



INTERNATIONAL COMMISSION OF AGRICULTURAL ENGINEERING
COMMISSION INTERNATIONALE DU GENIE RURAL
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September 26, 2005

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Evaluation of Farm Transportation System in Osun and Oyo States of Nigeria

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ABSTRACT

An assessment of farm transportation system to ascertain the availability of transportation for the evacuation of farm produce was undertaken in Osun and Oyo states of Nigeria employing printed questionnaires and personal communication as means of information collection. 20% of the farmers reside at between one and three km from their farms while for the remaining 80%, it ranges from four to 16 km. 17.6% of the farmers travel between one and three km to sell their produce while for the remaining 82.4%, the distances range from four to over 16 km. 61.8% of the farmers have access to only untarred roads, 9.1% to partly untarred/tarred roads and only 29.1% get to their farms except for the last stretch through tarred roads. The vehicles found on farm routes in the area surveyed include bicycles, cars, buses, pick-up vans and lorries. 32.7% of farmers and 86.8% of produce merchants don't own any form of transport and hence they depend on commercial transport, which could be scarce and expensive. Road conditions are deplorable especially during the rainy season and this cause further wear and tear on the poor condition vehicles used on the roads and delays in produce delivery. As palliative measures towards ameliorating the situation, it is recommended that roads users associations be formed with the objective of mobilizing men and resources to ensure regular maintenance of the routes. The two states' transport services should be extended to at least those farming areas where the routes are motorable. Non-governmental organizations involved in poverty alleviation programmes such as the Nigerian farmers association and farmers development union should provide credit facilities to enable farmers and farmers' groups acquire farm transport vehicles while the activities of the federal road maintenance agency should be extended to the food basket areas.

Key words

Farm transportation, farm routes, farm vehicles, produce merchants, food basket, rural roads

1. INTRODUCTION

Farm transportation plays a key role in the agricultural and economic development of many nations as it provides access for extension agents to transfer new and improved agricultural technologies to the rural and farming communities, timely delivery of inputs to the farm and evacuation of harvests to the urban areas where they are mostly demanded. These ensure improvement in agricultural production, food availability in urban areas and improvements in the economy of the rural communities (Klatzel, 2000)

Farm transportation is as old as human existence because even the early man who was only a gatherer still had to convey himself to the centres of food collection. Early form of transportation was mainly on-farm as the major activities were collection of water, crop gathering, animal

Y.Mijinyawa and J.Adetunji. "Evaluation of Farm Transportation System in Osun and Oyo States of Nigeria". *Agricultural Engineering International: the CIGR Ejournal*. Vol. VII. Manuscript LW 05 004. September, 2005.

hunting and related activities most of which were done within the neighborhood of the farmer and hence the distances covered were usually very short. The simplest and most probably the oldest method of conveying goods including agricultural produce employed by man, was on his head, shoulder or back depending on the sacredness of parts of the body (Oluguna, 1986). With increase in population and advent of cultivation agriculture, travel distances increased, as most of the centres of food production were far remote from the urban settlement where a bulk of the food was needed. Because of the limitations of volume of produce and speed of delivery, human portaging became inadequate and better means were desirable both as complements and alternatives. Improvements in human portage were the introduction of the backpack, which places the load on the lower waist by means of a wide belt and the tapered shoulder pole, which could increase the amount of load conveyed by about 25%. (White, 1975) Various types of carts and wagons pulled by man were found useful and where the environment permitted, animals as beasts of burden were employed in farm transportation either supporting the load directly or pulling a container onto which the produce was held. Mechanically powered equipment were later introduced.

For reasons of economic and technical limitations, and the peasant nature of agriculture, farm transportation in many developing countries is substantially by land (road and rail) and water in the riverine and coastal regions. Although rail development in Nigeria dates back to 1898 with the completion of the Lagos-Ibadan rail line and its extension to other parts of the country much later, its use in agricultural transportation was limited to between collection points located close to the line and the sea ports especially for cocoa, palm produce and groundnut. It was not available within the rural communities where the agricultural practices took place hence a majority of farm transportation has been by roads (Oguntoyinbo et al, 1978, Yusuf, 2004). Dennis and Anderson (1994) reported that up to 90% of travel in rural areas in developing countries involving transportation of goods is done by land using the back or shoulder.

