



CHALLENGES OF PHYSICAL DISTRIBUTION OF AGRICULTURAL PRODUCE AMONG RURAL SMALLHOLDER FARMERS IN ENUGU NORTH SENATORIAL ZONE IN NIGERIA

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Abstract: *Effective and efficient physical distribution of agricultural produce had had serious challenges in Enugu North senatorial zone of Enugu State, Nigeria. The study sought to determine the influence of poor road transportation network on effective and efficient distribution of agricultural produce in Enugu North senatorial zone. Secondly, it sought to ascertain the influence of inadequate storage facilities on effective and efficient distribution of agricultural produce in the zone. The population of study comprises farmers of agricultural produce in the zone which is unknown as there is no registered farmers' association in the area. Cochran's sample size determination was used to determine the sample size of 384. Survey method was used to distribute structured questionnaires to the 384 respondents who eventually returned 250 well filled questionnaires. For the reliability of the study, Cronbach's alpha was used and the value of 0.982 was determined. Analysis of data was done using simple linear regression statistical technique and the findings revealed that poor road transportation network has a significant negative influence on effective and efficient distribution of agricultural produce in Enugu North senatorial zone. Similarly, it was revealed that inadequate storage facilities have a significant negative influence on effective and efficient distribution of agricultural produce in the zone. Thus, government has to encourage the local and international supply of agricultural produce in the entire zone and internationally by building good road network as well as providing adequate storage facilities for farmers aimed at safe keeping and safe delivery of their agricultural produce to avoid post-harvest losses and reduce poverty by improving the farmers' income.*

Keywords: *Physical distribution, road transportation, storage, storage facilities, farmers, agricultural produce, Enugu North*

Introduction

There is empirical evidence that at the national level in Ethiopia, agriculture employs at least 80% percent of the working population (Tamene & Magento, 2017). Indeed, from the agricultural sector comes more than 48% of Ethiopia's Gross Domestic Product (GDP) according to (Tamene & Magento, 2017). For them, in the majorly dominated agro-based economy of Ethiopia, the smallholder sub-sector plays a crucial role in generating national output and means of

livelihood. Nonetheless, road transport is the most predominant mode of transportation; making transportation indispensable in the socio-economic development of any country or region in the world (Ajiboye & Afolayan, 2009). Unarguably, the exchange of goods and services, movement of people, information dissemination and the promotion of rural economy is highly dependent on efficient and effective rural transportation networks (Tamene & Magento, 2017). Thus, the movement of materials from the producer to the

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consumer, or the storage and movement of finished goods from production to consumption outlets is known as physical distribution (Mihai & Irina, 2013; Tseng et al., 2005). Apparently, physical distribution is a robust channel management component (Frazier, 2009). Notably, identifying the target market for a firm's products and services is very crucial in determining workable physical distribution strategies (Mbondo et al., 2015). Physical distribution is defined as the movement of raw materials and finished products (Ehikwe, 2002) and perceived as an aspect of outbound logistics of a firm that builds and sustains a relationship between the firm and its customers (Friday et al., 2011).

It refers to the outward movement of goods to the consumer from the end of the assembly line (Gani, 2017; Mulky, 2013). For Kotler et al. (2018), it comprises tasks involved in planning, executing, and controlling the physical flow of materials and final goods and supporting services from the upstream to the downstream; where they are used to satisfy consumer/customer needs and wants at a profit to the company. As a matter of fact, physical distribution aims at getting the right materials to the people, at the right place, at the right form, at the right quantity, at the right time (Rabinovich et al., 2008) and the right price. In agreement, Nebo et al. (2020) and Azizi et al. (2014) stated that it refers to as the series of overlapping activities that creates place, time and form utilities that are critical to customer service.

Physical distribution is a wonderful service rendered to the industrial customers and final consumers (derived demand) through a special effort made by the members of the distribution channel (middlemen or channel institution) (Azizi et al., 2014). Distribution according to Hosseinpour et al. (2013) is a very relevant aspect

of the marketing mix as it generates high competitive advantage for the company by ensuring that the consumer certifies the availability of his/her products. In projecting "green distribution" Mwaura et al. (2016) argued that distribution directly affects supply chain cost and customer experience by determining a company's overall profitability. Mwaura et al. (2016) declared that distribution centres and the vehicles that transmit an environmental friendly distribution practices represent green distribution in reality. They noted in addition that reducing carbon dioxide and embarking on other sustainable distribution behaviors that are economically valuable will foster a better quality of life for future generations.

More so, inadequate storage facilities, bad road network, power failure and poor communication has disorganized physical distribution functions which include transportation, warehousing, order processing, packaging, material handling and information management; having created more challenges than improving physical distribution service quality (Friday et al., 2011). Similarly, Nguyen (2019) in furtherance of the definition of physical distribution stated that it is the movement of finished goods from an organization to the consumers via a planned program of events. For Nguyen (2019), the program of events include transportation, warehousing, material handling, assembling and processing, packaging and information; which are the six fundamental physical distribution functions. Additionally, in supply chain management, physical distribution service quality does play a monumental role (Nguyen, 2019). The main objective which physical distribution tend to achieve is to ensure that there is timely and reliable movement of goods from the receipt of an order to effective and



efficient delivery of goods to the customer (Rabinovich et al., 2008). Quite interesting, empirical evidence indicated that the performance of the print media industry was significantly and positively influenced by physical distribution strategies (Mbondi et al., 2015).

Furthermore, the key physical distribution elements in the movement of agricultural or farm produce from the farm to the markets where they are needed are transportation and storage facilities. Nevertheless, in relation to household or smallholder farming, these two elements are grossly inadequate. Delays in transportation caused by bad condition of roads have resulted in higher transportation costs and higher cost of agricultural outputs due to bad road condition (Onwo & Udeorah, 2021). Ironically, Tamene and Magento (2017) observed that reducing the distances to major markets through adequate road transport network was germane in enhancing agricultural productivity of smallholder farmers in Ethiopia. Sadly, it has been reported that big truck drivers have abandoned most of the roads in the Sekyere Central District of the Ashanti Region of Ghana to commercial motorcycle operators as a result of poor road condition in which farmers found it very difficult to get vehicles to transport their farm produce to the market centres (Taiwo & Kumi, 2013). Previous research revealed that rural farmers' income have been drastically reduced due to high transportation costs of agricultural produce; consequent upon bad road condition in Ilorin East LGA of Kwara State in Nigeria (Tunde & Adeniyi, 2012). In addition, Nigeria loses more than a total of N48 billion on post-harvest losses annually (Faajir, 2017). That was as a result of lack of the provision of modern storage facilities coupled with farmers' lack of technical knowhow to process

agricultural outputs, thus, agricultural crops are vulnerable to post-harvest losses (Adepoju, 2014). Furthermore, empirical evidence revealed that studies on transportation and storage facilities as major physical distribution functions in the agricultural sector abound (Mobolade et al., 2019; Adeniyi et al., 2018; Aikins & Akudo, 2015; Ebewore & Achoja, 2013). However, none of them has engaged academic arguments and discussions on how the problems of poor road transportation networks and inadequate storage facilities can be permanently resolved having plagued the effective and efficient physical distribution of agricultural produce in Enugu North senatorial zone of Enugu State, Nigeria.

