doubled (World Bank, 2019).

Accessibility is a function of transportation infrastructure, land use, individual needs, preferences, and time. Rural public transit is important to the young, elderly, low income and disabled with few alternatives. Communications technology can provide an alternative means of achieving accessibility through telemedicine and distance learning. Improved transportation increases accessibility for rural residents to urban employment and amenities, while at the same time making rural areas attractive to urbanites. This in turn increases population and traffic with the possibility that an areas basic attractiveness is undermined. (Stommes & Brown, 2020).

Driving in rural areas is more dangerous than elsewhere - a function of speed, lower seat belt use, older cars, heavier vehicles, poor road design and conditions. Improvements to design and enforcement and the creation of travel options can have a big effect on rural quality of life

(Donnges et al., 2018).

Costs of transportation are higher for rural residents, a function of longer distances traveled to work and other activities, and the use of less fuel-efficient vehicles. A lack of options means that higher fuel costs adversely effect family budgets. The poorer the family and county. The higher the proportion of income spent on transportation (Starkey, 2018). Rural poor will disproportionately bear the costs of carbon taxes, fuel standards and other measures to reduce greenhouse emissions.

2.1.3.3 Effects of Rural Road Construction Projects On Trade Development

The main effect of rural construction projects is to bring the market to rural populations. However, by making goods more easily available it may cut down on the comparative advantage achieved if villagers trade solely amongst one another. It should be borne in mind that greater involvement in the cash economy is not necessarily uniformly beneficial to rural livelihoods (Ellis, 2018).

At one-time development plans assumed that the only activity of the rural poor was agriculture, and development was therefore to consist solely of trying to improve agricultural performance, including access to local markets by motorized transport. These plans failed to appreciate the diversity of economic activities of the rural poor. The majority supplement their agricultural income with such activities as basket making, cash crops, piece-work, fish-trading and other activities. All these benefit from easier access to local towns and cities. The Ellis (2018) study of Kenya showed that families living closer to the main road made more use of the road and were better off on average than those who did not live near the road.

Provision of regular motorized transport enables quicker transport of more goods to urban markets, with marginal savings on transport costs. Airey & Cundill, 2018) showed that the road improvement led to greater competition and falling fares on privately- provided bus/goods transport services. In the Zambia study (Hine et al, 2019), passenger travel was negligible due to the extreme remoteness of the region and the poor road system. Of more concern was the ability of a regular goods transport service to take large quantities of goods to be sold in towns.

Efficient rural transport systems involve complementary large- and small-scale transport modes. Intermediate means of transport are important for on-farm. Within village and village-to market transport and short trips within cities and peri-urban areas. Larger motorized vehicles are needed on routes with high demand such as rural-urban links. Trucks and buses depend on local feeder transport for consolidation and dispersal of passengers and goods, notably transport hubs

(markets, village terminals, and truck parks). This way trade is enhanced and sustained as small and large entrepreneurs move from the villages to the markets with improved rural transport.

2.1.3.4 Effect of Rural Road Construction Projects on Employment Opportunities

The development of intermediate means of transport services is viewed as a bolster to the growth of the private sector, which consists of manufacturers of transport equipment (carts, spares for bicycles among others). It's therefore considered that affordable transport technology would foster a multiplier effect in both the urban and rural economies and thus alleviate poverty through on-farm and off-farm employment creation. Farmers would be able to carry more loads of farm products to wider markets using carts, rickshaws or bicycles than if they were to carry on their heads. Using standards for motorized roads, intermediate means of transport paths are usually narrower and do not require heavy machinery with associated costs to build, but merely labour based methods which could equally employ local labour in the process (World Bank, 2018).

Youth employment is of critical concern to almost every country in the world. While the developed world has some strategies to cushion youth against unemployment, the developing and under developed world are struggling with the effect of youth unemployment. The worst hit is the Sub-Saharan Africa where youth unemployment rate is far beyond economic growth. Currently it stands at 21% according to ILO estimate. With no proper long-term regional strategy to address the situation, it is expected to escalate. In order to cut down the employment problem, the government has to strategize by all means to link people from the rural and urban thus making the rural dwellers have more employment opportunities. This can be done by improvement of rural transport.

According to TRL (2018), it is now widely recognized that there exists an economic, social and environmental interdependence between urban and rural areas and a need for balanced and mutually supportive approach to development of the two areas. The discrete consideration of rural development as completely distinct from urban development is no longer valid. A new perspective, referred to as the rural-urban linkage development approach, is increasingly becoming the accepted approach. Rural-urban linkage generally refers to the growing flow of public and private capital, people (migration and commuting) and goods (trade) between urban and rural areas. It is important to add to these the flow of ideas. The flow of information and the flow of diffusion of innovation.

Adequate infrastructure such as transportation, communication, energy and basic services is the backbone of the urban-rural development linkage approach. There is a positive relationship between adequacy of transportation infrastructure, ease of mobility and access to employment and enhancement of income. Adequate investments in infrastructure. Particularly transportation infrastructure, also improve rural productivity and allow access to markets, jobs and public service by both men and women (Bamberger& Davis, 2018).

Urban access tends also to lead to more opportunities for paid work, greater diversity of purchases of consumer goods (necessities as well as luxuries) and thus more involvement in the cash economy. This will inevitably have a cultural as well as an economic effect on rural villages, perhaps raising economic expectations. Increased involvement in the cash economy may also improve access to credit which is a useful tool for encouraging small enterprise (Howe & Davis, 2020).

2.1.4 Structural Conditions Not Affected by Rural Road Construction Projects

The prevailing social structure and concentration of productive assets had an enormous bearing on determining how effects occurred in each of the study locations (Arnon, 2018). The concentration and distribution of land were particularly important, and largely outside the area of influence of any road project. However, poor family situation in Sorsogon, Philippines that experienced no difference in income after the road project, because they had nothing to sell. Therefore, recognizing how assets are distributed is important in under-standing how benefits will accrue, and for planning, mitigation, and complementary measures to enable those who lack assets to also benefit from any planned investment (Arnon, 2018).

Traders effectively controlled market exchange in paddy and rubber with relationships of debt. It was increasingly difficult to escape from these relation-ships as indebtedness rose. In Negros, Philippines, the concentration of land ownership was particularly heavy in the haciendas (estates), where the majority of project site inhabitants lived. Most villagers had no land at all, and the residents were required to work in the hacienda when seasonal labor was needed (Arnon, 2018). The situation in Imo was slightly different, because land ownership was less concentrated, but landholdings were small, and the poor in particular were required to work in the tea plantations throughout the year, limiting their opportunities for exploring more lucrative livelihood alternatives. Many were therefore locked into these long-term working relationships that resulted from the prevailing norms in social relations, economic exchange, and ownership of productive assets. In these overwhelmingly rural, agricultural project settings, land ownership is clearly a key parameter in determining if, and how, people can take advantage of opportunities that a road may bring (Barnum & Sabot, 2015).

2.1.5 Conditions That Can Be Affected by Rural Road Construction Projects

The improvement of rural roads is broadly recognized as a fundamental precondition for the development of rural areas, and remoteness and lack of mobility are widely identified by the poor them-selves as factors in heightening vulnerability and perpetuating their poverty. Investment in transport can create economic opportunities for the poor directly through employment in infrastructure construction and maintenance, and the provision of rural transport services, and indirectly through improving the conditions and opportunities for marketing goods and services (Barnum & Sabot, 2015).

Although it may not be reflected in an income sense, this effect reduces the vulnerability of the poor and can be reflected as a means of multidimensional poverty reduction. Beyond this, basic transport needs may be different for different socioeconomic groups. The poor lack time and energy. Effects that either reduce or exacerbate this time and energy deficiency have a critical bearing on poverty. Better-off groups that have time, energy, and capital may have better opportunities to expand their livelihood activities and welfare (Brauvan, 2019).

2.1.6 Governance Issues Surrounding Rural Roads Construction Projects

2.1.6.1 Roads as Political Capital

Roads played a critical role as political capital in all of the study locations. Decisions about where roads should be built, which roads should be up-graded, and which roads should be maintained were heavily influenced by the prevailing political context. This was not a recent phenomenon, as the example of the Negros study location shows (Brauvan, 2019). Negros has always been a key sugar-producing area of the Philippines, and many of the decisions regarding its development have been made with sugar production, the plantation owners' interests, and the interests of the industry in mind. In some rural areas, the villagers lobbied authorities and politicians

for the inclusion of their roads in rehabilitation schemes. The ability to do this successfully appeared to depend heavily on the level of political influence communities could exert (Brauvan, 2019). As a result, decisions about road rehabilitation, maintenance, and the prioritization of work were often far from transparent. Poorer areas are likely to suffer under this regime, as they are least likely to have the connections and authority to lobby effectively for better roads.

2.1.6.2 Neglect of Maintenance

Regular maintenance of rural roads is a critical pre-condition for sustaining the positive effects that roads bring to rural communities (Adewale, 2015). Minor maintenance is often neglected because of lack of funds, but it is also neglected because there is little political capital or mileage in maintaining roads regularly, as the results of minor maintenance is not highly visible. Instead, politicians prefer to authorize major rehabilitation or reconstruction to take place after the road has deteriorated very much. The promise of improved roads from politicians is often sufficient to ensure their election, and, if works do take place, politicians are quick to claim credit (Adewale, 2015).

Rural roads that lacked proper maintenance are often exposed to erosion. The disintegration of basement structural formation of these roads has resulted to unsatisfactory reports over the state of the roads built in our society today especially within our country Nigeria (Gregory, Ihuoma & Odike, 2021). The Effect of Erosion on road construction project could span from economic implications of road construction to damages on constructed roads that can cause damages to motorist, with its associated dangers of accident increasing the level of mortality and morbidity in the affected areas (Gregory et al., 2021).

The global urbanization trend, effects heavily on road, parking areas and structures through several anthropogenic sources that consequently reduces soil compatibility and exposes the soil to erosion of the mostly damaging gully type (Gregory et al., 2021).

This practice prevailed in all the study countries to a greater or lesser extent. And in this context, establishing regular and transparent maintenance regimes and criteria for rehabilitation is very difficult. Roads consequently get reconstructed, are left to deteriorate, and then are re-constructed again in 10-or-so-year cycles, so that villagers experience peaks and troughs of accessibility, rather than having a constant and guaranteed level of access.

Institutional Responsibility for Roads Problems of maintenance, which stem from scarcity of funds, are exacerbated when the institutional responsibility for rural roads is not clear or where the budget source for maintenance has not been properly established. Often, there appeared to be a lack of clarity (in practice, if not in theory) concerning who was responsible for maintaining the project roads and where the funds would come from (Adewale, 2015). This was particularly the case with the integrated projects, which rehabilitated gravel roads. The asphalt roads rehabilitated under transport sector projects were usually the responsibility of the public works department or department of roads/highways. With the integrated projects, roads were often only a subcomponent of the works, and the executing agency for the project was the agriculture or irrigation department, with no direct funding line for road maintenance. Also, problems of unclear institutional responsibility are compounded when there are frequent shifts in personnel at responsible implementing agencies due to the high level of politicization of the bureaucracy. Institutional continuity and ownership of the roads suffer as a consequence, and roads fall into disrepair major rehabilitation or reconstruction to take place after the road has

deteriorated very much. The promise of improved roads from politicians is often sufficient to ensure their election, and, if works do take place, politicians are quick to claim credit. This practice prevailed in all of the study countries to a greater or lesser extent. And in this context, establishing regular and transparent maintenance regimes and criteria for rehabilitation is very difficult (Adewale, 2015). Roads consequently get reconstructed, are left to deteriorate, and then are re-constructed again in 10-or-so-year cycles, so that villagers experience peaks and troughs of accessibility, rather than having a constant and guaranteed level of access.

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2.1.7 Some Rural Economic Indicators Associated with the Study Areas

2.1.7.1 Rock Quarrying

According to Veric & Duckere 2019, in the simplest term, a rock quarry is a place where little size rocks are made from big rocks. Although, the basic process is the same, each quarry is different. Explosives are detonated to provide energy for the most efficient blasting. The blast that occur when the explosives are set off, free the stone from the quarry wall. The free stone from the quarry wall are loaded by large hand trucks. To move the rocks, they are crushed and divided into different sizes. The various effects produced by these operations are both size and location dependent. Manifestations of specific effects are in the air, water and soil.

2.1.7.2 Effect on habitat and biota

According to Vermenlen & Whitten (2019), the bio- diversity of an ecosystem is highly restive. Some species are restricted to a single cave system and are little known. The works further state that as the rock is removed by quarrying, any cave passage is destroyed along with any sediment, it may have contained. The works go further to state that habitat provided by the caves and passage will cease to exist. An animal that inhabits the twilight or transition zone, and is mobile and able to find new homes, might survive, the rest will die.

The works of Howard & Cameroun (2018) reveal that dust, if uncontrolled may spread over the surrounding during storms and create harmful conditions for the Flora and fauna. When dust smothers leave surfaces, vegetation can be damaged through the blocking of leaf stomata, thus, inhibiting gas exchange and reducing photosynthesis.

2.1.7.3 Effect on damage to vegetation

Aigbedion (2018) and Adekoya (2020) noted that recent environmental effect studies of quarry mining in Sagamu showed a decline in kola nut output from the plantations within a few kilometers' radius of the quarry sites. The research reveals

that this phenomenon is most probably associated with the high amount of dust discharged into the air mainly from the quarry sites. The particulate matter eventually gets deposited on the kola nuts leaves and flowers as well as the soil supporting the plants.