In developing countries, farm transportation experiences a catalogue of problems. These problems include the absence of all weather roads in rural communities, limited vehicles, poor and expensive commercial transport system (Barwell et al, 1985 and Olanrewaju, 1992), Farming communities are denied of any form of access routes or at best are only linked to one another through network of footpaths. Survey reports revealed that in the Philippines, less than 50% of the rural villages had access to the road system, in Bangladesh, 80% of the villages have no direct access to a mechanized means of transport; in India, in 1973, about 70% of the villages did not have all-weather road connections and 55% of the villages were not connected to any type of road; in Egypt, 32% of the villages were connected to larger villages only by a network of footpaths; in Indonesia, 30.2% of the villages lacked proper road connection. Between 1982 and 1985, about 72% of rural settlements in Nigeria had no connection to any road. (Olanrewaju, 1992)

Although between 1983 and now, efforts were initiated at improving the rural roads situation in Nigeria through the Directorate of Food, Road and Rural Infrastructures (DFFRI) , the Agricultural Development Programme (ADP) system and and the Petroleum Trust Fund (PTF), very little was achieved as most of those expected to be done by DFFRI were abandoned half-way while the feeder and untarred ones by ADP in very few agricultural areas were prone to erosion during the rainy season when they are most needed for farming purposes, (Olanrewaju

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1992, Kraxberger, 2003). As at 1996, survey reports showed that a majority of the Nigeria populace still had no access to road while between 90 and 95% of the rural roads which was estimated at between 130,000 and 160,600 km nationwide were in very poor condition.(Buhari, 2000., Yusuf, 2004, FERMA 2003). Babagana et al (1996) reported that up to 60% of the farmers in North Eastern Nigeria had no access to tarred road.

For economic reasons, most rural dwellers do not own any form of transportation because they cannot afford the cost of purchase. Survey carried out in different countries have shown that traditional methods of moving goods satisfy the requirement for on and off farm transportation to a greater degree than the generally accepted vehicles such as tractors, pick-up vans, trucks and buses and the situation is not likely to change for as long as the attendant problems persist (Barwell et al, 1985; Oluguna, 1986; Adeoti and Kaul, 1988) A study carried out in Uganda reported that out of 715 journeys a day recorded at 55 points on rural roads, 75% were done on foot, 22% on bicycle and only 2% were motorized(IFAD ,2001).

In Nigeria, farm transportation is particularly important, as most of the foods producing communities are located in the remote areas. It is for this reason that the existing farm transportation system should be improved upon and expanded within the economic and technical limitations of the end-users.

The survey reported in this paper was carried out in the two contiguous states of Osun and Oyo in Southwestern Nigeria which lies between latitude 7° 03' and 9° 23' N and between longitude 2° 47' and 4° 35'E. (fig.1). The vegetation of this area is rain forest even though long years of human activities have changed the northern extreme of it to savannah. The annual rainfall is about 1300 mm, which is evenly distributed over the eight-month rainy season. These climatic conditions are favourable to the cultivation of many crops and raising of animals. The area is about 42,320 km², more than half of which is cultivated. The major food produced in the area are yam *Dioscorea spp*, cassava *Manihot esculenta*, maize *Zea mays*, melon *Colocynthis spp*, groundnut *Arachis hypogae*, cowpea *Vigna unguiculata*, guava *Psidium guajava*, pawpaw *Carica papaya*, banana *Musa spp*, citrus *Citrus spp*, pineapple *Ananas comosa*, cocoa *Theobroma cacao*, oilpalm *Elaeis guineensis*, coffee *Coffea spp*, tomatoe *Lycopersicum esculentum*, pepper *piper nigerum* and assorted vegetables.

In order to ensure food availability and improve the economic status of the farmers, these crops which are mainly produced in rural areas must be effectively evacuated to the urban centres. This is dependent on an effective farm transportation system. It is therefore the objective of this study to assess the farm transportation system in the area and where considered inadequate, make recommendations for improvement.