Review of Related Literature

Physical Distribution of Agricultural Produce

Physical distribution is one of the fundamental and important aspect of marketing mix variables that adds enormous value to products by creating place utility, time utility, quantity utility, price utility, form utility and possession utility (Nebo et al., 2020; Ajah et al., 2020). The activities that allow the free movement of agricultural produce from production centers or from the farm to where they are needed by the consumers or industrial customers are known as agricultural marketing (Abugu et al., 2020). According to Abugu et al. (2020), transportation, storage, processing and handling make up these activities. Nevertheless, transportation is more pivotal to the completion of the physical distribution process (Ajah et al., 2020) because a good transportation system is indispensable in ensuring effective distribution of agricultural produce (Ajiboye & Afolayan, 2009). Unfortunately, bad transportation network has continued to plague the free movement of agricultural or farm produce from place to place (Adefalu et al., 2016). Apparently, due to the bad



nature of rural Nigerian roads, it became very hard for commuters and other vehicles to penetrate the farms to load and transport farm produce such as yam, cassava, cocoyam, maize, millet, melon, cowpea, soybean, potato, tomato, plantain, beans, rice, garri, other fruits and vegetables etc., from the farms to the existing local and urban markets. In other words, majority of the farm roads in Nigeria are impassable to the extent that farmers carry their farm input and output on their heads in search of available farms and markets. Unequivocally, Umeh et al. (2018) revealed that the traditional means of transportation such use of head, donkeys, camels, wheel barrows, bicycles, motor cycles, motor van, and tricycles (Keke) are being used for transporting farm produce in the localities. Moreover, besides the problems of bad road networks and fewer numbers of vehicles, high transportation costs have immensely truncated the growth of agricultural production in Ikwo local government area of Ebonyi State, Nigeria.

Emphatically, the task involved in linking many of the agricultural producing areas with available markets is not easy owing to the fact that agricultural produce are not geographically concentrated but rather dispersed (Kohls & Uhl, 1985). Despondently, inadequate infrastructure and transportation services have posed serious threats to food production and circulation in Nigeria and other developing countries in the world (Ajiboye & Afolayan, 2009). In addition, Ajiboye (2016) revealed that high transportation cost affected the distribution of agricultural produce in Nigeria. Incidentally, during post-harvest or farming season, food storage can be used to forestall food scarcity (Abugu et al., 2020). Kiaya (2014) declared that the core rationale for storing agricultural produce in Nigeria is the nature of the perishability of agricultural produce and bio-

materials, continuous food production, export market opportunity, regulation and control of price, and nutritional quality preservation. High storage cost, product spoilage during storage, attack by pests and diseases, poor handling and damaged containers usage are storage problems that result to post-harvest losses in Nigeria (Kumar & Kalita, 2017).

Furthermore, farmers traditionally store their produce such as yam, cocoyam and other tubers under large trees to provide shades for it, bury them in underground pits, tie them in barns, and wrap them with leaves and grasses (Ituma, 2013). They also use old drums, jute bags, earthen pots, gourds and rhombus which cannot protect the crops from diseases, insects, fungi, bacteria attack and bad weather conditions thereby handing in heavy social and economic losses to the household or smallholder farmers (Ituma, 2017). Farmers use traditional approaches since there is no modern innovative storage facilities available to them (Ituma, 2013). In Nigeria, farmers use polypropylene bags, plastic containers, and jute sacks and silos which are effective traditional storage structures to store agricultural crops (Abbas et al., 2018). In contrast, De Groote et al. (2013) observed that traditional storage structures are being jettisoned by farmers in Africa as they shell their maize earlier and tend to store grains inside their house in polypropylene bags to protect it from diseases and pests and from being stolen by thieves. Interestingly, cribs and public silos were the improved storage materials used by farmers (Fakayode et al., 2014).

Kumar and Kalita (2017) added that grains are naturally stored as bulk or bags in simple granaries made with local materials such as mud, straw, bricks, and bamboo in most of the developing countries in South Asia and Africa. Nevertheless,



the most commonly used storage structures in Asia are plastic containers, mud bins and pots, kothis, and bokharies (Baloch, 2010). Chigoverah and Mvumi (2016), and De Groote et al. (2013) lamented that more than 30% of grains are lost as a result of the use of traditional storage methods; especially when they are used to store grains for more than six months.

Poor Road Transportation Network of Agricultural Produce in Nigeria

Transportation is sine qua non in conducting modern times economic activities (Ajah et al., 2020; Hashidu & Adamu, 2018; Ayo-Odifiri et al., 2017). Road transportation system is germane in fostering tremendous economic growth in agricultural production (Edriss, 2017). Nigerian roads are in such a deplorable condition that farmers trek to nearby and distant markets carrying their agricultural crops or produce on their heads (Oladosu et al., 2018). Consistent with this, Ikejiofor and Ali (2013) revealed that 85.3% of farmers travel on the bad roads while only 14.7% trek on the good ones. According to Ikejiofor and Ali (2013), research showed that farmers preferred to carry their produce on their heads (head potrage). It was also revealed that there is a strong and positive relationship between transport cost and nature of roads travelled by farmers and also, a strong and positive relationship between transport cost and distance travelled (Ikejiofor & Ali, 2013).

Poor transportation network has made the cost of transportation higher in Africa than any other continent in the world (Berg et al., 2017). Even in the health sector, empirical evidence revealed that qualitative health care delivery requires adequate road transportation infrastructures (Gbadamosi & Olorunfemi, 2016). Surprisingly, inaccessibility to medical treatment was caused by poor road network and high transport cost. According to

Gbadamosi and Olorunfemi (2016), emergencies in the rural hospitals were stalled due to poor transportation system. Paradoxically, Berg et al. (2017) argued that trade deficit, unemployment, crime, illiteracy, poverty and ill health were encountered by the poor masses consequent upon poor transportation network. In reality, inadequate transportation network is a harbinger to the growth of economic activities in Nigeria (Ayele, 2017; Afolabi, Ademiluyi, Adebayo & Oyetubo, 2016; Avenenge, 2015). Sadly, poor accessibility of rural roads deprives many communities in Nigeria access to their most basic needs (Adeniyi et al., 2018; Afolabi et al., 2016). Hopefully, adequate transportation network (good roads and available vehicles) is what it takes to guarantee an efficient and effective movement and availability of agricultural produce from the upstream to the downstream (Gbam, 2017; Ajiboye & Afolayan, 2009).