2.1.7.4 Degradation of natural landscape

Nwaugo et al. (2018) stated that a common negative effect of quarry mining from earth's surface is the destruction of its natural landscape, creating open space in the ground and generating heaps of rock waste phenomena are amply demonstrated in several parts of Nigeria, where commercial quarrying had occurred in the past or is currently taking place. The research further states that the natural land-scape in these areas is now replaced by a kind of land or hummock topography punctuated by irregular holes.

2.1.7.5 Effect of Rural Road Construction on Water

According to Assad and Jordan (2018), states that quarrying substantially modifies the routing of recharge and water quality degraded. This work went to say that the first effect of quarrying is to remove the overlaying vegetation and soil. The work continued by stating that measures must be taken to control runoff, sedimentation and deterioration of ground- water. According to Drydale et al. (2018), and Gunn and Hobbs (1990), these works states that quarrying causes sinkhole collapse. According to the works of Nwabo & Taiwo (2018), they investigated the environmental and health effect of Granite mining exploration and exploitation in northeastern Nigeria. The work stated that during blasting and crushing, a large amount of very fine dust particles are released and dispersed by wind over areas. The study gave an example of Auchi-Igara road which revealed a high concentration

of dust in the air and surrounding vegetation. According to Adiuku-Brown (2019), who investigated the environmental effect of quarrying activities in Jos and discovered that quarrying contributed significantly to global warming of the atmosphere, which have caused a serious environmental effect. According to Onyinloye & Ajayi (2018), they carried out a study on the environmental effect assessment of quarry activities in Oba-Ile, Ondo state. The study discovered that pollutions affect the health of the people living close to the site thereby making life difficult to the residence. It was discovered that the majority of the people within the jurisdiction of less than 1 km to 3 km to Oba-Ile are vulnerable to different types of pollution such as noise, air(dust), water and land pollution. The report indicated that the negative effect arising from quarrying activities affect the residence as they suffer directly the consequences of pollution. Nwaugoet al. (2018), carried out research on the comparative assessment of Domestic water supply sources in Ishiagu, a heavy metal mining community in Ebonyi State. The work reveals that heavy mining including quarrying has led to the presence of heavy metals in Ishiagu community. This has affected water quality in the area (Nwaugo et al. 2018). Obiekezie & Nwaugo (2019) investigate the prevalence of respiratory diseases in Ishiagu community of Ebonyi State Nigeria and discovered it was caused by inhaling of suspended particulate substances.

According to Azad and Ashish (2018), He carried out a study on the effect of quarrying on Biodiversity which destroys it. According to Gunn and Hobbs (1990), they carried research on the hydrological effect, consequences and implications of stone quarrying activities. They found out that stone quarrying increased runoff, reduced water quality, re-routing of recharge water through the aquifer and localized reduction in groundwater storage. According to Hetzer (2019), he carried investigation on the effect of quarrying on water volume shrink- age; the work stated

that there was a continuous flow of soil down the drain (raveling) and instead of an abrupt collapse, the sinkhole formed a continuous subsidence.

2.1.7.6 Effect of Rural Road Construction on Soil

According to Nwaugo et al. (2018), who carried out a research on soil bacterial flora and enzymatic activities in heavy metals (Pb and Zn) contaminated soil of Ishiagu, Ebonyi State. The research discovered the considerable presence of Lead and Zinc in Ishiagu area of Ebonyi State which was caused by previous mining activities in that area. The work recommended that the government should take measures to stop mining activities in that area due to the environmental effect on the host communities. According to Omosanya & Ajibade (2018), who conducted research on the environmental effect of quarrying on Otere village in Ogun State. The research discovered that quarrying activities, apart from the respiratory diseases caused to the host communities, it also affected the metallic content of the soil properties, and thus, affected negatively soil quality in the area (Nwaugo et al. 2018). Quarrying as an activity that involves the extraction of earth material for economic value takes place within the physical and therefore has effected both on the physical and socio-economic environment (Johnson 1979). As a result of the ecological dominance of humans over the environment, the balance between environmental elements as well as between himself and the environment is altered. The altered environment so created exposes humans to back-wash repercussions (Enger & Smith 2020) which informed an aggravation of certain illnesses and emergence of new ones.

The concept of integrated Environmental and Health monitoring assists us to appreciate the fact that particulate matter concentration constitutes hazards to the quarry site environment. The different ailment, most especially respiratory diseases are risks to which humans exposed to particulate matter (PM10) are likely to contact

including alteration of the environment. The dilution and spread of particulates from quarry sites to other locations; this has affected the environment and altered the natural physical environment. This has affected the air, water and soil quality within the host quarry community.

The World Health Organisation (WHO) conceptual framework for Integrated Environmental and Health Monitoring (IEHM) is in line with the researcher's conceptualization of quarrying as an activity that has both socio-economic and environ- mental effects. This is the Integrated Environmental and Health Monitoring framework developed by the World Health Organization (WHO) on the principal components of the environment. Thus, environmental concern, therefore, makes this study imperative. An investigation which will quantify background and cur- rent physical and chemical characteristics of surface water, soil and quality, identify sources of heavy metal contamination, pollution and quantity pollution in order to show the extent of the effect on water and soil.

2.1.7.7 Contribution of Quarrying to Rural Economic Development

Social development in our context refers to the provision of people-oriented infrastructures, programmes and policies geared toward improvement in health, education, living standard and quality of life of the people. Social and economic developments are often inter-related. The concept of economic development will imply jobs creation, income distribution, health, improvement, educational services and environmental sustainability of the community (Garry & Asokan, 2019).

It is expected that as the communities lose their farmlands and other means of livelihood to industries, they should in turn receive other benefits that compensate for their losses such as employment opportunities, provision of potable water supply, health services, educational services, better road network, and provision of

electricity and establishment of subsidiary industries. The rock quarrying industries should bring about social and economic development in the affected communities such that the communities will not regret what they have lost (Oguntoye & Alani, 2018). By so doing, the pareto optimality which ensures that some people are not worse off by the establishment of public or private industries is maintained.

2.1.7.8 Contributions of Agriculture to Rural Development

Agricultural growth does contribute to poverty reduction, in several ways. (Irz et al., 2001) identify effects of agricultural growth on farm economy, rural economy, and national economy. The effect on farm economy is achieved through higher incomes for farmers, including smallholders who constitute a large share of the rural poor, especially in Sub-Saharan Africa. It is also achieved through more employment as on-farm labour demand rises per hectare because the area cultivated increases or frequency of cropping increases. Positive effects on the rural economy are achieved by creation of more jobs in agriculture and the food chain. These include production links both “upstream” from the farm in demand for inputs and services for agriculture as well as “downstream” from the farm in the demand for processing, storage, and transport of produce (see section 2.3). But there are also consumption links as farmers and farm laborers spend their increased incomes on goods and services in the local (rural) economy. Finally, on a national level, an increase in agricultural output tends to decrease food prices and benefiting consumers and net purchasers of food (which may include farmers). Since the poor, both urban and rural spend a greater proportion of their incomes on food they benefit relatively more. Therefore, low food prices are often an objective of governments. The effect depends a great deal on the degree to which farm production is tradable and the associated price elasticity of demand. In many countries markets do not function

well (see chapter 4) and infrastructure is inadequate. In such cases farm produce cannot be treated as a tradable and increased output leads to major decreases in output prices.

Rural development is understood primarily in the economic sense of the process of assuring a progressive improvement in economic security of people in rural areas. Rural areas are usually defined in terms of maximum population density, with figures varying from 150 to 500 inhabitants per square kilometer, depending on the structure of society. While any economic activity in rural areas will have the potential to contribute to rural development, the roles agriculture may play fall into four broad categories:

Provision of Employment. In countries whose share of overall employment in agriculture is at high levels, for example where farmers represent over 50% of the workforce, agriculture is likely to be the key economic activity determining the progress of rural development. With such a substantial proportion of the labour force engaged in agriculture, any policy which led to a swift and artificial reduction in employment could have disastrous consequences for the labour-force and dependents, leading to social and political instability.

Related economy. The farm sector in every country supports a range of ancillary and service industries, generating economic activity in supply and distribution chains as well as processing industries. Where agriculture is the primary economic activity, the entire rural economy, including services such as health care, education and basic infrastructure, may depend on the profitability of the sector.

In remote and peripheral areas, where society has identified a legitimate priority to prevent depopulation, agriculture is likely to be one of a limited range of economic activities possible to maintain the economic viability of the region. Throughout rural

areas, agriculture may contribute to rural development by providing environmental and cultural services to society.

2.2 Theoretical Review

2.2.1 Growth Theories

Growth pole theory is driven by the concept that growth or economic development is usually not uniform across a region but is often concentrated at a specific pole. The pole represents a concentration of economic activity in one area; from which growth is propagated or diffused to other areas or regions. Growth pole theories were very popular in the 1960s and early 1970s, and many countries, including developing countries, embraced them as guides for their national growth strategies to mitigate regional disparities in incomes, employment, and education accessibility. Growth pole theories were used to facilitate decentralization and encourage rapid economic growth or industrialization. Growth pole theories are also meaningful for assessing or forecasting population change, as they can suggest best use of limited regional resources to be invested, allocated, or distributed for maximum effect on economic development.

Location growth theories endeavor to explain the distribution of economic activity as it relates to the functional allocation of activities to locations, the locations of

individual activities, the division of spatial markets among producers, and the distributions of different types of production across portions of territory. The goal is to exclude from the analysis any geographical features that may be influencing the concentration of territorial activities, leaving the location choices to be explained by the economic factors that define location processes, such as the agglomerations of economies that cause economic activities to concentrate, and the transportation costs that distribute activities in space. Balancing these two phenomena explains, even within a uniform space hypothesis, the existence of agglomerations of economic activities. Activities that promote socio-economic development and improve living standards of the people such as improvement in road infrastructure should be encouraged. Adequate and functional road infrastructure provides employment, improves education, equality, ease movement, promotes trade and unity and above all alleviates poverty (Donnges et al., 2018).

2.3 Analytical Review

2.3.1 Likert Scale Analysis

Using 5- point Likert scale which is stated as follows; Very High Effect (VHE) = 5, High Effect (HE) = 4, Moderate Effect (ME) = 3, Low Effect (LE) = 2 and No Effect (NE) = 1.

The weight of the scales will be added and divided by the number of scales to establish the acceptance level for the items;

$\frac{VHE+HE+ME+LE+NE}{N} = \frac{5+4+3+2+1}{5} = 3.0$ (items with mean score 3 and above is said to have a very high effect while those below is said to have no effect.

2.3.2 Multiple Regression Analysis

The multiple linear regression equation is as follows:

$Y = b_0 + b_1X_1 + b_2X_2 + \ldots\ldots b_pX_p$

where Y is the predicted or expected value of the dependent variable which is level of diversification, X_1 through X_p are p distinct independent or predictor variables which include years, productivity, labour, number of people employed, b_0 is the value of Y when all of the independent variables (X_1 through X_p) are equal to zero, and b_1 through b_p are the estimated regression coefficients. Each regression coefficient represents the change in Y relative to a one unit change in the respective independent variable.

2.3.3 Ordinary Least Square Multiple Regression

Ordinary Least Square Multiple Regression Technique is computed as follows;

$Y_1 = f(X_1X_2\ldots\ldots\ldots\ldots X_{10}^{e})$

Y= 1= Effect

Where Y = dependent variable; effect of constructing new roads on Agriculture, brick laying and quarry works.

X_1-X_5: Independent Variables Where

X_1=years

X_2= Amount produced

X_3= Amount sold

X_4 = Labour

X_5 = Number of people employed

2.4 Empirical Review

Ellis (2018) in his cross-sectional study on the effect of rural road construction projects on trade development in Canada discovered that the main effect of rural construction projects is to bring the market to rural populations. However, by making goods more easily available it may cut down on the comparative advantage achieved if villagers trade solely amongst one another. It should be borne in mind that greater involvement in the cash economy is not necessarily uniformly beneficial to rural livelihoods.

According to World Bank (2018) research on the effect of rural road construction project on employment opportunities in Africa, it was found out that the development of intermediate means of transport services is viewed as a bolster to the growth of the private sector, which consists of manufacturers of transport equipment (carts, spares for bicycles among others). It's therefore considered that affordable transport technology would foster a multiplier effect in both the urban and rural economies and thus alleviate poverty through on-farm and off-farm employment creation. Farmers would be able to carry more loads of farm products to wider markets using carts, rickshaws, or bicycles than if they were to carry on their heads. Using standards for motorized roads, intermediate means of transport paths are usually narrower and do not require heavy machinery with associated costs to build, but merely labour based methods which could equally employ local labour in the process.

According to Arnon (2018) in his community study. He found out that the prevailing social structure and concentration of productive assets had an enormous bearing on determining how effects occurred in each of the study location. The concentration and distribution of land were particularly important, and largely outside the area of influence of any road project.

Many studies have shown that road condition, distance to market, travel time to market, household size, labour availability, and farming experience, influence the transition to commercial agriculture Ouma et al; (2010). Sebatta (2014) in his research related farmer's market participation to road road distance and condition by arguing that farmers in hinterlands with poor or no roads fail to commercialize their produce due to high transport costs especially during the wet seasons. Road quality is also known to influence agricultural intensification and when combined with the enforcement of forest protection laws could reduce threats to forest (Angor 2012;Christ 2011)

Barnum & Sabot (2015) in his descriptive study found out that the improvement of rural roads is broadly recognized as a fundamental precondition for the development of rural areas, and remoteness and lack of mobility are widely identified by the poor themselves as factors in heightening vulnerability and perpetuating their poverty. He further asserted that Investment in transport can create economic opportunities for the poor directly through employment in infrastructure construction and maintenance, and the provision of rural transport services, and indirectly through improving the conditions and opportunities for marketing goods and services.