2. MATERIALS AND METHOD

Three different sets of questionnaires, one each for farmers, produce merchants and transporters were designed for the purpose of information collection. Information sought included home - farm and home - market distances, mode of movement and conveyance of produce, routes plied and vehicle ownership.

Eight major food producing zones in the surveyed area were selected for the study. These were Ogbomosho, Saki, Irepo, Oke-Ogun, Ona-ara, Ilesha, Esa-oke and Ile-Ife. Points of information collection were urban food markets, village markets, villages and farmers' residence, farms, collection points and motor parks.

The questionnaires were administered during field visits by giving them to the respondents to fill and retrieved while additional items of information were gathered through personal communication and focused group discussion. Personal observations were also made. A total of 282 questionnaires made up of 165 farmers, 41 Transporters and 76 Produce Merchants were administered and collected. Respondents were purposively selected ensuring that they were full time farmers, transporters and produce merchants respectively. Farmers were selected through the Extension workers of the States' Agricultural development programmes while the transporters were selected through the assistance of the officials of the motor parks. Some of the produce merchants were identified at the markets

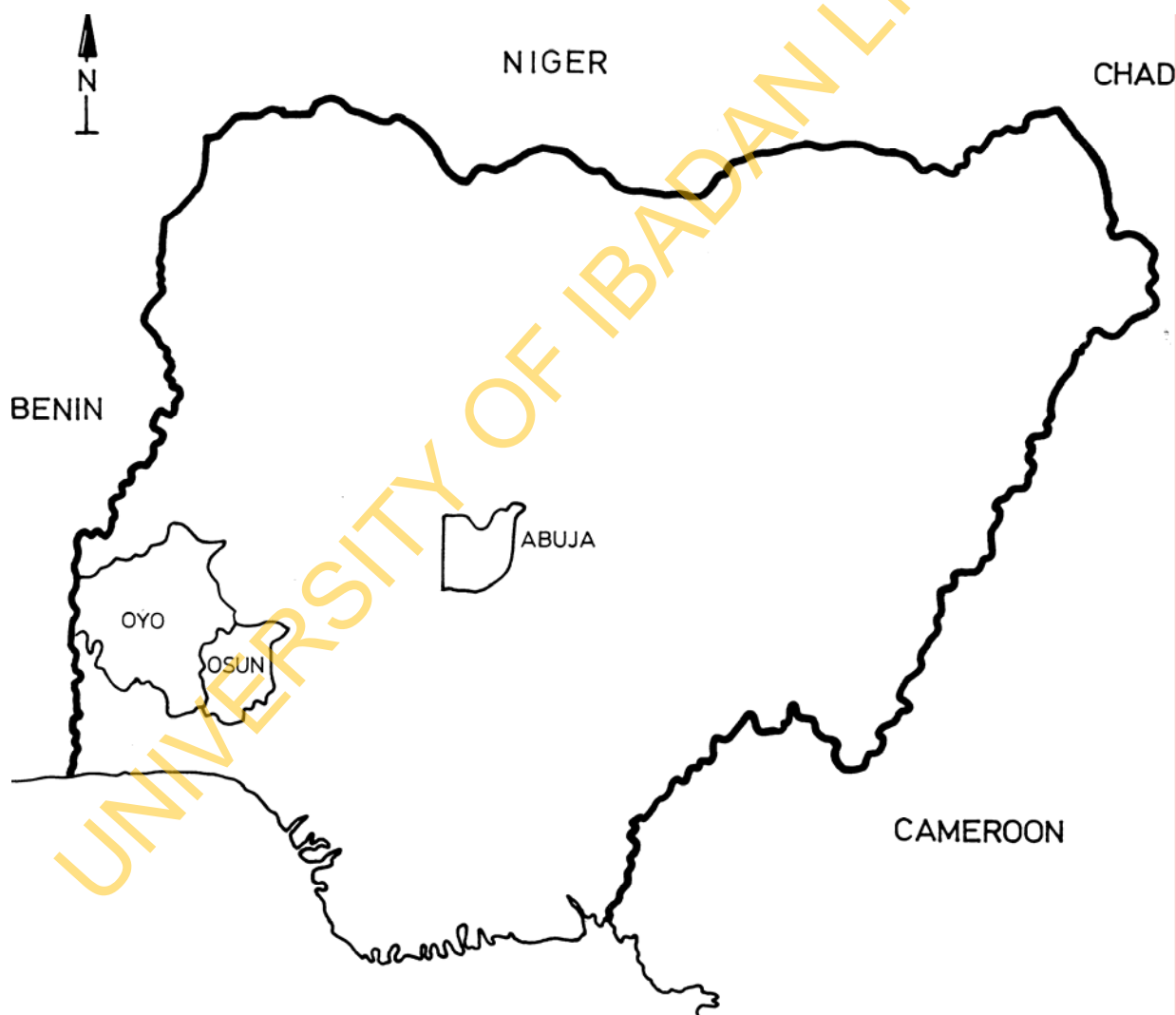


Figure1. Map of Nigeria showing the surveyed states

3. RESULTS AND DISCUSSION

The results of the survey are summarized in Tables 1 to 4 and discussed.

3.1 Travel Distances and Means of Transportation

Tables 1 and 2 show the distances often traveled in delivering farm produce to the end-users. About 58% of the farmers have their farms located between one and six km from their home villages while the rest have theirs at longer distances. For home – market distances, 38.5% of the farmers travel less than six km. The farmers whose farm distances are less than six km, usually trek or walk to their farms as no form of farm vehicle is available on most of such routes while those whose farms are farther than six kilometers usually get to their farms using bicycles, motorcycles and public transport especially buses and pick-up vans. Trekking is not only physically tiring but