Good road transportation network is highly critical in Nigeria and other developing countries in the world since agricultural produce that emerge from the farms are mainly perishable and lacks available and modern storage facilities to preserve them for longer period of time after harvest (Adefalu et al., 2016). Transportation is even hypercritical when the agricultural produce are certain fruits and vegetables that are highly perishable (high perishability) and thus requires readily available vehicle for immediate and onward movement to the available markets where both the intermediaries and final consumers are readily awaiting its arrival (Gbam, 2017). Impressively, empirical study revealed that the relationship between rural road network and agricultural productivity was significantly positive (Edeme et al., 2020). Aikins and Akude (2015) in their study reported that Nigerian roads are very bad leading



to high transport fare, vehicle breakdown and delays in the movement of agricultural produce. This poor condition of rural roads in Nigeria has resulted to poor agricultural production (Oladosu et al., 2018).

However, Nigerian roads are greatly in desolate condition and may not seamlessly permit free movement of agricultural produce aimed at generating income for the farmer as well as ensuring poverty alleviation (Adefalu et al., 2016; Etim & Nkeme, 2015; Ezealaji & Adenegan, 2014). Edriss (2017) in an empirical study revealed that poverty has a significant relationship with road network. Moreover, the bad nature of rural roads in Nigeria is such that imposes significant vehicle operating costs and travel times leading to increased transportation fare and price of agricultural produce in the market (Fungo, Krygsman & Nel, 2017; Adefalu et al., 2016). In agreement with this, Akuirene et al. (2020) stated that bad road network has a significant impact on the maintenance of vehicles (Enwerem & Ali, 2016). Adeniyet al. (2018) added that poor transport network increases not only the price of conveying food from one place to another, rather, it also increases the price of supplying farm inputs such as water and fertilizer. Regrettably, the income generated by farmers is drastically reduced by poor nature of Nigerian roads (Edeme et al., 2020). They added that this poor state of roads equally affects the nature and quantity of agricultural produce to be harvested and transported by the farmers.

In contrast, Adeniyet al. (2018) revealed that there is a positive relationship between cost of evacuation of farm output and improvement of road network. For Adeniyi et al. (2018), as the condition of the roads leading to the farms improves, farmers experience a proportionate

reduction in the cost of conveying farm produce. Overtly, this generates a ripple effect as farm produce will get quicker to the accessible markets without spoilage or damage. In tandem with this, previous study indicated that improved commercial activities which led to convenient location of shops, increase in income, improved standard of living and poverty alleviation was propagated by road network improvement (Hashidu & Adamu, 2018).

Furthermore, about 80% increase in the marketing cost of agricultural produce is caused by poor transportation facilities (Adedeji et al., 2014; Asogwa&Okwoche, 2012). Adedeji et al. (2014) precisely noted that inter-urban and intra-urban roads are better than rural roads where most of the smallholding farmer live. In order to meet the needs and wants of the rural population, many programs have been embarked upon by the federal government to guarantee adequate provision of transport facilities; yet, these programs have not yielded the expected results (Adedeji et al., 2014). In addition, in Jos North, poor transportation system prevented farmers from specializing in the production of agricultural crops that offer them competitive advantage (Gbam, 2017). Therefore, to enable agriculture contribute significantly to the economic growth in Nigeria, adequate transportation networks needs to be provided to expedite seamless movement and reduce the cost of the flow of agricultural commodities to areas where they are needed (Gbam, 2017). The researcher therefore proposes that:

H1: Poor road transportation network has a significant negative effect on physical distribution of agricultural produce in Enugu North senatorial zone.



Poor Storage Facilities of Agricultural Produce in Nigeria

Food grains have substantially been damaged after harvest as a result of inadequate storage and processing facilities (Mobolade et al., 2019). Rice, maize, millet, cowpea, pigeon pea, sorghum, soya beans and other crops have been lost due to poor storage facilities (Faajir, 2017). Agbaeze et al. (2020) identified storage as a critical component of food production value chain in Nigeria. Certainly, the judicious provision of adequate storage facilities to farmers will nip problems of wastages and scarcity in the bud being that the major bane of food security in Nigeria is poor or inadequate storage facilities (Adegbola et al., 2011; Igberaese & Okojie-Okoedo, 2010). Ebewore and Achoja (2013) reported that storage facilities such as barn (44%), basket (26.7%), floor/platform (13.3%), bag (13.3%), underground pit (1.35%), and container/bin/pot (1.35%) were available to arable farmers and that most of the storage facilities were grossly ineffective for storing farm produce besides barn.

Painstakingly, post-harvest losses of agricultural crops can be drastically and dramatically reduced when adequate storage facilities are put in place coupled with the fixing of transportation for seamless distribution (Adepoju, 2014). However, a lot of wastages are experienced by Nigerian farmers leading to food scarcity and poverty in the country (Adegbola et al., 2011). Food security cannot be achievable in a culture of wastage especially when adequate storage facilities are unfixed (Igberaese et al., 2010). Indeed, fixing adequate storage facilities would have averted food wastage of 0.81 million metric tonnes experienced in Nigeria between 1995 and 2000 (Adegbola et al., 2011). Shockingly, 25–40% of losses of food grain specifically within the farm occur during

storage in Sub-Saharan Africa. In support of this argument, Rajashekar et al. (2012) reported that in India, post-harvest losses resulted to 12 to 16 million metric tons of grains within one year, an amount reported by World Bank to be able to feed 1/3 of the Indian poor. Adepoju (2014) in his study discovered that inadequate storage facilities significantly contributed to the post-harvest agricultural losses in Kano. This is consistent with the study done by Seid et al. (2013), where it was revealed that post-harvest losses in maize and horticultural crops was linked to lack of adequate storage facilities.