2.5 Summary of Literature Review

Rural transport is a subject that is receiving increasingly more attention from development specialists. Over the last decade, the World Bank. ILO and other organizations concerned with rural development and poverty alleviation have initiated programmes and projects to understand better the role that rural transport plays in the local socio- economic development and to demonstrate the importance, variety and extent of rural transport.

Donnges, et al, (2018) said that the availability and affordability of rural transport services and intermediate means of transport are very crucial; to rural development. As seen in the above literature it is very clear that the government of Kenya is putting lots of effort in developing rural transport as it plays a major role in socio-economic development of its rural dwellers. Nevertheless, the literature has also shown that most rural dwellers have been isolated in terms of the: rural transport and thus affecting sustainability in Agricultural sector especially agribusiness, their accessibility to basic needs, employment opportunities and trade development.

Lastly, the literature review has shown that rural transport is a means to an end in socio- economic development. The aim is to obtain access to the basic social and economic goods, services, and facilities to which rural communities need to have access to be able to live a socially and economically productive and decent life. The transport needs of rural people are associated with basic needs such as water, food and firewood, social welfare aspects of rural life such as health and education and with economic welfare aspects of rural life such as agriculture, livestock, and home industries.

2.6 Research Gap

Several studies have been carried out on rural road construction and economic development but most of them failed to outline the contribution of rural road construction projects on trade developments, agricultural productivity and increase in general rural employment opportunities. On the other hand, a lot of researchers had been done on road transportation and economic development in Imo State but none has been done on the effect of rural roads construction on the economic development in Okigwe local Government Area in Imo state. Local organizations like quarry workers association, brick layers association and farmers' cooperatives did not properly document their productivity records. On the other hand, there has not been any concrete research conducted to examine the effects of constructing new

rural roads on their productivity output and employment rate as well. This study filled in this gap by analyzing the effects of rural road infrastructure on socio-economic development in Okigwe L.G.A, Imo State.

CHAPTER THREE

METHODOLOGY

3.1 Research Design

The research design used for this study is both descriptive and cross-sectional design.

3.2 Study Area

The study area is located on latitude: $5^{0}25^{11}50.23^{1}$N and longitude $7^{0}2^{11}149.33^{1}$E. The general topography of the study area is fairly flat and its watershed is mostly covered by depleted rainforest vegetation. The climate of the study areas is typically humid and it lies within the rainforest/equatorial monsoon region of Nigeria, which has its peak rainfall within June, July, September and October and low rainfall in December, January and February (Peter et *al*; 2008). It has a mean temperatures of 27°C throughout the year and total annual rainfall exceeding 2500mm ranging between April to October (Ezemonye and Emeribe, 2012).The area has its maximum temperature as 33.4°C and minimum temperature as 21.2°C, its highest and lowest rainfall was recorded as 1900 and 2000mm respectively for 2012 (Ezemonye and Emeribe, 2012).

The vegetation of the area is tropical rain forest with vegetation consisting of mostly grasses such as Wire weed (*Sida acuta)*, guinea grass (*Panicum maximum*), elephant grass (*Pennistum purpureum*), star grass (Cynodon *nlemfuensis*), Siam weed

(*Cromolina odorata*), among others. Vegetation of the area consisted of secondary forest-savannah mosaic due to anthropogenic activities that have reduced the density of the forest. Some plants conspicuously grown in the wild of the study site include Iroko mahogany, obeche, bamboo, rubber and oil palm (*Elaeis guineensis*), raffia palm (*Raphia hokeri*) mango (*Magnifera indica*), and avocado (*Persea Americana*), kola (*Kola nitida*). Cultivated crops in the area include maize (*Zea mays*), yam (*Diocorea spp*), cassava (*Manihot esculenta*), and fluted pumpkin (*Telfairia occidentalis*) amongst others

The population is predominantly rural which consist majorly of farmers and quarry workers.

Figure 1: 3.1: Map of Nigeria showing Imo state

Source: Apakama, 2017.

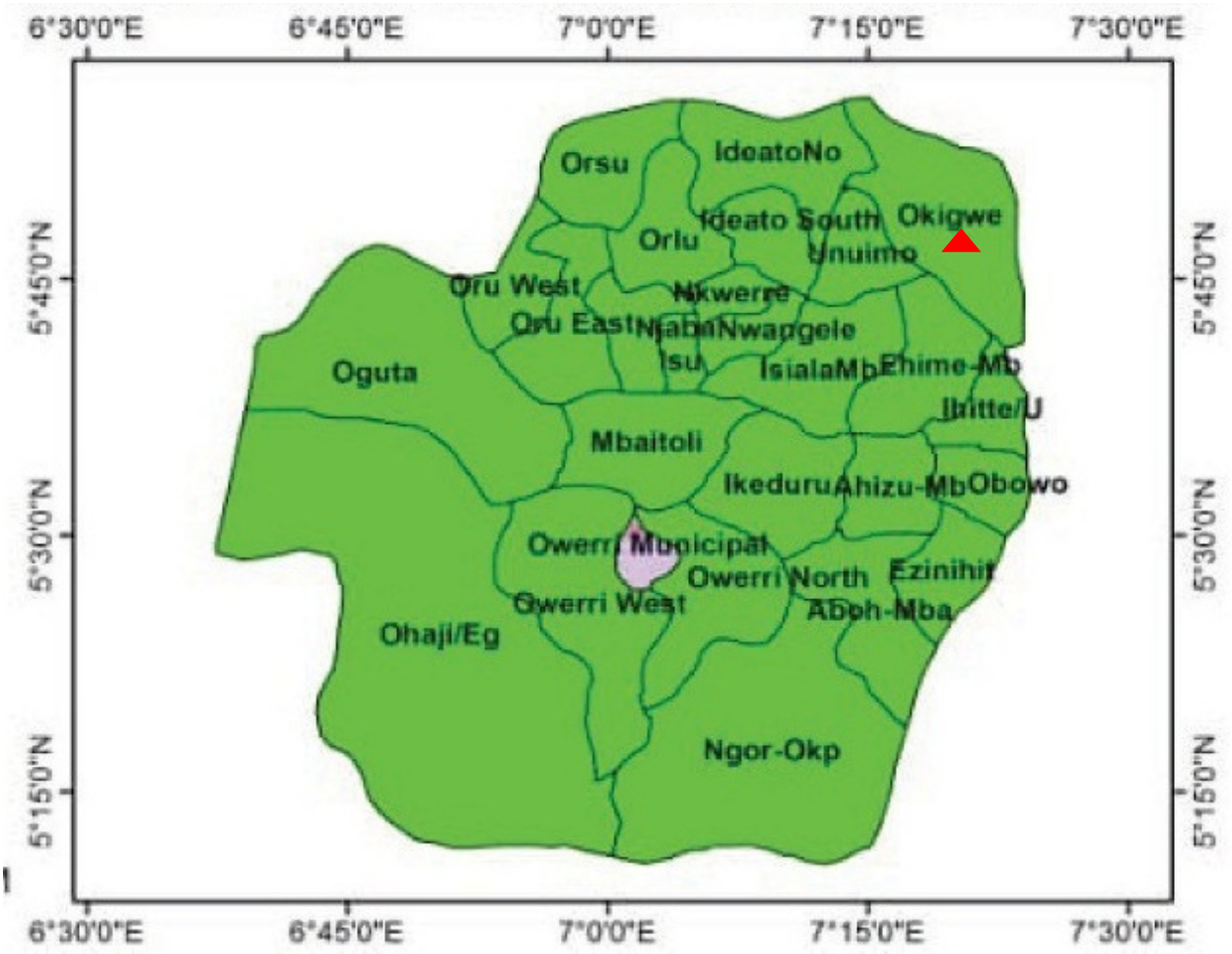

Figure 3.2: Map of Imo State Showing the Study Areas.

Source: Peter *et al*., 2008.

3.3 Study Population

A population of three hundred persons (300) was considered for this study. They comprise of 37 farmers, 50 Quarry workers and 213 Brick molders.

3.4 Sample and Sampling Techniques

3.4.1 Sample Size

Sample size is the selected number pick at random from the list unit of the sampling frame. The sampling size will not cover the entire sample frame due to the time stipulated for this study.

The sample size will be calculated by using this formula;

$\mathbf{n} = \frac{N}{1+N\,(e^2)}$(Taro Yamane, 1967).

Where n = sample size

N = total population = 300

e = sampling error = 0.05

$n = \frac{300}{1+300\,(0.0025)} = \frac{300}{1.75} = 171$

n = 171. But it will be approximated to 180 to accommodate sampling error.

3.4.2 Sampling Techniques

Purposive sampling technique was used for this study to avoid bias.

3.5 Data Collection.

For the purpose of this research work, both the primary and secondary sources were adopted. The primary data were gotten using a well-structured questionnaire. The secondary data were gotten from a record of yearly production obtained from the

cooperative (agricultural cooperatives, quarry workers cooperative and brick layers' cooperatives).

3.6 Data Collection Instrument

There are different instruments which can be used in collection of data such as personal discussion personal observation, postal questionnaire, and administration of questionnaire, direct observation and consulting relevant publication. Therefore, for the purpose of this study, a well-structured questionnaire and a comprehensive record of yearly activities was used for this study. The questionnaire contained information on the demographic characteristics of the respondents and information on the existence of road construction in the area. The yearly record is a comprehensive documentation of the level of productivity, rate of employment, labour etc. before and after constructing new roads.

3.7 Method of Data Analysis

Descriptive and inferential statistics such as frequency distribution, percentage, ordinary least square, multiple regression technique was used to analyses the objectives and test the hypotheses.

Specifically, objectives i was analyzed using frequency distribution, percentage.

Objective ii was analyzed using 5- point Likert scale which is stated as follows; Very High Effect (VHE) = 5, High Effect (HE) = 4, Moderate Effect (ME) = 3, Low Effect (LE) = 2 and No E (NE) = 1.

The weight of the scales will be added and divided by the number of scales to establish the acceptance level for the items;

$\frac{VHE+HE+ME+LE+NE}{N} = \frac{5+4+3+2+1}{5} = 3.0$ (items with mean score 3 and above is said to have a very high effect while those below is said to have no effect.

Objective iii will be analyzed using multiple regression.

The multiple linear regression equation is as follows:

$Y = b_0 + b_1X_1 + b_2X_2 + \ldots\ldots b_pX_p$

where Y is the predicted or expected value of the dependent variable which is level of diversification, X_1 through X_p are p distinct independent or predictor variables which include years, productivity, labour, number of people employed, b_0 is the value of Y when all of the independent variables (X_1 through X_p) are equal to zero, and b_1 through b_p are the estimated regression coefficients. Each regression coefficient represents the change in Y relative to a one-unit change in the respective independent variable.

For the null hypotheses, Ordinary Least Square Multiple Regression Technique will be computed as follows;

$Y_1 = f(X_1X_2\ldots\ldots\ldots\ldots X_{10}^{e})$

Y= 1= Effect

Where Y = dependent variable; effect of constructing new roads on Agriculture, brick laying and quarry works.

X_1-X_5: Independent Variables Where

X_1=years

X_2= Amount produced

X_3= Amount sold

X_4 = Labour

X_5 = Number of people employed

CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 DATA PRESENTATION

4.1 Questionnaire Distribution

Table 4.1: Questionnaire Distribution

Sampled Communities	Number Of Questionnaires Shared	Number Of Questionnaires Retrieved
Ezinachi Okigwe	63	30
Ihube Okigwe	78	40
Amour Okigwe	39	10
Total	180	80

From Table4.1 above, it was observed that out of the 180 questionnaires shared, 30 questionnaires were retrieved from Ezinachi out of the 39 shared questionnaires, 40 questionnaires were retrieved from Ihube Okigwe out of the 48 shared questionnaires while 10 questionnaires were retrieved from the 13 shared questionnaires at Amor Okigwe. The data also showed that out of the 100 shared questionnaires, 80 questionnaires were retrieved making it 80% retrieval rate.

4.2 Age Distribution of Respondents

From the response obtained by the respondents during the questionnaire issuance, the figure below shows the age distribution of the population.

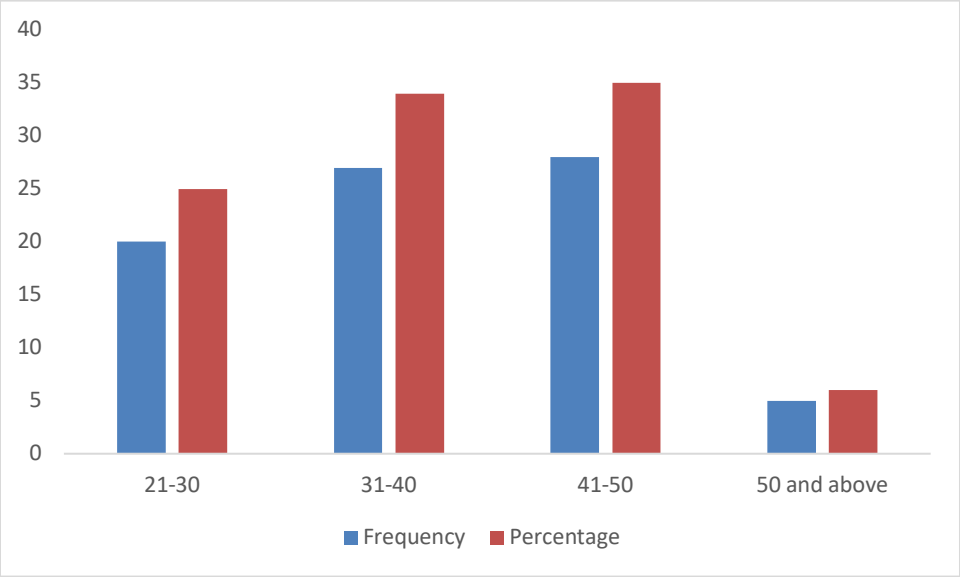

Figure 4.2: Age Distribution of the Respondents.