In short, storage simply means the art and science of preserving and safe keeping of materials for future use (Ebewore & Achoja, 2013). In the field of agriculture, it is the preservation and safe keeping of agricultural produce to avoid decay, obsolescence, rot, and spoilage (Deshi et al., 2014). Inadequate industries exist in Nigeria with the intent to transform agricultural produce into finished products, aside the fact that incessant power failures does not allow them to operate at full capacity even when they fully exist (Abbas et al., 2018). Consequently, a lot of money is lost regarding post-harvest losses by Nigerian farmers as a result of poor or inadequate storage facilities (Abbas et al., 2018). In line with this, most retailers and farmers of agricultural crops in Kano, Nigeria experienced losses due to bad weather condition, inadequate transportation facilities, poor handling, poor sales, attack by diseases and pests, poor storage facilities and managerial ineptitude (James et al., 2018).

James et al. (2018) revealed that more than 84% of respondents accepted that poor storage facilities are the main causes of post-harvest losses of agricultural produce in Nigeria. This finding revealed that poor storage facilities is fourth



behind poor handling, pests and diseases, bad weather condition and poor market patronage, while toppling managerial skills and poor transportation. Corroborating this study, Abdullahi et al. (2020) reported that small scale farmers face the challenge of insufficient storage facilities to preserve their maize and make profit from them when they are brought to the markets. In their study, Abdullahi et al. (2020) noted that inadequate storage facilities was next to lack of capital, followed by poor government support, high cost of labor, diseases and pests, and problem of transportation. In line with this, Agada and Ijih (2019) revealed in their study that aside improper packaging, pre-mature harvesting, pests and diseases attacks and processing facilities inadequacy; inadequate storage facilities contributed immensely to post-harvest crop losses. All these agricultural problems are caused by government negligence of the value of agriculture leading to their lack of support to farmers in combating these challenges toward moving the nation forward through achieving sustainability in agriculture (Abdullahi et al., 2020; Abbas et al., 2018).

Interestingly, farmers were encouraged to add value and increase the shelf life of their agricultural produce through the Nigerian agricultural policy by developing and using both “on-farm and off-farm” storage facilities and agro processing technology (Adepoju, 2014). Sequel to poor processing and poor storage facilities in Nigeria, the Nigerian Stored Products Research Institute in 1985 estimated that between 30-50 % of grains, roots and tubers, and nearly 100% of the fruit and vegetables grown in Nigeria are wasted (Okojie, 1991). Consequently, storage techniques were developed by Food and Agricultural Organization (FAO) and Nigerian Stored Products

Research Institute (NSPRI) to support farmers in storing their fruits and vegetables. Unfortunately, small scale farmers are very poor in Nigeria to make high energy consuming refrigeration technique available. Surprisingly, Agada and Ijih (2019) reported that maize was stored by majority of farmers using chemicals. Mobolade et al. (2019) issues a warning on the toxic nature of using chemical to store grains, despite its recorded success in preserving and storing them.

Coincidentally, Mobolade et al. (2019) writing on the traditional grain preservation and storage methods in Nigeria and India, specifically commended the use of storage containers. Accordingly, Mobolade et al. (2019) praised the socio-economic impact of the storage container by critically noting its cheapness, environmental friendliness and the grain’s high shelf life. Obviously, commodities can be safeguarded from insect infestation for substantially longer periods via this traditional method (Mobolade et al., 2019). Breathtakingly, drying in the sun, use of sack for storage, hand winnowing and threshing, use of pestle and mortar for grinding were the highly traditional post-harvest approaches adopted by farmers (Agada & Ijih, 2019). The researcher therefore proposes that:

H2: Poor storage facilities have a significant negative effect on physical distribution of agricultural produce in Enugu North senatorial zone.

Resource-Based Theory

The threshold of this study is the resource based theory (RBT) which posited that a firm requires effective use of resource to gain competitive advantage (Davis & Simpson, 2017). However, resources are those assets owned by a firm, groups and/or individuals such as materials, man, machine and money that are used in actualizing



organizational and personal objectives and goals. Barney and Hesterly (2015) declared that the RBT which is a strategic management concept proposes that the resources available to a firm generate high competitiveness for it. The theory holds that superior competitive advantage could be gained by firms that have great marketing capabilities (Roostika, 2019). It tries to identify the sources and causes of a firm's competitive advantage and performance by focusing on the internal resources and capabilities (Ramon-Jeronimo, 2019). Thus, it's only when a firm's resources are all together precious, inimitable, irreplaceable and extraordinary that competitive advantage can be realized (Poazi et al., 2017). Sibanyoni and Mupambwa (2017) contended that the adoption of RBT in a competitively dynamic business environment is very relevant in achieving robust marketing success.

Contextually, it is obvious in this empirical study that the major challenges encountered by the farmers in the physical distribution of their agricultural produce to the available markets are the inadequacies of road transportation networks and storage facilities. This is in tandem with Sibanyoni and Mupambwa (2017) who argued that the inadequacy of resources needed for innovating and improving a firm's internal capabilities nibble away at its attainment of sustainable competitive advantage. Unquestionably, road transportation network and storage facilities are the two core resources required in ensuring the availability (physical distribution) of agricultural produce to the industrial customers and/or final consumers aimed at gaining competitive advantage. Hence, their lack limits the farmers' expectation (profit earnings). In truism, the availability of adequate road transportation networks and effective storage facilities (resources) will substantially enhance the

farmers' economic resources in such a way that the costs of storing and transporting agricultural produce will drastically be reduced by earning competitive advantage for the farmers through improved profits.

Methodology

Survey method was adopted by the research by administering structured questionnaire to gather primary data from farmers who produce agricultural crops in Enugu North senatorial zone. The researcher selected larger and more viable native markets such as Orié Okpuje, Ikpa market Nsukka, Orié Oba, Orié Igboeze, Nkwo Ibagwa-Aka, Nkwo Okutu, Afor Opi, Eke Ozzi, and Eke Obollo-Eke. The scope was anchored on poor road transportation network and also, poor storage facilities which are challenges of physical distribution of agricultural produce in this zone. The population is unknown and sample size of 384 was determined using Cochran's method. From the 384 sample size, 250 were correctly filled, returned and validated. The 250 farmers were chosen conveniently. Face and content validity were used to determine the validity of the instrument. Research experts modified and made the necessary corrections so that the instrument can measure adequately. The value of the test of reliability is 0.982 which was conducted using Cronbach's alpha indicating that there is internal consistency of the instrument. The hypotheses were tested using simple linear regression statistical tools applied with the aid of Statistical Package for Social Sciences (SPSS; Version 22).

Data Presentation and Analysis

Here, the data generated from the farmers of agricultural produce in Enugu North senatorial zone were presented in frequency tables and analyzed using statistical tool. The scaling ranges from 1-5 representing strongly disagree, disagree,



undecided, agree and strongly agree respectively.
The analysis was done with descriptive and

inferential statistics with the aid of SPSS version 22.0.

Table 1. Coded responses on the effect of poor road transportation network on the physical distribution of agricultural produce in Enugu North senatorial zone.

S/N o	Questionnaire items	Strongly disagree	Disagree	Undecided	Agree	Strongly Agree	Total (Freq)
		Freq	Freq	Freq	Freq	Freq	
1	Bad road network is a major problem of agriculture in your locality	01	05	14	45	185	250
2	The bad roads damage agricultural produce during transit	0	03	14	41	192	250
3	Due to the poor nature of the roads, farmers witness transport delays often times	02	02	15	44	187	500
4	Transporters charge high fare prices for carrying farm produce due to bad road networks	04	05	10	51	180	250
5	Hoodlums and armed robbers attack snail speed vehicle and steal their money and farm produce due to bad road networks	02	04	12	54	178	250
6	Sometimes the transport vehicle may spoil on the way or may not even turn up for one reason or the other	05	09	10	43	183	250
TOTAL		14	28	75	278	1105	1500

Source: fieldwork 2020

In Table 1, based on the aggregate response, a total of 1105 indicated strongly agree, 278 indicated agree, 75 indicated undecided, and 28 indicated disagree, while 14 indicated strongly disagree respectively. This implies that poor road transportation network has a significant and negative effect on physical distribution of agricultural produce in Enugu North senatorial zone.



Hypothesis One

H1: Poor road transportation network has a significant negative effect on physical distribution of agricultural produce in Enugu North senatorial zone.

Table 2. Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.955 ^a	.911	.911	.20410	.213

a. Predictors: (Constant), Poor Road Transportation Network

b. Dependent Variable: Physical Distribution

Table 3. ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	320.087	1	320.087	7683.600	.000 ^b
	Residual	31.161	748	.042		
	Total	351.248	749			

a. Dependent Variable: Physical Distribution

b. Predictors: (Constant), Poor Road Transportation Network

Table 4. Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.933	.043		21.641	.000
	Poor Road Transport Network	.812	.009	.955	87.656	.000

a. Dependent Variable: Physical Distribution

$$R = 0.955$$

$$R^2 = 0.911$$

$$F = 7683.600$$

$$T = 87.656$$

$$DW = 0.213$$



Interpretation

Table 3 indicates that the regression sum of squares (320.087) is greater than the residual sum of squares (31.161), which indicates that more of the variation in the dependent variable is not explained by the model. The significance value of the F statistics (0.000) is less than 0.05, which means that the variation explained by the model is due to chance. In Table 2, R is the correlation coefficient and has a value of 0.955, indicating that poor road transportation network has a significant negative effect on physical distribution of agricultural produce in Enugu North senatorial

zone. R-square, the coefficient of determination, shows that 91.1% of the variation in physical distribution is explained by the model. With the linear regression model, the error of the estimate is low, with a value of 0.20410. The Durbin-Watson statistics of 0.213 which is less than 2 indicates that there is no autocorrelation. However, poor road transportation network coefficient of 0.955 indicates that there is a significant negative effect of poor road transportation network on physical distribution of agricultural produce, which is statistically significant as shown in Table 4 (with $t = 87.656$). The hypothesis is therefore accepted.

Table 5. Coded responses on the effect of poor storage facilities on the physical distribution of agricultural produce in Enugu North senatorial zone.

S/N o	Questionnaire items	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	Total (Freq)
		Freq	Freq	Freq	Freq	Freq	
1	Poor storage facilities is a major challenge of agriculture in your locality	01	01	11	60	177	250
2	Farm produce may sometime spoil before it gets to the market	0	02	14	52	182	250
3	Traditional storage facilities are manly in use and cannot be trusted	0	0	12	49	189	250
4	Farmer harvest all their crops at once and transport to the nearest market since there is no effective storage facilities for fruits and vegetables	02	03	09	46	190	250



5	Pests, disease, rodents attack farm produce in the farms as they are most times allowed to overmature to avoid quicker decay or spoilage	03	01	11	42	193	250
6	The price of farm produce may be cheap as the farmer may not have any option that to sell due to lack or preservative or storage facilities	0	02	09	67	172	250
TOTAL		06	09	66	316	1103	1500

Source: fieldwork 2020

In Table 5, based on the aggregate response, a total of 1103 indicated strongly agree, 316 indicated agree, 66 indicated neutral, and 09 indicated disagree, while 06 indicated strongly disagree respectively. This implies that poor storage facilities have a significant and negative effect on physical distribution of agricultural produce in Enugu North senatorial zone.

Hypothesis Two

H2: Poor storage facilities have a significant negative effect on physical distribution of agricultural produce in Enugu North senatorial zone.

Table 6. Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.968 ^a	.937	.937	.15054	.422

a. Predictors: (Constant), Poor Storage Facilities

b. Dependent Variable: Physical Distribution

Table 7. ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	253.043	1	253.043	11165.757	.000 ^b
	Residual	16.951	748	.023		
	Total	269.995	749			

a. Dependent Variable: Physical Distribution

b. Predictors: (Constant), Poor Storage Facilities



Table 8. Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.527	.040		13.318	.000
Poor Storage Facilities	.888	.008	.968	105.668	.000

a. Dependent Variable: Physical Distribution

R = 0.968

R² = 0.937

F = 11165.757

T = 105.668

DW = 0.422

Interpretation

Table 7 indicates that the regression sum of squares (253.043) is greater than the residual sum of squares (16.951), which indicates that more of the variation in the dependent variable is not explained by the model. The significance value of the F statistics (0.000) is less than 0.05, which means that the variation explained by the model is due to chance. In Table 6, R is the correlation coefficient and has a value of 0.968, indicating that poor storage facilities have a significant negative effect on physical distribution of agricultural produce in Enugu North senatorial zone. R-square, the coefficient of determination, shows that 93.7% of the variation in physical distribution is explained by the model. With the linear regression model, the error of the estimate is low, with a value of 0.15054. The Durbin-Watson statistics of 0.422 which is less than 2 indicates that there is no autocorrelation. However, poor storage facilities coefficient of 0.968 indicates that there is a

significant negative effect of poor storage facilities on physical distribution of agricultural produce, which is statistically significant as shown in Table 4 (with t = 105.668). The hypothesis is therefore accepted.