From Figure 4.2 above, it can be seen that 20 (25%) of the respondents were within the age range of 21-30 years, 27 (34%) of the respondents were within the age range of 31-40 years, 28 (35%) of the respondents are within the age range of 41-50 years while 5 (6%) of the respondents were 50 years and above. This indicates that the population of the area is mostly characterized by old people.

4.3 Occupational Distribution of the Respondents

The chart below shows the occupational classification of the respondents which was obtained during the field work.

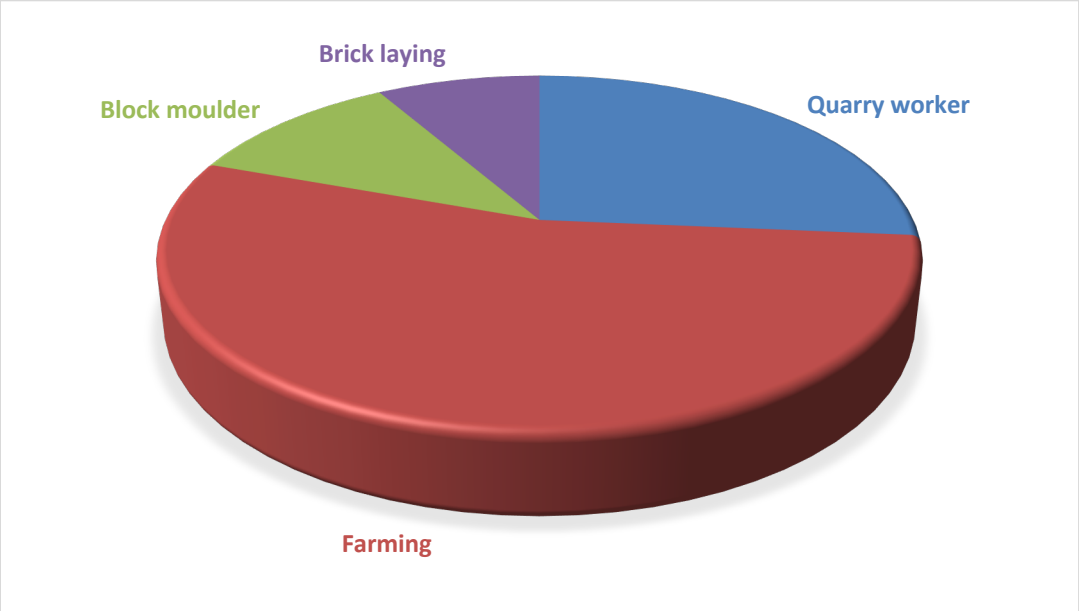

Figure 4.3: Occupational Distribution of Respondents

The data from Figure 4.3 above showed that 19 (24%) of the respondents are quarry workers, 39 (49%) of them are farmers, 8 (10%) of them are block moulders, 6 (8%) of them are brick layers while 8 (10%) of them are unemployed. This indicate that majority of the population are into farming.

4.4 Educational Distribution of the Respondents

The chart below shows the educational distribution of the population in the study area which was obtained during the field work.

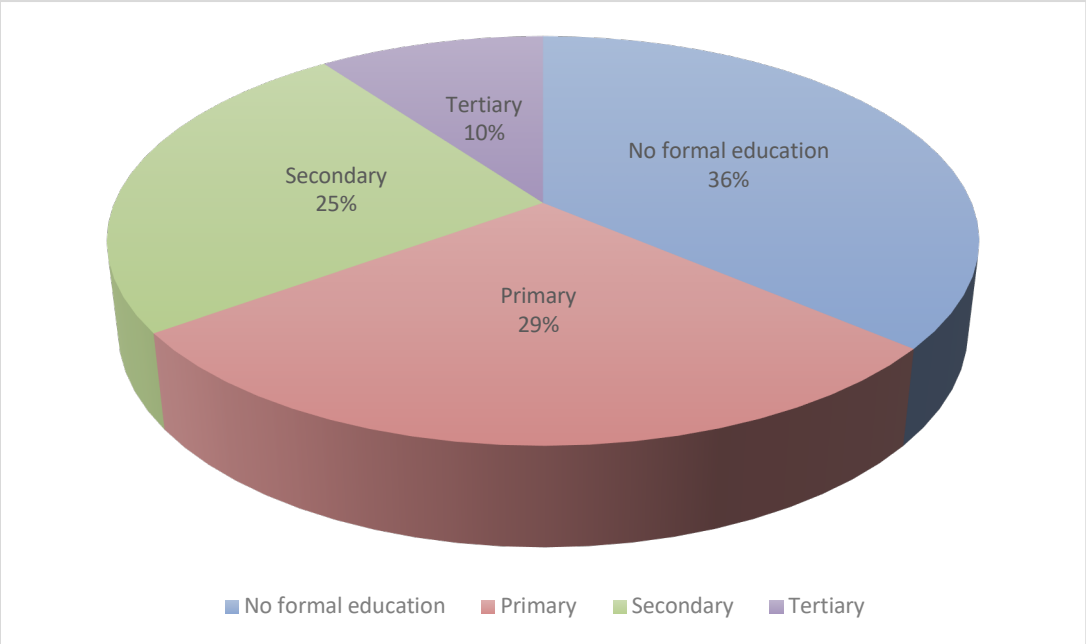

Figure 4.4: Educational Distribution of the Respondents

From Figure 4.4 above, 29 (36%) of them have no formal education, 23 (29%) of them had primary education, 20 (25%) of them had secondary education while 8 (10%) of them had tertiary education. This indicates that the population is mostly characterized by people with no formal education.

4.5 Income Distribution of the Respondents

The figure below shows the Income distribution of the population in the study area which was obtained during field work.

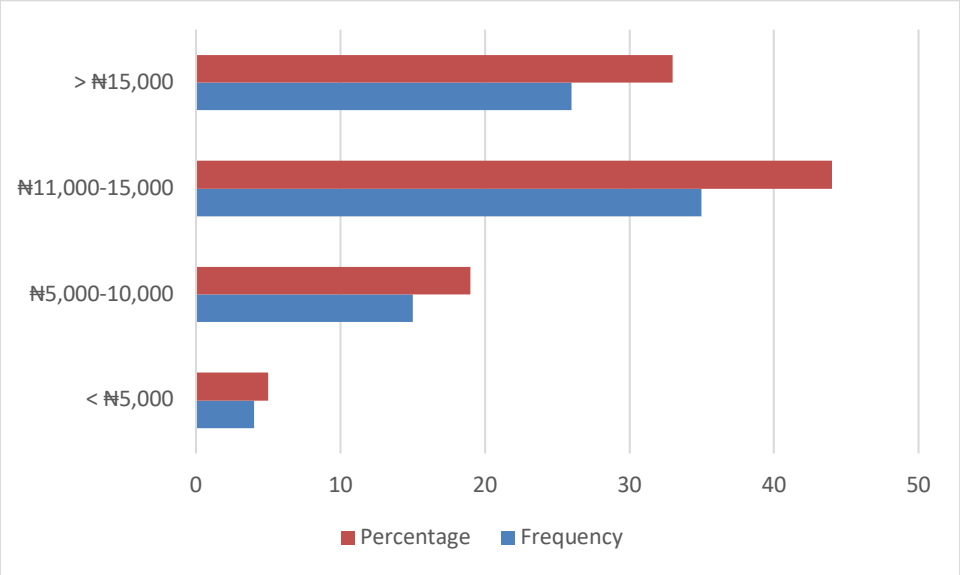

Figure 4.5: Income Distribution of the Respondents

From Figure 4.5 above, 4 (5%) of the respondents earn below ₦5,000, 15 (19%) of them earn between ₦5,000-10,000, 35 (44%) of them earn between ₦11,000-15,000 while 26 (33%) of them earn above ₦15,000.

4.6 Existence of Rural Road Constructions in Okigwe, Imo State

Table 4.2: Existence of Rural Road Infrastructure in the Study Area.

Do have accessible roads in your community?	Frequency	Percentage
Yes	19	24
No	61	76
Total	80	100
What is the condition of the roads?		
Good	12	15
Bad	23	29
Worse	45	56
Total	80	100
Has been any form of road construction work in your area?		
Yes	13	16
No	67	84
Total	80	100
If Yes, has it been completed as at the time of this report?		
Yes	7	9
No	73	91
Total	80	100
If No, what factor do you think prevented road construction in your area?		
Bad government	15	19
Weak government policies	34	43
Attitude of people to rural development	13	16
Others.	18	23
Total	80	100

Source: Field Survey, 2022.

This table was used to determine the existence of the rural road from the respondents.

From table 4.6 above, it was seen that 24% of the respondents confirmed that they have accessible roads while 76% of them did not agree to that. It was also observed that 15% of the examined roads were in good condition as at the time of this research, 29% of the roads were bad while 56% of the roads were in worst conditions as the time of this research. On the other hand, 16% of the respondents affirmed that there has been some sort of road construction in their areas before now but 84% of them conformed that there had never been any form of road construction in their area. From the results, it was seen that 9% of the ongoing road construction projects in the study area has been completed as at the time of this report while 91% of them were abandoned. When interviewed, 19% of the respondents attributed the deplorable conditions of their road to bad government, 43% of them attributed it to weak government policies, and 16% of them attributed it to attitude of the people to rural development while 23% of them attributed it to other factors not mentioned here.

4.7 Indicators of Socio-Economic Development in the Study Area

The figure below is a pictorial representation of Socio-Economic Indicators of the study area, it shows the major source of occupation which the respondents are engaged in.

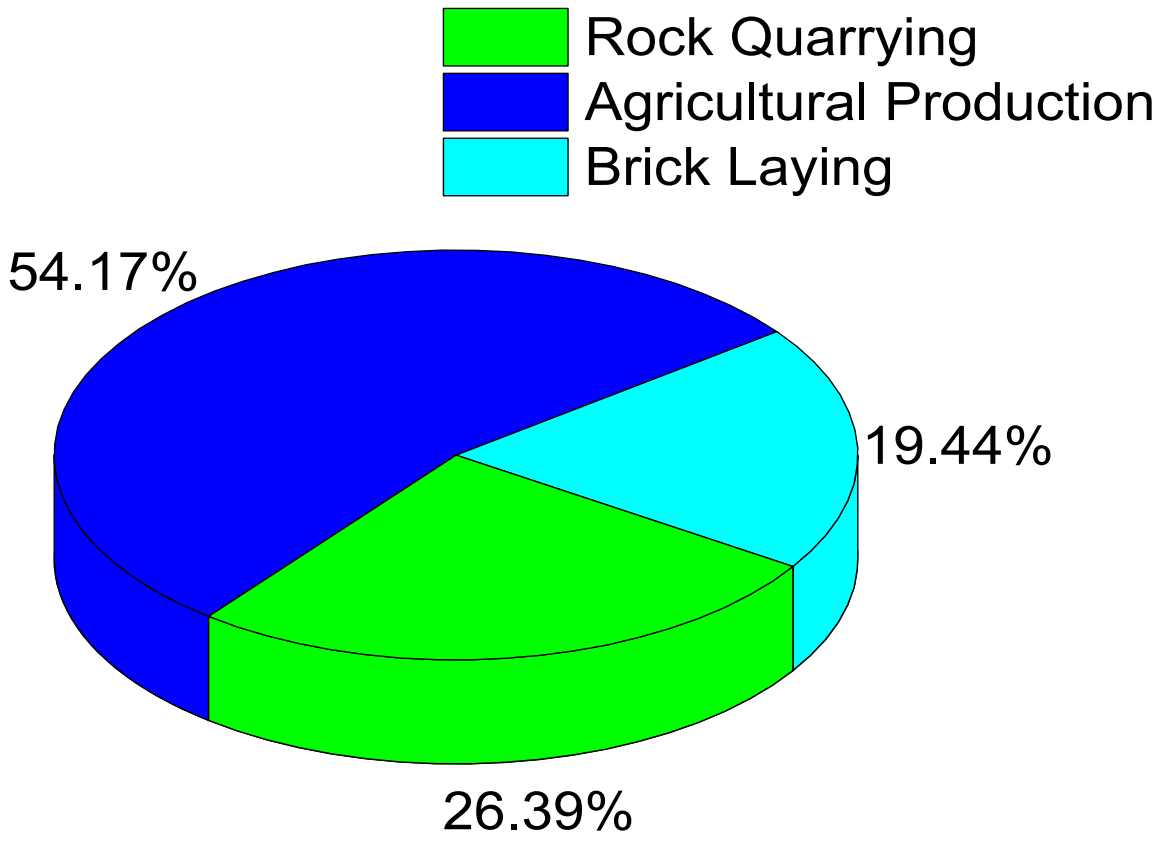

Figure 4.6: Indicators of Socio-Economic Development in the Study Area.

From Figure 4.6 above, it was obvious that the indicators of socio-economic development in Okigwe L.G.A were Rock quarrying, Agricultural production and bricklaying. The figure showed that agricultural production is a steady activity engaged by a good proportion (54.17%) of respondents which help them to eke out a living. However, rock quarrying is another activity that majority (26.39%) of the

respondents engage in to make ends meet. The result also showed that only few (19.44%) of the respondents engage in brick laying to meet their daily needs.

4.8 Effects of Constructing Rural Roads on Diversification

The figure below shows the Effects of constructing rural road on Diversification in the study area.

Figure 4.7: Effects of Constructing Rural Roads on Diversification

Keys: VHE = Very high effect, HE = High effect, ME = Medium effect, LE= Least effect and NE = No effect

From Figure 4.6 above, it was observed that all the diversification parameters mentioned above were all grossly affected by construction of new roads. But labour supply and level of productivity with mean scores of 4.3 (>3.0) each were greatly affected by construction of new roads. These results are in line with the work of Garry & Asokan, (2019) which showed that steady brick laying activities promotes economic development and trigger jobs creation, income distribution, health, improvement, educational services and environmental sustainability of the community.

4.9 Yearly Quarry Works Records before Construction of Rural Roads

The chart below shows the yearly quarry work before the rural road construction. In the study area.

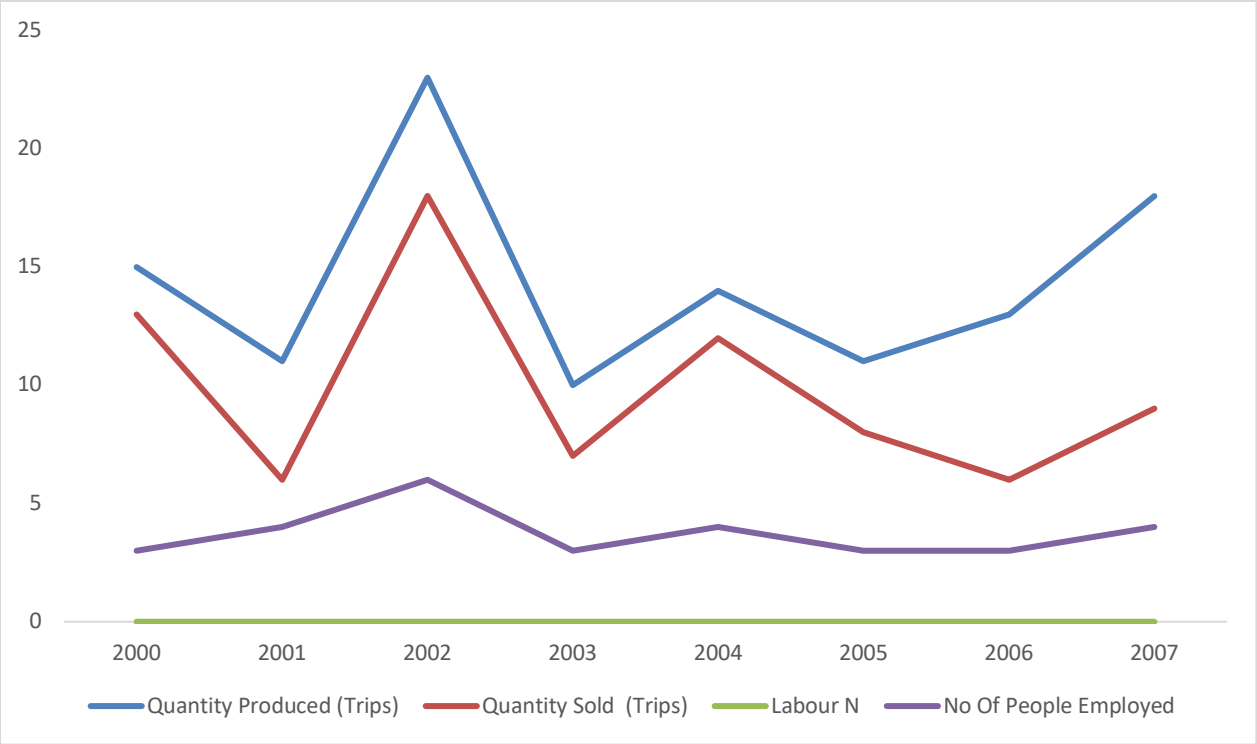

Figure 4.8: Chart of Yearly Quarry Works Records before Construction of Rural Roads

From the figure above, it was observed that the least quantity produced (trips) was recorded in 2003, with just 11 trips however. While the highest quantity produced (trips) was recorded in 2007, with just 18 trips. On the other hand, the least labour (₦56,000) was expended on 2003 while the highest labour (₦72,000) was expended in 2007.

4.10 Yearly Quarry Works Records after Construction of Rural Roads

The chart below shows the yearly quarry works after road construction in the study area.

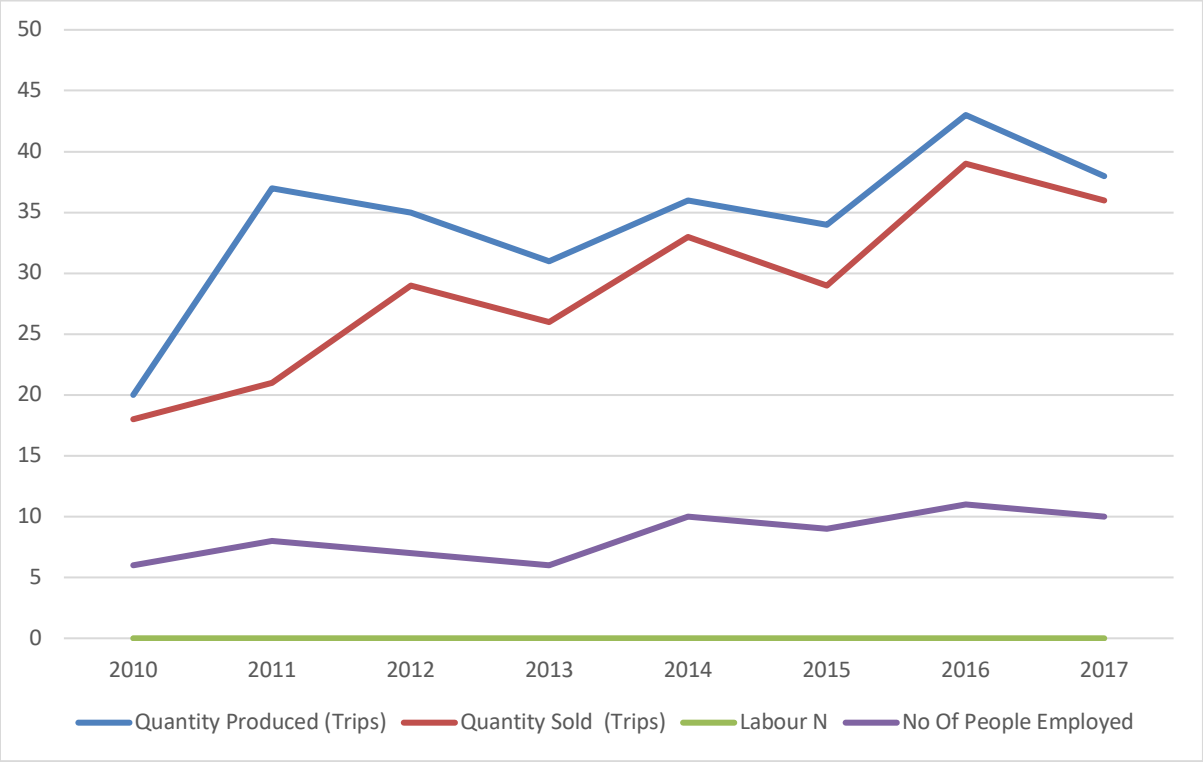

Figure 4.9: Chart of Yearly Quarry Works Records After Construction of Rural Roads

Figure 4.9 above showed that the lowest quantity produced was recorded in 2010 with 20 trips while the least labour (₦144,000) was expended in 2010.The highest quantity produced was recorded in 2016 with 43 trips while the highest labour (₦312,000) was expended in 2016.

4.11: Evaluation of the Effect of Constructing Rural Roads on Rock Quarrying in Okigwe L.G.A

Source	SS	df	MS
Model	109.679842	4	27.4199606
Residual	9.2576577	11	.841605245
Total	118.9375	15	7.92916667

Number of obs	= 16
F(4, 11)	= 32.58
Prob > F	= 0.0000
R-squared	= 0.9222
Adj R-squared	= 0.8939
Root MSE	= .91739

NE	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Years	.005629	.1130968	0.05	0.961	-.2432954	.2545534
QP	.1020697	.0705324	1.45	0.176	-.0531712	.2573105
Qs	.1899772	.1602262	1.19	0.261	-.1626783	.5426328
LB	-7.53e-06	.0000149	-0.51	0.622	-.0000402	.0000252
_cons	-10.18623	226.2468	-0.05	0.965	-508.1522	487.7797

Keys: QP= Quantity produced, QS=Quantity supplied, LB = Labour, NE= Number of employment

From the result above, number of observations is 16, Prob>F = 0.00001, which showed that the model is significant, R-squared =0.9222, Adj R-squared = 0.8939, Root MSE = 0.91739 .The result also showed that all the test variables are insignificant at YRS (0.961), QP (0.176), QS (0.261) and LB (0.622). The result also showed that YRS (0.05), QP (1.45), QS (1.19) all have positive effect on constructing new roads while LB (-0.51) has negative effect on the tested parameter. This implies that investing on new road infrastructure will boost the number of gainful employments in the study area while ensuring that better returns on sales is achieved by those employed in the area

4.12 Yearly Agricultural Records before Construction of Rural Roads

The chart below shows the yearly agricultural records before rural road construction in the study area.

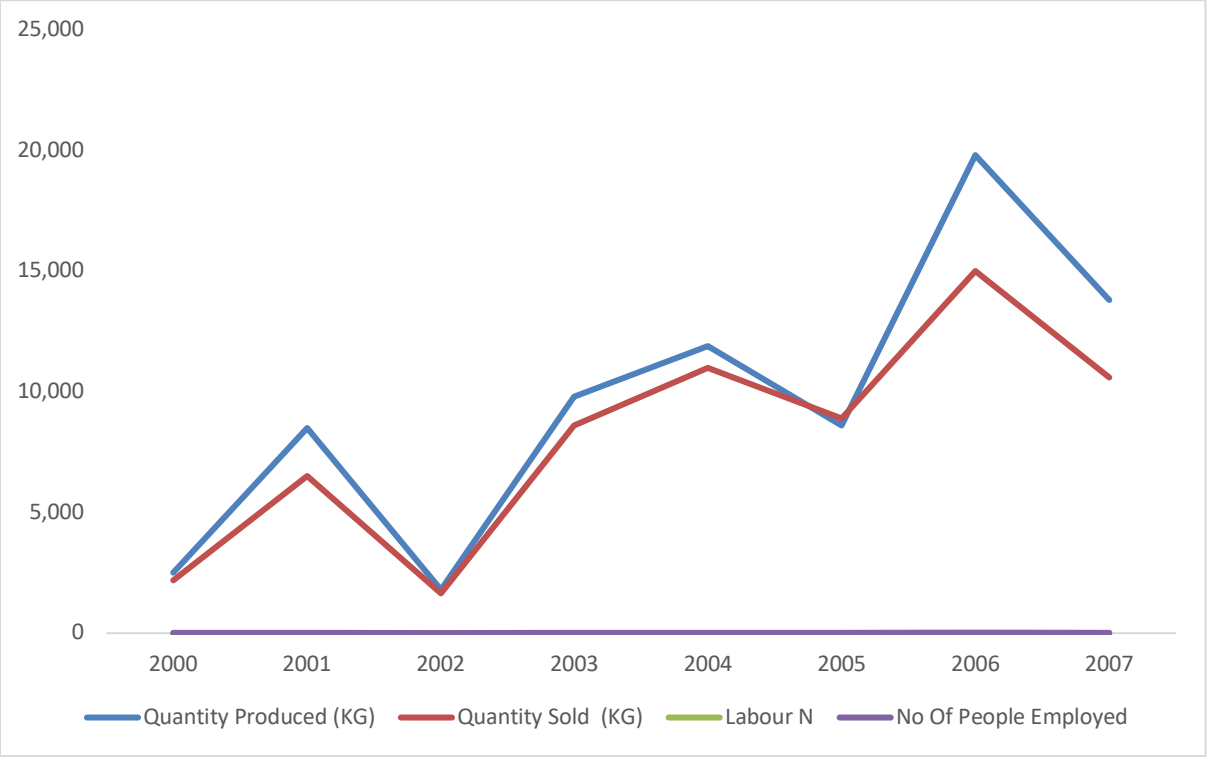

Figure 4.11: Chart of Yearly Agricultural Records before Construction of Rural Roads

The figure above showed that the least quantity of produce (1,800Kg) was observed in 2002 but the highest produce (19,800 Kg) was observed in 2006. However, the highest number of employment was recorded in 2006 with 23 employees while the least number of employment was recorded in 2002 with just 4 employees.

4.13 Yearly Agricultural Records after Construction of Rural Roads

The chart below shows the yearly agricultural records after construction of rural road in the study area.