Discussion of Findings

Findings revealed that poor road transportation network has a significant negative effect on physical distribution of agricultural produce in Enugu North senatorial zone (r = 0.955, p < 0.05). Corroborating this finding, Ikejiofor and Ali (2013) revealed that 85.3% of farmers travel on bad roads while only 14.7% travel on good roads as the farmers journey to their farms and markets. It was discovered by them that the roads can fairly be accessible during the dry seasons as they are filled of gullies and potholes in the rainy seasons. For them, farmers pay for human labor for carrying their farm produce. Similarly, Adedeji et al. (2014) found that in Obokun local government area of Osun State, the transportation of agricultural



produce had been stalled by the bad nature of roads and consequently, the rate of poverty has increased as farming is the mainstay of the people's survival. Moreover, it was revealed by Adefalu et al. (2016) that in Kaiama local government area of Kwara State, farmers have been highly impoverished due to high transportation costs caused by poor road transportation network which also has led to delays in transporting produce to the markets. In contrast, Edeme et al. (2020) revealed that road transportation network had negative and insignificant influence on agricultural performance.

Similarly, it was revealed that poor storage facilities have a significant negative effect on physical distribution of agricultural produce in Enugu North senatorial zone ($r = 0.968$, $p < 0.05$). This is consistent with Faajir (2017) whom his study revealed a significant relationship between physical distribution of grains and storage facilities in Northern Nigerian states. Consistent with this, Agada and Ijih (2019) found in their study that poor storage facilities were the root causes of maize farmers' post-harvest losses in Oju, Benue State. In addition to this, James et al. (2018) discovered in selected markets in Kano that inadequate storage facilities were the main causes of post-harvest losses. Abbas et al. (2018) further noted that inadequate storage facilities coupled with lack of industries to transform farm produce into finished goods has made farmers to lose much money due to post-harvest losses that has perennially bedevilled agricultural production in Nigeria. More so, in Northern Uganda, it was found that improved storage structures were adopted by only 22% of household farmers (Owach et al., 2017). Further, Ojugiri et al. (2018) reported that inadequate storage facilities (17.52%) were the challenges faced by the maize farmers in

Owerri, Imo State. Onumadu et al. (2014) is in agreement with this finding.

Conclusion

Both poor road transportation network and poor storage facilities are fundamental harbinger that militate against effective and efficient physical distribution of agricultural produce in Enugu North senatorial zone of Enugu State in Nigeria. As farmers strive to produce enough for their households and for the wider population, they find it very difficult to preserve or store their produce in better storage facilities leading to rot, spoilage and total wastage resulting to shortages, hunger and poor market performance in terms of fair pricing. To make matter worse, poor road transportation network makes it very difficult for farmers to convey their agricultural produce to available local markets. Consequently, agricultural produce become scarce and even where and when available, they are very costly as coincidentally, farmers charge higher prices as mark up in order to recover from the cost of storage, transportation and entire seasonal cost of agricultural production (cost of land, cost of labour and cost of other inputs). The state government should invest in supporting agricultural production by construction good road networks and also provide financial assistance to help farmers store their produce all year round. Where modern storage facilities are not readily available, government should through their seasoned agricultural extension officers train farmers on how they can preserve their produce locally to avoid post-harvest losses.

References

- Abbas, A.M., Abbas, I.I., & Agada, I.G. (2018). Reducing postharvest losses in Nigeria's agricultural sector: Pathway to sustainable agriculture. *Innoriginal*



International Journal of Sciences, 5(2), 16-21.

Technology and Research (IJNTR). 4(3), 102-110.

Abdullahi, B.N., Yeboah, F.K., Ahmed, N.A., & Muhammad, U. (2020). Profitability of small-scale maize production in Nigeria: a case study of Bichi Local Government, Kano State-Nigeria. *EJFOOD, European Journal of Agriculture and Food Sciences*, 2(5), 1-5.

Adepoju, A.O. (2014). Post-harvest losses and welfare of tomato farmers in Ogbomosho, Osun State, Nigeria. *Journal of Stored Products and Postharvest Research*, 5(2), 8-13.

Abugu, J.O., Ayaga, D., & Nwafor, M.E. (2020). Agricultural marketing in Nigeria: Effects on food security. *Contemporary Marketing Research Journal (CMRJ)*, 7(6), 16-29.

AfolabiAdemiluyi & Owolabi (2016). Analysis of Rural Transportation of Agricultural Produce in Ijebu North Local Government Area of Ogun State Nigeria. *International Journal of Economics & Management Sciences*, 6(1), 1-6.

Adedeji, Olafiaji, Omole, Olanibi & Lukman, (2014). an assessment of the impact of road transport on rural development: a case study of obokun local government area of Osun State, Nigeria. *British Journal of Environmental Sciences*, 2(1), 34-48.

Agada, M.O., & Ijih, B.E. (2019). Analysis of post-harvest management practices among maize farmers in Oju, Benue State, Nigeria. *Journal of Agriculture and Environmental Sciences*, 8(1), 191-198.

Adefalu, L.L., Olorunfemi, O.D., Olatinwo, L.K., & Olatunji, Y. (2016). Perceived effects of poor road transportation network on crop production in Kaiama Local Government Area of Kwara State, North Central Nigeria. *International Journal of Agricultural Management and Development*, 6(4), 497-503.

Agbaeze, E.K., Ohunye, F.O., Obamen, J., & Ibe, G.I. (2020). Management of food crop for national development: Problems and challenges of cassava processing in Nigeria. *Sage Open*, 6, 1-13.

Adegbola, J.A., Bamishaiye, E.I., & Daura, A.M. (2011). Food security in Nigeria: Government's intervention and the place of effective storage. *Asian Journal of Agriculture and Social Development*, 1(2), 56-63.

Aikins, K.A., & Akude, G.S. (2015). The impact of motor tricycles on transportation of agricultural produce in the Pru District of Ghana. *Global Journal of Biology, Agriculture and Health Sciences*, 4(3), 22-26.

Adeniyi, J.O., Akirinmade, Y., & Abiodun, A.L. (2018). Analysis of road transport impact on rural development in Nigeria: A study on Akure North Local Government Area, Ondo State. *International Journal of New*

Ajah, B.N., Okolo, V.O., Oranusi, I.N., Obikeze, C.O., & Okoro, D.P. (2020). Effective transportation and warehousing as critical elements of physical distribution and their effects on the price of agricultural products in Enugu State, Nigeria. *International Research Journal of Management and Commerce*, 7(6), 1-21.