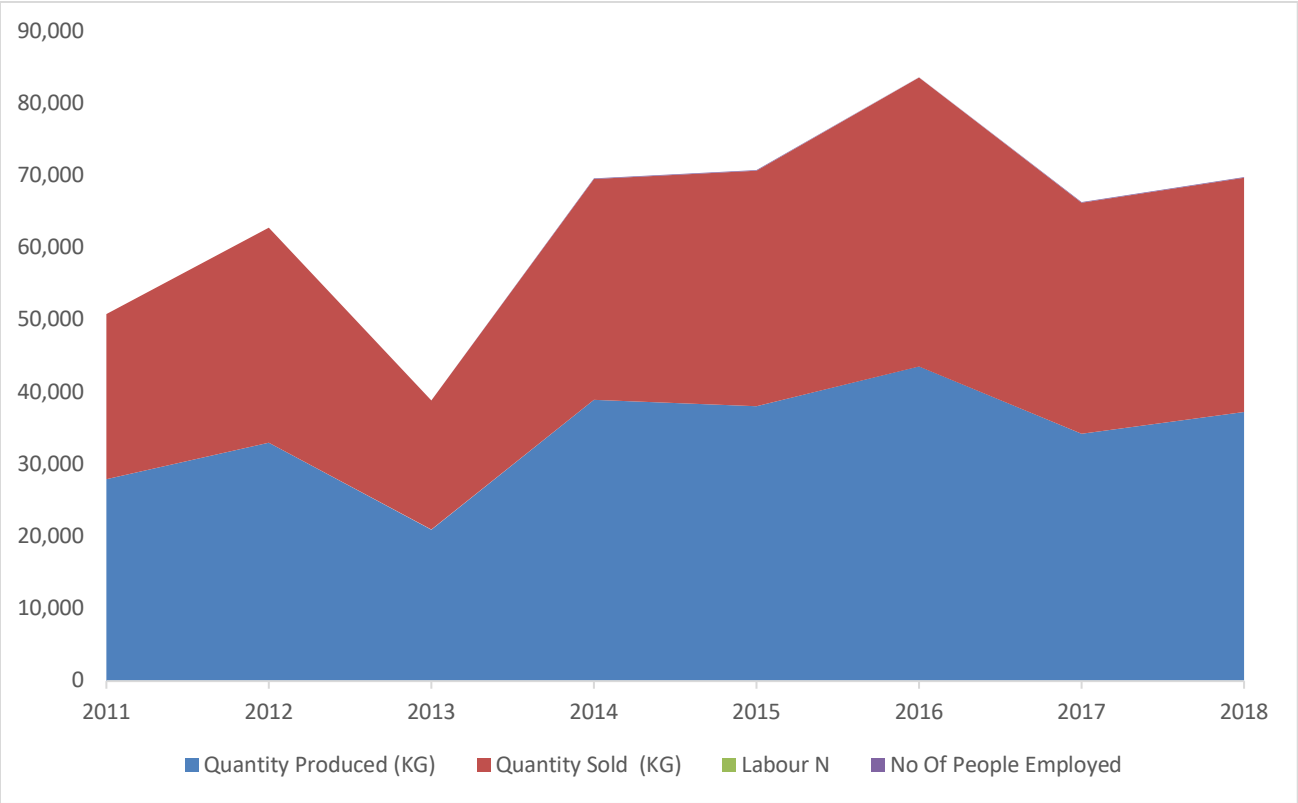

Figure 4.12: Chart of Yearly Agricultural Records after Construction of Rural Roads

From the figure above, the least quantity of produce (17,860Kg) was observed in 2013 but the highest produce (39,000Kg) was observed in 2014. However, the highest number of employment was recorded in 2014 with 41 employees while the least number of employment was recorded in 2013 with just 18 employees.

4.14: Estimating the Effect of Constructing rural road on Agricultural Production in Okigwe L.G. A.

Source	SS	df	MS
Model	3167.95728	4	791.98932
Residual	37.7927213	11	3.43570194
Total	3205.75	15	213.716667

Number of obs	16
F(4, 11)	230.52
Prob > F	0.0000
R-squared	0.9882
Adj R-squared	0.9839
Root MSE	1.8536

NE	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Years	-.2772536	.2556249	-1.08	0.301	-.8398802	.285373
QP	.0002287	.0002814	0.81	0.434	-.0003906	.000848
QS	.0001471	.0003705	0.40	0.699	-.0006683	.0009626
LB	.0004949	.0000892	5.55	0.000	.0002985	.0006913
_cons	556.2539	511.2758	1.09	0.300	-569.0566	1681.564

Keys: QP= Quantity produced, QS=Quantity supplied, LB = Labour, NE= Number of employment

From the result above, number of observations is 16, Prob>F = 0.00001, which showed that the model is significant, R-squared =0.9882, Adj R-squared = 0.9839, Root MSE = 1.8536. The result also showed that some the tested variables are insignificant at QP (0.434), QS (0.699) and YRS (0.301) are insignificant except LB which is significant at LB (0.0001). The result also showed that most of the variables have positive effect on constructing new roads while only years (-1.08) has negative effect on constructing new roads. This implies that constructing new roads will boost the number of gainful employments in the study area

4.15 Yearly Brick Laying Records before Rural Road Construction

The chart below shows the yearly records of brick laying in the study area before rural road construction.

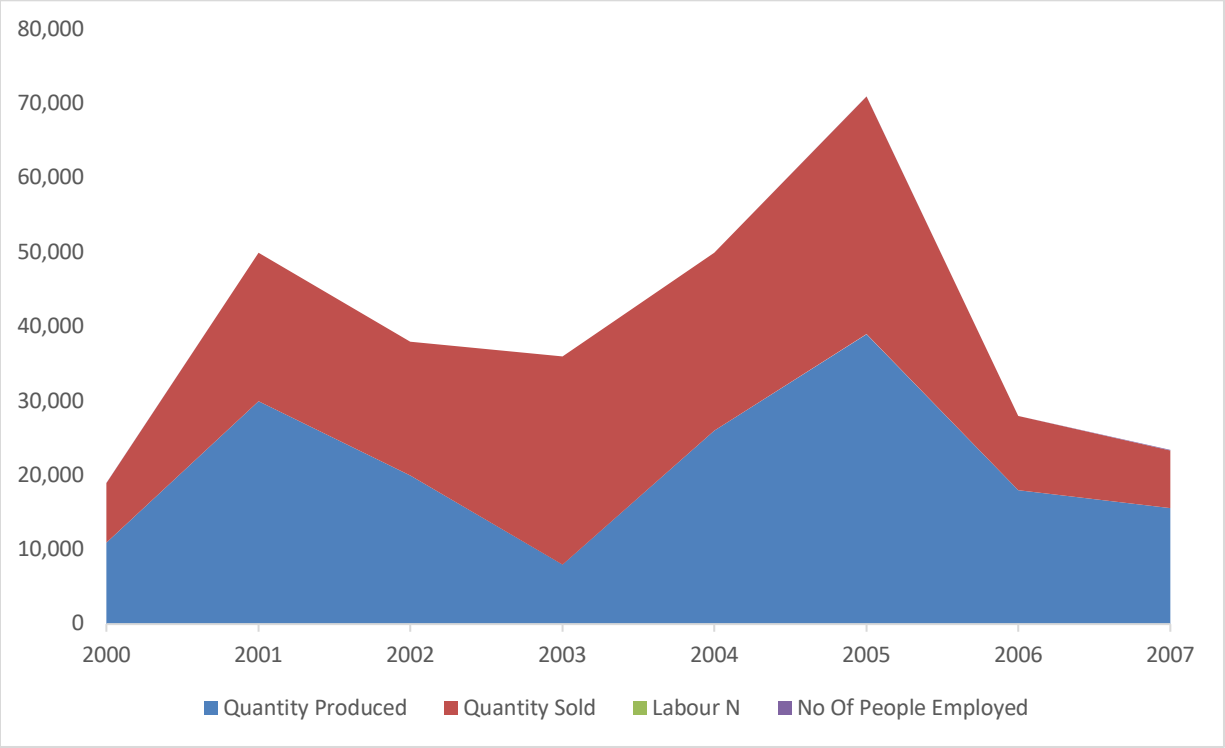

Figure 4.14: Chart of Yearly Brick Laying Records before Rural Road Construction

From the figure above, it was observed that the least quantity of bricks (8,000Kg) was produced in 2003 while highest quantity of bricks (39,000Kg) was produced in 2005. On the other hand, the least number of employment was recorded in 2000 with just 3 employees while the highest number of employment was recorded in 2006 with 22 employees.

4.16 Yearly Brick Laying Records after Rural Road Construction

The chart below shows the yearly records of brick laying after road construction in the study area.

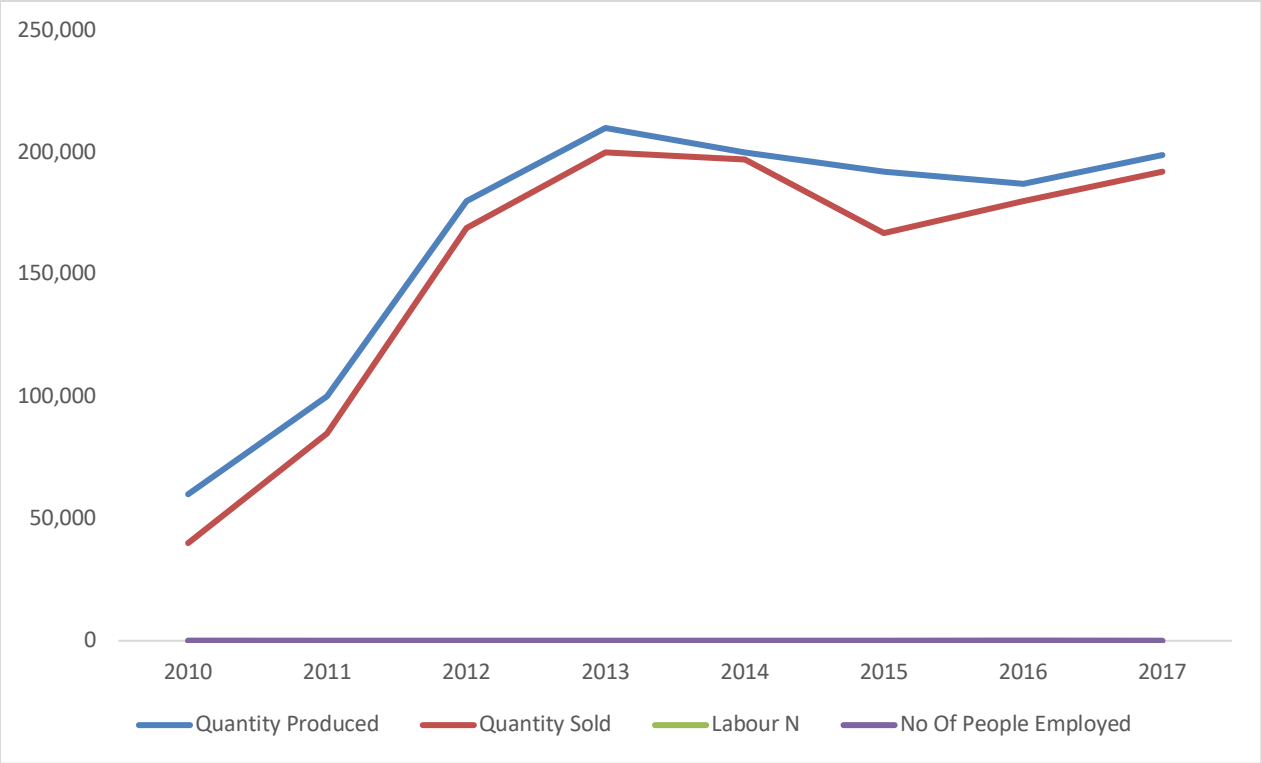

Figure 4.15: Chart of Yearly Brick Laying Records after Rural Road Construction

From the figure above, it was observed that the least quantity of bricks (60,000Kg) was produced in 2010 while highest quantity of bricks (210,000Kg) was produced in 2013. On the other hand, the least number of employment was recorded in 2010 with just 25 employees while the highest number of employment was recorded in 2016 with 60 employees.

4.17: Estimating the effect of Rural Road Construction on Brick laying Income in Okigwe L.G.A

Source	SS	df	MS
Model	5661.6252	4	1415.4063
Residual	216.812302	11	19.7102093
Total	5878.4375	15	391.895833

Number of obs	16
F(4, 11)	71.81
Prob > F	0.0000
R-squared	0.9631
Adj R-squared	0.9497
Root MSE	4.4396

NE	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Years	2.47457	.5730898	4.32	0.001	1.213208	3.735932
QP	.0001156	.0001458	0.79	0.444	-.0002052	.0004365
QS	-.0000289	.0001483	-0.20	0.849	-.0003554	.0002975
LB	-.0000116	.0000225	-0.51	0.617	-.0000611	.000038
_cons	-4949.132	1147.784	-4.31	0.001	-7475.386	-2422.877

Keys: QP= Quantity produced, QS=Quantity supplied, LB = Labour, NE= Number of employment

From the result above, number of observations is 16, Prob>F = 0.00001, which showed that the model is significant, R-squared =0.9631, Adj R-squared = 0.9497, Root MSE = 1.4228. The result also showed that only NE (0.001) is significant while other parameters QP (0.674), QS (0.504) and LB (0.195) are insignificant. The result also showed that QP (0.43), LB (1.33) and NE (4.32) all have positive effect on constructing new roads while only QS (-0.69) have negative effect on constructing new roads. This implies that constructing new roads will boost the number of gainful employments in the study area. Investment on infrastructural development can stimulate growth by injecting needed cash into local economy and creating employment (International Road Federation, 2018). Moreover, the development of new roads is viewed as a bolster to the growth of the private sector, which consists of manufacturers of transport equipment (carts, spares for bicycles among others).