- Ajiboye A.O., & Afolayan, O. (2009). The impact of transportation to agricultural production in a developing country. The case of kolanut. *Journal of Agricultural Economic and Rural Development* 2(2), 49 -57.
- Akuirene, A.O., Atie, M.O., Ishiekwene, C.M., & Nwose, E.U. (2020). Effect of poor road network and maintenance on safety and security in Delta State Nigeria: Mixed perceptions in industrialized oil-producing community. *Biomedical Research and Reviews*, 4, 1-6.
- Ayele, H.N. (2017). Road sector development and socio-economic growth in Wonbera Woreda, Benshangul Gumuz, Ethiopia. *Global Journal of Management and Business Research: B Economics and Commerce*, 17(4), 36-48.
- Ayo-Odifiri, O.S., Fasakin, J.O., & Henshaw, F.O. (2017). Road Connectivity Approach to Eased Traffic Congestion on Market Roads in Benin Metropolis, Nigeria. *American Journal of Engineering Research (AJER)*, 6(6), 41-48.
- Azizi, S., Kapak, S.J., & Tarhandeh, F. (2014). physical distribution service quality through iranian convenience stores retailers perspectives: A mixed method approach. *Iranian Journal of Management Studies*, 7(1), 121-150.
- Baloch, U.K. Wheat: Post-Harvest Operations; Lewis, B., Mejia, D., Eds.; Pakistan Agricultural Research Council: Islamabad, Pakistan, 2010; pp. 1–21.
- Barney, J.B., & Hesterly, W.S. (2015). *Strategic management and competitive advantage: Concepts and cases*. Global Edition, Pearson Education Limited.
- Berg, C.N., Deichmann, U., Liu, Y., & Selod, H. (2017). Transport policies and development. *The Journal of Development Studies*, 53(4), 465-480.
- Chigoverah, A.A., & Mvumi, B.M. (2016). Efficacy of metal silos and hermetic bags against stored –maize insect pests under stimulated small holder farmer conditions. *J. stored Prod. Res.* 69, 179-189.
- Davi, P.J., & Simpson, E. (2017). Resource-based theory, competition and staff differentiation in Africa: Leveraging employees as a source of sustained competitive advantage. *American Journal of Management*, 17(1), 19-33.
- De Groote, H., Kimenju, S.C., Likhayo, P., Kanampiu, F., Tefera, T., & Hellin, J. (2013). Effectiveness of hermetic Systems in controlling Maize storage pests in Kenya. *Journal of Stored Product Research*, 53, 27-36.
- Deshi, S.N., Wonang, D.L., & Dafur, B.S. (2014). Control of rots and spoilage of agricultural products: A review. *International Letters of Natural Sciences* 13(2), 63-72.
- Ebewore, S. O., & Achoja, F.O. (2014). Storage practices among arable farmers in Delta State, Nigeria: Implication for food security. *Journal of National Sciences Research*, 3(1), 51-58.
- Edeme, R.K., Nkalu, N.C., Idenyi, J.C., & Arazu, W.O. (2020). Infrastructural development, sustainable agricultural output and employment in ECOWAS countries. *Sustainable Futures* 2, 100010.
- Edriss, & Chiunda (2017). Interface between road transportation and poverty in Africa: The



- case of Malawi, 1994-2013. *Journal of Social Economics Research*, 4(1), 9-21.
- Ehikwe, A.E. (2002). *Transportation and distribution management*. Precision publishers Limited.
- Enwerem, G.C., & Ali, G.A. (2016). Economic effects of bad roads on vehicle maintenance in Nigeria. *International Journal of Scientific and Research Publications*, 6(6), 761-766.
- Etim, N.A., & Nkeme, K.K. (2015). Barriers to Increasing Agricultural Production in Nigeria. *American Journal of Agricultural Science*, 2(4), 138-143.
- Ezealaji, N.L.O., & Adenegan, K.O. (2014). The role of agricultural market reform in enhancing Farmers' income in Nigeria. *African Journal Of Marketing Management*. 6(3), 27-32.
- Faajir, A. (2017). Storage facility development and marketing of grains in North of Nigeria the states of the North of Nigeria. *The Business and Management Review*, 9(1), 397-404.
- Frazier, G.L (2009). Physical distribution and channel management: A knowledge and capabilities perspective. *Journal of Supply Chain Management*, 45(2), 23-36.
- Friday, D., Ntayi, J.M., Muhwezi, M., Eyaa, S., & Tukamuhabwa, B. (2011). Vertical collaboration and physical distribution service quality in Uganda's soft drinks demand chains. *International Journal of Economics and Management Sciences*, 1(4), 42-52.
- Fungo, E., Krygsman, S., & Nel, H. (2017). The role of road infrastructure in agricultural production. *36th Southern African Transport Conference (SATC 2017) 10-13 July, 2017. Pretoria, South Africa.*
- Gani, A. (2017). The logistics performance effect in international trade. *The Asian Journal of Shipping and Logistics*, 33(4), 279-288.
- Gbadamosi, K.T., & Olorunfemi, S.O. (2016). Rural road infrastructural challenges: an impediment to health care service delivery in Kabba-Bunu Local Government Area of Kogi State. *Academic Journal of Interdisciplinary Studies*, 5(2), 34-44.
- Gbam, B. (2017). Effect of transportation on the marketing of agricultural products in Jos North. *Quest Journals Journal of Research in Business and Management*, 5(2), 99-106.
- Hashidu, B.R., & Adamu, M.K. (2018). Effects of road development on commercial activities in Gombe City, Gombe state, Nigeria. *Global Scientific Journals*, 6(4), 17-33.
- Hosseinpour, A., Hajizadeh, F., Shariati, S.M.M., & Rokhideh, R. (2013). Optimizing product portfolio of capillary distribution companies. *Arabian Journal of Business and Management Review (Nigerian Chapter)*, 1(6), 1-6.
- Igberaese, F. I., & Okojie, O. (2010). Food and hunger everywhere: A Nigeria paradox of poverty. *International Review of Business Research Papers*, 6(4), 90-100.
- Ikejiofor, I.G., & Ali, A. (2013). The effects of road transport characteristics on the marketing of agricultural produce in Nsukka LGA, Enugu state, Southeastern Nigeria. *Innovative Journal of Social Sciences*, 2(1), 1-4.
- Ituma, O.E. (2017). The position of rural farmer's agricultural storage facilities for yam tuber



- preservation in Ebonyi State. *Journal of Educational and Social Research*, 3(5), 155-160.
- James, D., Abba, A., Aisha, M., Shamsuddeen, J., & Oni, O.O. (2018). Determination of Causes of Post-Harvest Losses in Orange Marketing in Selected Markets in Kano State, Nigeria. *International Journal of Agriculture and Earth Science*, 4(5), 23-31.
- Kiaya, V. (2014). Post-harvest losses and strategies to reduce them. Technical paper Scientific and technical Department. Retrieved from <https://www.actioncontrelafaim.org> > 2018/01 > te.
- Kohls R., & Uhl J. (1990). *Marketing of Agricultural Products* 6th ed. Guier Macmillan Company .
- Kotler, P., Armstrong, G., & Opresnik, M. O. (2018). *Principles of marketing*. (17th ed.). Pearson Education Ltd.
- Kumar, D., & Kalita, P. (2017). Reducing postharvest losses during storage of grain crops to strengthen food security in developing countries. *Foods*, 6(8), 1-22 doi:10.3390/foods6010008.
- Malgwi, G. Kadri, S. Nwosun, E., & EsekHagbe, R. (2008). Problems and prospects of ginger production, processing and Marketing in Kaduna State. *Journal of Sustainable Tropical Agricultural Research*, 26, 54-58.
- Mbondo, G.K., Okibo, W.B., & Mogwambo, (2015).influence of physical distribution strategies on the performance of service firms in Kenya: a survey study of print media distribution in South Nyanza region, Kenya. *European Journal of Business and Management*, 7(14), 39-49.
- Mihai, F., & Irina, A. (2013), Defining the concept of supply chain management and its relevance to romanian academics and practitioners. *Amfiteatru Economic Journal*, 15(33), 74-88.
- Mobolade, A.J., Bunindro, N., Sahoo, D., & Rajashekar, Y. (2019). Traditional methods of food grains preservation and storage in Nigeria and India. *Annals of Agricultural Sciences*, 64,196–205.
- Mwaura, A.W., Letting, N., Ithinji, G., &Orwa, B. (2016). green distribution practices and competitiveness of food manufacturing firms in Kenya. *International Journal of Economics, Commerce and Management*, 4(3), 190-207.
- Mulky, A.G. (2013). Distribution challenges and workable Solutions. *IIMB Management Review*, 25, 179-195.
- Nebo, G.N., Okolo, V.O., & Obikeze, C.O. (2020). Influence of material handling and inventory control as strategic physical distribution elements on the price of agricultural products in Enugu State – Nigeria. *GE-International Journal of Management Research*, 8(7), 90-111.
- Nguyen, T.D.A. (2019). The effect of physical distribution service quality on customer perceived value in Omni-channel. *International Journal of Research Studies in Management*, 8(1), 101-115.
- Okojie, C. (1991). Achieving self reliance in food production in Nigeria: Maximising the contribution of rural women. *Journal of Social Development in Africa*, 6(2), 33-52.
- Oladosu, J.O., Kolawole, O., & Mensah, F.A. (2018). The effect of rural transport infrastructure on agricultural productivity in



- some selected local governments of Oyo State. *IMPACT: international journal of research in Humanities, Arts and Literature (IMPACT: IJRHAL)*, 6(11) 85-94
- Onumadu, F.N. Odoemelam, L.E., & Osakwe, O.P. (2014). Analysis of organic food-crop production in Umuahia South local government area of Abia State, Nigeria. *International Journal of Scientific & Technology Research*, 3(11), 231-235.
- Onwo, I.N., & Udeorah, S.F. (2021). Road network and security: Challenges of small and medium-size enterprises in Port Harcourt. *International Journal of Research and Innovation in Social Science (IJRISS)* 1(1), 300-305.
- Osugiri, I.I., Ben-Chendo, G.N., Nwaihu, E.C., Okwara, M.O., & Utazi, C.O. (2018). Economic analysis of agricultural marketable surplus of maize in owerri agricultural zone of Imo State, Nigeria. *International Journal of Agriculture Innovations and Research*, 6(6), 378-381.
- Owach, C., Bahiigwa, G., & Elepu, G. (2017). Factors influencing the use of food storage structures by agrarian communities in Northern Uganda. *Journal of Agriculture, Food Systems, and Community Development*, 7(2), 127-144.
- Rabinovich, E., Rungtusanatham, M., & Laseter, M. L. (2008), Physical distribution service performance and internet retailer margins: The drop-shipping context. *Journal of Operations Management*, 767-780.
- Rajashekar, Y., Bakthavatsalam, N., & Shivanandappa, T., (2012). Botanicals as grain protectants. *Psyche J. Entomol.* 2012. <https://doi.org/10.1155/2012/646740>.
- Poazi, F.D.W., Tamunosiki-Amadi, J.O., & Fems, M. (2017). The resource-base view of organization and innovation: recognition of significant relationship in an organization. *International Journal of Economics and Management Engineering*, 11(3), 692-699.
- Ramon-Jeronimo, J.M., Florez-Lopez, R., & Araujo-Pinzon, P. (2019). Resource-based view and smes performance exporting through foreign intermediaries: The mediating effect of management controls. *Sustainability*, 11, 3241; doi:10.3390/su11123241.
- Roostika, R. (2019). SMEs craft industry application of resource based view: capabilities role of SMEs performance. *Review of Integrative Business and Economics Research*, 8(S4), 423-440.
- Seid, H., Hassen, B., & Yitbarek, W.H. (2013). Postharvest loss assessment of commercial horticultural crops in South Wollo, Ethiopia: Challenges and opportunities. *Food Sci. Quality Management*, 17, 34-39.
- Sibanyoni, C., & Mupambwa, P. (2017). Using resource-based theory to examine the competitiveness of an incubation plant in mining and agriculture. *International Review of Management and Business Research*, 6(2), 692-716.
- Taiwo, A., & Kumi, F. (2013). An appraisal of road condition effect on rural transportation in sekyere central district of the Ashanti region of Ghana. *Journal of Transportation Technologies*, 3, 266-271.
- Tamene, S., & Magento, T.L. (2017). The effect of rural road transport infrastructure on smallholder farmers' agricultural productivity in HorroGuduruWollega zone,



Western Ethiopia. *AUC Geographica*, 52(1), 89-99.

Environmental Studies and Management EJESM, 5(3), 232-238.

Tseng, Y., Taylor, M.A.P., & Yue, W.L. (2005). The role of transportation in logistics chain. *Proceedings of the Eastern Asia Society for Transportation Studies*, 5, 1657-1672,

Ume, S.I., Knadozie, K.O., & Kadurumba, C. (2017). Role of transportation and marketing in enhancing agricultural production in Ikwo local government area of Ebonyi State, Nigeria. *Sustainability, Agri, Food and Environmental Research*, 6(4), 22-39.

Tunde, A.M., & Adeniyi, E.E. (2012). Impact of road transport on agricultural development: A Nigerian example. *Ethiopian Journal of*