It's therefore considered that affordable transport technology would foster a multiplier effect in both the urban and rural economies and thus alleviate poverty through on-farm and off-farm employment creation (World Bank, 2018).

4.2 TESTING OF HYPOTHESIS

4.2.1 Restatement of Research Hypothesis

H_0: Constructing new roads have no significant effect on labour, productivity, and employment rate in Okigwe, Imo State.

H_1: Constructing new roads have significant effect on labour, productivity, and employment rate in Okigwe, Imo State.

Table 4.16: Hypothesis Testing Table

```
. pwcorr im la er p, star(5)

             |       im       la       er        p
-------------+------------------------------------
          im |   1.0000
          la |   0.3670*  1.0000
          er |  -0.0639   0.0515   1.0000
           p |   0.2823* -0.1376  -0.1003   1.0000

. regress im la er p

      Source |       SS           df       MS      Number of obs   =        79
-------------+----------------------------------   F(3, 75)        =      8.34
       Model |  .357417181         3  .11913906   Prob > F        =    0.0001
    Residual |  1.07119223        75  .014282563   R-squared       =    0.2502
-------------+----------------------------------   Adj R-squared   =    0.2202
       Total |  1.42860941        78  .018315505   Root MSE        =    .11951

------------------------------------------------------------------------------
          im |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          la |   6.78e-07   1.65e-07     4.11   0.000     3.50e-07    1.01e-06
          er |  -.0005867   .0011412    -0.51   0.609    -.0028602    .0016867
           p |   9.42e-07   2.86e-07     3.30   0.001     3.73e-07    1.51e-06
       _cons |   4.134728   .0261904   157.87   0.000     4.082554    4.186902
------------------------------------------------------------------------------
```

Keys: IM = Effect, LA =Labour, ER = Employment rate, P = Productivity rate.

From the table above, the total number of observations is 79, R-squared = 0.2502, Adjusted R-squared =0.2202 while Root MSE = .11951. Prob>F = 0.0001, this shows that the model is significant. From the table, labour is significant at 0.0001, productivity is significant at 0.001 while employment rate is insignificant at 0.609. This implies that constructing new roads have gross effect on labour supply and productivity. The result from the (t) column showed that employment rate (-0.51) has negative effect or effect on constructing new roads, while labour (4.11) and

productivity (3.30) have positive effect on constructing new roads in the study area. Improvement of rural roads is broadly recognized as a fundamental precondition for the development of rural areas, and remoteness and lack of mobility are widely identified by the poor themselves as factors in heightening vulnerability and perpetuating their poverty. Although it may not be reflected in an income sense, this effect reduces the vulnerability of the poor and can be reflected as a means of multidimensional poverty reduction. Barnum and Sabot (2015).

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 SUMMARY OF FINDINGS

From the results, 25% of the respondents were within the age range of 21-30 years, 34% of the respondents were within the age range of 31-40 years, 35% of the respondents are within the age range of 41-50 years while 6% of the respondents were 50 years and above.

The result also showed that 24% of the respondents are quarry workers, 49% of them are farmers, 10% of them are block moulders, 8% of them are brick layers while 10% of them are unemployed. On the other hand, 29% of them had primary education, 25% of them had secondary education while 10% of them had tertiary education.

From the results, it was observed that all the diversification parameters mentioned above were all grossly affected by construction of new roads. But labour supply and level of productivity with mean scores of 4.3 (>3.0) each were greatly affected by construction of new roads.

From the result above, number of observations is 16, Prob>F = 0.0001, which showed that the model is significant, R-squared =0.9540, Adj R-squared = 0.9373, Root MSE = 1.4228. The result also showed that only number of employed (NE) (0.001) is significant while other parameters quantity produced (QP) (0.674), quantity supplied (QS) (0.504) and labour (LB) (0.195) are insignificant. The result also showed that QP (0.43), LB (1.33) and NE (4.32) all have positive effect on constructing new roads while only QS (-0.69) have negative effect on constructing

new roads. This implies that constructing new roads will boost the number of gainful employments in the study area.

From the table above, the total number of observations is 79, R-squared = 0.2502, Adjusted R-squared =0.2202 while Root MSE = .11951. Prob>F = 0.0001, this shows that the model is significant. From the table, labour is significant at 0.0001, productivity is significant at 0.001 while employment rate is insignificant at 0.609. This implies that constructing new roads have gross effect on labour supply and productivity. The result from the (t) column showed that employment rate (-0.51) has negative effect or effect on constructing new roads, while labour (4.11) and productivity (3.30) have positive effect on constructing new roads in the study area. Improvement of rural roads is broadly recognized as a fundamental precondition for the development of rural areas, and remoteness and lack of mobility are widely identified by the poor themselves as factors in heightening vulnerability and perpetuating their poverty.

5.2 CONCLUSION

Investment in rural road infrastructure in the study area led to diverse diversification, increased productivity and boosts the number of gainful employments. Improvement of rural roads is broadly recognized as a fundamental precondition for the development of rural areas whereas remoteness and lack of mobility were widely identified by the respondents themselves as factors heightening vulnerability and perpetuation of poverty. When road networks and transportation infrastructure investments are made in a developing country such as Nigeria, the benefits garnered from the investment usually extend beyond economic development to social transformation.

5.3 RECOMMENDATIONS

From the outcome of this study, the following recommendations were made;

i. The government and other well-meaning individual should as a matter of urgency assist the studied communities with constructing new access road to and from the communities.
ii. Farmers, Bricklayers, and Quarry workers should be educated on how to demand for a better access road from the government through their association heads in maximize production.
iii. Members of the communities should be trained on how to gain access to grants from the government be it federal or state to boost their productivity.

5.4 CONTRIBUTION TO KNOWLEDGE

Outcome of this study will provide scholars with a better understanding of the influence of good road infrastructure investment on economic development, especially in a struggling economy such as Nigeria's. This study can potentially contribute to positive social change by suggesting improvements in the road communication networks, which can subsequently lead to improved standards of living, decreases in travel time, and cost of transportation. Apart from constructing new access roads, the government or concerned agency should also create time to inspect the already constructed roads. This will give them the avenue to detect cracks and potholes and other sort of problems which may be affecting the used of the constructed roads. Gutters should also be constructed to drain off all sorts of flooding in their working sites and neighboring areas. In as much as the studied farmers need good access roads, they also need proper background knowledge of recent farming techniques. The farmers should be educated on how to apply fertilizer in the right proportion, how to manage weeds effectively how to access loan and other credit facilities and how to maximize their harvesting, processing, and selling operations.

REFERENCES

Adewale, J.G. (2015). Socio-Economic Factors Associated with Urban- Rural Migration in Nigeria: A case study of Oyo State Nigeria. *Journal of Human Ecology* 17(1):13-16.

Aigbedion, J. O. (2018). Rural Transportation" in Toyin Falola and Olanrewaju, S. A (Ed) Transport systems in Nigeria, Maxwell School of Citizenship and Public Affairs, Syracuse University pp. 12.

Arnon, I. (2018). Modernization of Agriculture in Developing Countries. Resources, Potentials and Problems. John Whiley & Sons, New York.

Arnon, I. (2018). Modernization of Agriculture in Developing Countries. Resources, Potentials and Problems. John Whiley & Sons, New York.

Azad, E. and Ashish, S.T. (2018). The Prospects of World Urbanization. United Nations Organization, New York.

Bamberger, I.S and Davis, M. O. (2018). An Appraisal of Rural Transport Situation for Sustainable Development in Nigeria. InIbitoye, O. A. (Ed.) *Rural Environment and Sustainable Development.Ado-Ekiti: Petoa Educational Publishers*, pp. 174-180

Barnum, H.N. and Sabot, R.H. (2015). Migration, Education and Urban Surplus Labour. *Employment Series Monograph. Organization of European cooperative for Development, France*.

Barnum, T.Y.and Sabot, P. (2015). Promoting Livelihood Opportunities for Rural Youth. Knowledge and Skills Development Unit. International Fund for Agricultural Development, New York.

Barwell, E.E. (2019). *The Effect of Migration on the Quality of Nigeria Rural Life. Nigerian Agricultural Research Management and Training Institute Seminal Series*, 3:116.

Bennell, J. (2018). Towards a Renewed Focus on Rural Development. *Agriculture and Rural Development* 11 (2): 4-6.

Bennell, P. (2018). Promoting Livelihood Opportunities for Rural Youth. Knowledge and Skills Development Unit. International Fund for Agricultural Development, New York.

Brauvan, J. (2019). Towards a Renewed Focus on Rural Development. *Agriculture and Rural Development* 11 (2): 4-6.

Brauvan, T.O. (2019). Rural Development and Migration in Nigeria: Effect of the Eastern Zone of Bauchi State Agricultural Development Project. Nigerian Institute of Social and Economic Research, NISER, Ibadan.

Chester, N.R and Neelameghan M. O. (2019). The Place of Transport in the Attainment of the Millennium Development Goals in Rural Areas of Nigeria. Ife Journal of Environmental Design and Management.4 (1), 33 - 48.

Chester, R.U. and Neelameghan, K. R. (2019). Nigeria‟s Transport Infrastructural Development: An Integral Part of National Economic Empowerment and Papacostas, C.S. 2018. *Fundamentals of Transportation Engineering. Prentice Hall Inc. New Jersey*.

Connerley, I.A. and Schroeder, M. O. (2019). An Appraisal of Rural Transport Situation for Sustainable Development in Nigeria. In Ibitoye, O. A. (Ed.) ural Environment and Sustainable Development. Ado-Ekiti: *Petoa Educational Publisher*s, pp. 174-180

Czuczman, T.I. (2018). The Prospects of World Urbanization. *United Nations Organization, New York.*

Donnges, P. Ellis, S. Hine, J. and Ternell, A. (218). Improving Rural Mobility Options for Developing Motorized and Nonmotorized Transport in Rural Areas.World Bank Technical Paper No. 525.*World Bank. Washington, DC*.

Donnges, T.I., Aderamo, A. j. and Omolaran, O. I. (2018). “Accessibility Problem and the Incidence of poverty in Nigerian Rural Environment: A Case of Offa Local Government Area of Kwara State”. *Geostudies Forum. Publication of the Department of Geography, University of Ilorin* (3) 2: 45-56.

Ekpe, A. A. (2018). “Road Accessibility Problems and Human Resource Development”. *Journal of Rural Studies* (3) pg 2

Essang, S.M. and Mabawonku, A.F. (2015). Effect of Urban Migration on Rural Development: Theoretical Considerations and Empirical Evidence from Southern Nigeria. *The Developing Economics* 13:137- 149.

FAD (2018). Official Gazette. Federal Government of Nigeria Government Priorities, Federal Ministry of Information, Abuja.

Fadyomi, A.F. (2018). Effect of Urban Migration on Rural Development: Theoretical Considerations and Empirical Evidence from Southern Nigeria. *The Developing Economics* 13:137- 149.

Fadyomi, T.O. (2018). Rural Development and Migration in Nigeria: Effect of the Eastern Zone of Bauchi State Agricultural Development Project. *Nigerian Institute of Social and Economic Research, NISER, Ibadan.*

FAO (2015). The State of Food and Agriculture-1984. Food and Agriculture Organization, Rome.

FAO (2015). The State of Food and Agriculture-1984. Food and Agriculture Organization, Rome.

Geoff, M.R. (2018). Development Strategies for the Rural Poor Economic and Social Division, Food and Agriculture Organization, Rome.

Gregory, C. Enyinna., Ihuoma, D., and Odike Precious (2021). Effect of Erosion On Sustainable Road Construction Project In Nigeria. *International Journal of Scientific & Engineering Research* Volume 12, Issue 9, September-2021

Hetzer, M.P. (2019). Economic Development. Longman Publishers, New York.

Hine, O. (2019). Evolution of rural roads in the Nigeria Cocoa Belt, *Journal of Tropical Geography*, 4 (1) pp. 1-10.

Hine, P.R. (2019). The Effect of Rural Roads on Employment, Productivity and Rural Welfare: A Study of Three Villages in Yobe State, Nigeria. *NISER MonographSeries No. 3, Ibadan, NISER.*

Ijere, M.J. (2019). Gender and Rural-Urban Migration in the Ecuadorian Sierra. Columbia University Press, Columbia.

Ijere, M.J. (2019). Gender and Rural-Urban Migration in the Ecuadorian Sierra. Columbia University Press, Columbia.

International Institute of Tropical Agriculture (IITA) (2015). Agriculture in Nigeria: Identifying opportunities for increased commercialization and investment.

Irz, M. (2001). Current and emerging youth policies and initiatives with a special focus on links to agriculture. South African Case Study Draft Report, pp.1-51.

Naranyan, D. (2015). Empowerment and Poverty Reduction: A Sourcebook. Rawat Publications. New Delhi.

Narayan, Y.O. (2015). Rural Development and Migration in Nigeria: Effect of the Eastern Zone of Bauchi State Agricultural Development Project. *Nigerian Institute of Social and Economic Research, NISER, Ibadan*

Ndem, A.N. (2018). Poverty to Sustainable Development: A Community-based Approach. University of Calabar Printing Press, Calabar, Nigeria.

Nwaugo, C.A (2018). Surveillance for Health status in minority communities. *United State; UK Pubmed central, British Library, University of Manchester* 53 (6) pp. 1-36.

Oguntoye, U.I. and Alani, Q.I. (2018). Poverty to Sustainable Development: A Community-based Approach. University of Calabar Printing Press, Calabar, Nigeria.

Okpara, E.E. (2013). The Effect of Migration on the Quality of Nigeria Rural Life. *Nigerian Agricultural Research Management and Training Institute Seminal Series*, 3:116.

Omosanya, R.T. and Ajibade, W.U. (2018). Corruption and its Socio-Economic Implication in Nigeria. Nigerian Journal of Clinical and Counselling Psychology 11 (1):1-19.

Page, N. and Czube, C.E. (2019). Empowerment: What is it. Journal of Extension 37 (5) Available at www.joe.org/joe 1999 October/Comm.htm.

Petoskey, E.L., Van Stelle K.R. and De Jong, J.A. (2018). Prevention through Empowerment in a Native American Community. Drugs and Society 12 (1-2) 147-162.

Riverson, and Steve Carapetis, John D.N., (2018). "Potential of Intermediate Means of Transport in Improving Rural Travel and Transport in Africa), World Bank Technical Paper No. 161.Infrastructure Division, World Bank, Washington D.C.

Riverson, and Steve Carapetis, John D.N., (2019). "Potential of Intermediate Means of Transport in Improving Rural Travel and Transport in Africa), World Bank Technical Paper No. 161.*Infrastructure Division, World Bank, Washington D.C.*

Starkey, P. (2018). *Improving Rural Mobility Options for Developing Motorized and Nonmotorized Transport in Rural Areas. World Bank Technical Paper No*. 525.World Bank. Washington, DC.

Tabacco Control Research Report (2019). Youth Empowerment and Health Promotion. Available at www.ftce. Fsu.edu/rereport. July 99/inedex. htm.

Transport Research Laboratory (202). The Role of Transport and the Basis for interaction in: Thomas, W.L. ed. Man‟s Role in Changing the Face of the Earth. Chicago, University of ChicagoPress.

Twaddell, A.M and Emerine, D. (2018). Empowerment and Poverty Reduction: A Sourcebook. Rawat Publications. New Delhi.

World Bank (2018). "*Rural Transportation" in Toyin Falola and Olanrewaju, S. A (Ed) Transport systems in Nigeria, Maxwell School of Citizenship and Public Affairs, Syracuse University* pp. 128

World Bank (2019). Youth Employment: Key to Conflict Prevention, Poverty Reduction.

World Health Organization (2019). The Effect of Rural Roads on Employment, Productivity and Rural Welfare: A Study of Three Villages in Yobe State, Nigeria. NISER Monograph Series No. 3, Ibadan, NISER.

Adekoya, O. A. (2020). Administration and Provision of roads in State, NISSER,Ibadan

APPENDIX 1

QUESTIONAIRE

Department of Project Management Technology,

Federal University of technology Owerri,

P.M.B. 1526, Owerri,

Imo state.

Dear Respondent,

I am a Masters student of the above-named institution and Department, carrying out a thesis research on **"Analysis of Effects of Rural Road Infrastructure on Socio-Economic Development in Imo State.".** I hereby require some information from you to enable me complete my research work. I assure you that this is purely an academic exercise and all information given to me will be treated with great confidentiality and your completion of attached questionnaire will be highly appreciated.

Thanks,

Yours Faithfully,

Reg no: ……

SECTION A: Socio-Demographic Characteristics

Please tick (√) as appropriate.

1. Name of Community: .....
2. Gender: Male ☐ Female ☐
3. Age: 21-30 Years ☐ 31-40 Years ☐ 41-50 Years ☐
   50 Years and Above ☐
4. Marital Status: Single ☐ Married ☐ Widowed ☐ Divorced ☐
5. Occupation/Profession: Civil Servant ☐ Farmer ☐ Fishing ☐ Trading ☐
   Unemployment ☐
6. Educational Qualification: No Formal Education F.S.L.C Primary ☐ Secondary ☐
   Tertiary ☐ ☐
7. How long have you lived in this Area: Below 5 Years 5-10 Years ☐
   Above 10 Years ☐

SECTION B: Key Indicators of Rural Economy in the Study Areas.

What do you do for a living?

(a) Farming ☐
(b) Brick laying ☐
(c) Brick moulding ☐
(d) Quarry works ☐
(e) Others ☐

How long have you been in your present occupation?

1-2yrs ☐ 3-4 yrs. ☐ 5yrs. And above ☐

Do you make profit in what you do?

Yes ☐ No ☐

If Yes, what do you think contributed to that profit? Please give reasons……

Will you recommend your occupation to people?

Yes ☐ No ☐

Do have accessible roads in your community?

Yes ☐ No ☐

What is the condition of the roads?

Good ☐ bad ☐ Worse

Has been any form of road construction work in your area?

Yes ☐ No ☐

If Yes, has it been completed as at the time of this report?

Yes ☐ No ☐

If No, what factor do you think prevented road construction in your area?

(a) Bad government ☐

(b) Weak government policies ☐

(c) Attitude of people to rural development ☐

(d) Others. ☐

Do you think that constructing new roads will create more employment?

Yes ☐ No ☐

If Yes, please explain……..

SECTION C: Effect of Rural Road Construction Project on Agriculture

Are you into any form of agriculture?

Yes ☐ No ☐

What type of agriculture are you into?

a. Fish farming ☐
b. Animal husbandry ☐
c. Forestry ☐
d. Crop farming ☐
e. Snailry ☐
f. Piggery ☐
g. Poultry ☐
h. Others. ☐

How much do you earn per month?

Less than ₦5,000☐ ₦5,000-10,000☐ ₦11,000-15,00☐above ₦15,000 ☐

How many people work for you in your farm?

1-5 persons ☐ 6-10 persons ☐ above 10 persons ☐

Do you find it difficult paying them?

Yes ☐ No ☐

If you have the opportunity, will you employ more people?

Yes ☐ No ☐

Have you applied for any form of assistance from the government?

Yes ☐ No ☐

If Yes, were your request granted?

Yes ☐ No ☐

Do you have accessible road to your farm?

Yes ☐ No ☐

How do you transport your agricultural produce?

By foot ☐ using animals ☐ Using buses ☐ other means of transportation ☐

SECTION D: Effect of Rural Road Construction Project on Rock Quarrying

Have you been involved in Rock Quarrying?

Yes ☐ No ☐

How much were you paid per work?

Less than ₦5,000 ☐ ₦5,000-10,000 ☐ ₦11,000-15,000 ☐ above ₦15,000 ☐

How were you paid?

Daily ☐ Weekly ☐ Monthly ☐

Were your salary enough to carter for your needs?

Yes ☐ No ☐

Do you have good roads to your working site?

Yes ☐ No ☐

Do you think that having a good road will boost your work?

Yes ☐ No ☐ Not sure ☐

SECTION D: Effect of Rural Road Construction Project on Brick Production in Okigwe, Imo State

Do you produce bricks in lack quantity?

Yes ☐ no ☐

How do you work?

Daily ☐ Weekly ☐ Every Two Weeks ☐ Monthly ☐

How much do you earn per month?

Less than ₦5,000 ☐ ₦5,000-10,000 ☐ ₦11,000-15,000 ☐ above ₦15,000 ☐

Do you have good access roads to your work site?

Yes ☐ No ☐

If No, do think it will be wise to construct good access roads to your work site?

Yes ☐ No ☐

APPENDIX II

Obtaining information from a respondent in Ezinachi Okigwe LGA by the Researcher.

Obtaining response from a Quarry worker at Ihube in Okigwe LGA by the Researcher.

Obtaining information from farmer in Amor Okigwe LGA by the Researcher.

A pictoral representation of quarry produce that is ready for sale as captured by the Researcher during field work.

A pictorial view of a rocky ground where quarry works is done as captured by the Researcher.

Obtaining information from respondent in his farm by the Researcher during field work.

LIST OF DATA COLLECTED DURING FIELD WORK

DATA ON ROCK QUARRYING

Years	Quantity Produced (Trips)	Quantity Supplied (Trips)	Labour (₦)	Number of people Employed
2000	15	13	180,000	3
2001	11	6	88,000	4
2002	23	18	144,000	6
2003	10	7	56,000	3
2004	14	12	96,000	4
2005	11	8	64,000	3
2006	13	6	42,000	3
2007	18	9	72,000	4
2010	20	18	144,000	6
2011	37	21	168,000	8
2012	35	29	232,000	7
2013	31	26	208,000	6
2014	36	33	264,000	10
2015	34	29	232,000	9
2016	43	39	312,000	11
2017	38	36	288,000	10

DATA ON AGRICULTURAL PRODUCTION

Years	Quantity Produced (KG)	Quantity Supplied (KG)	Labour (₦)	Number of people Employed
2000	2,500	2,180	10,400	6
2001	8,500	6,500	11,500	9
2002	1,800	1,650	6,000	4
2003	9,800	8,600	21,400	15
2004	11,900	11,000	19,300	18
2005	8,600	8,900	10,600	9
2006	19,800	15,000	26,850	23
2007	13,800	10,600	7,890	7
2011	28,000	22,800	32,800	26
2012	33,000	29,780	42,900	30
2013	21,000	17,860	23,850	18
2014	39,000	30,560	60,000	40
2015	38,100	32,620	58,200	38
2016	43,600	40,000	73,000	50
2017	34,300	32,000	54,000	36
2018	37,250	32,500	61,000	41

DATA ON BRICK LAYING

Years	Quantity Produced (KG)	Quantity Supplied (KG)	Labour (₦)	Number of People Employed
2000	11,000	8,000	24,200	3
2001	30,000	20,000	13,900	5
2002	20,000	18,000	16,800	8
2003	8,000	28,000	14,900	6
2004	26,000	24,000	10,600	8
2005	39,000	32,000	18,600	13
2006	18,000	10,000	3,800	22
2007	15,600	7,800	5,400	18
2010	60,000	40,000	69,800	25
2011	100,000	85,000	125,000	40
2012	180,000	169,000	149,000	45
2013	210,000	200,000	289,000	48
2014	200,000	197,000	308,000	45
2015	192,000	167,000	257,000	49
2016	187,000	180,000	367,000	60
2017	199,000	192,000	467,000	50

APPENDIX IV

REGRESSION ANALYSIS OUTPUT

```
1  . import excel "C:\Users\MAIN PC\Desktop\Malachy Last Defense\Book1 (DATA ON ROCK QUARRYING).xlsx", sheet

2  . regress NE Years QP Qs LB
```

Source	SS	df	MS
Model	109.679842	4	27.4199606
Residual	9.2576577	11	.841605245
Total	118.9375	15	7.92916667

Number of obs	=	16
F(4, 11)	=	32.58
Prob > F	=	0.0000
R-squared	=	0.9222
Adj R-squared	=	0.8939
Root MSE	=	.91739

NE	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Years	.005629	.1130968	0.05	0.961	-.2432954	.2545534
QP	.1020697	.0705324	1.45	0.176	-.0531712	.2573105
Qs	.1899772	.1602262	1.19	0.261	-.1626783	.5426328
LB	-7.53e-06	.0000149	-0.51	0.622	-.0000402	.0000252
_cons	-10.18623	226.2468	-0.05	0.965	-508.1522	487.7797

```
1  . import excel "C:\Users\MAIN PC\Desktop\Malachy Last Defense\Book2 (DATA ON AGRICULTURAL PRODUCTION).xls

2  . regress NE Years QP QS LB
```

Source	SS	df	MS
Model	3167.95728	4	791.98932
Residual	37.7927213	11	3.43570194
Total	3205.75	15	213.716667

Number of obs	=	16
F(4, 11)	=	230.52
Prob > F	=	0.0000
R-squared	=	0.9882
Adj R-squared	=	0.9839
Root MSE	=	1.8536

NE	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Years	-.2772536	.2556249	-1.08	0.301	-.8398802	.285373
QP	.0002287	.0002814	0.81	0.434	-.0003906	.000848
QS	.0001471	.0003705	0.40	0.699	-.0006683	.0009626
LB	.0004949	.0000892	5.55	0.000	.0002985	.0006913

_cons	556.2539	511.2758	1.09	0.300	-569.0566	1681.564

```
1  . import excel "C:\Users\MAIN PC\Desktop\Malachy Last Defense\Book3 BRICK LAYING.xlsx", sheet("Sheet1") f

2  . regress NE Years QP QS LB
```

Source	SS	df	MS
Model	5661.6252	4	1415.4063
Residual	216.812302	11	19.7102093
Total	5878.4375	15	391.895833

Number of obs	=	16
F(4, 11)	=	71.81
Prob > F	=	0.0000
R-squared	=	0.9631
Adj R-squared	=	0.9497
Root MSE	=	4.4396

NE	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Years	2.47457	.5730898	4.32	0.001	1.213208	3.735932
QP	.0001156	.0001458	0.79	0.444	-.0002052	.0004365
QS	-.0000289	.0001483	-0.20	0.849	-.0003554	.0002975
LB	-.0000116	.0000225	-0.51	0.617	-.0000611	.000038
_cons	-4949.132	1147.784	-4.31	0.001	-7475.386	-2422.877