takes between one to two hours to go in the morning and return in the evening. Not only is useful energy dissipated on traveling, much time is also lost. For these reasons most farmers don't return everyday but rather spend a few days sleeping in the nearest hamlets to their farms. Those farmers, whose farms are above 15 km, sleep more on the farm and many have farm houses which provide a place of abode during such periods. Besides home – farm distances, security of produce is another reason why some farmers sleep on the farm. Produce can either be stored on the farm and taken directly to the market or brought home for temporary storage before being taken to the market. Human portage is normally used for conveyance of produce to markets within the neighborhood not usually more than six kilometers while for longer distances, bicycles, motorcycles, buses and Pickup vans are used. As a result of volume of produce to be conveyed, produce merchants employ more of farm vehicles than human portage, the travel distance notwithstanding.

Table 1: Travel distances by farmers

Distance (km)	Home-Farm Distances		Store - Market Distances	
	Frequency	%	Frequency	%
1 –3	33	20.0	29	17.6
4 – 6	63	38.2	36	21.8
7 – 9	30	18.2	24	14.5
10 – 12	9	5.5	21	12.7
13 – 15	9	5.5	12	7.3
Above 16	7	12.8	43	26.1
	165	100.0	165	100.00

Table 2. Distances traveled by produce merchants

Distance (km)	Frequency	%
1 – 10*	24	31.6
11 – 20	28	36.8
21 – 30	4	5.3
31 – 40	4	5.3
41 – 50	2	2.6
51 – 60	2	2.6
61 – 70	4	5.3
71 – 80	2	2.6
Above 80	6	7.9
Total	76	100.00

* Distances mainly covered by Rural Produce Merchants

3.2 Vehicle Type and Ownership

Table 3 shows the types of farm vehicles available for farm transportation in the area surveyed and ownership among farmers, produce merchants and Transporters. About 32.7% of the farmers, 86.8% of produce merchants and 26.8% of transporters do not own any form of transport, the main reason being the inability to acquire one. The implication of this is that most of them have to convey their produce by human portage in the case of farmers, which is tedious, or depend on commercial transportation especially for the merchants, which is both irregular and expensive, and reduces the net profit.

Only about 10.6% of produce buyers own buses and pick-up vans which are the common vehicles in the study area. This group of merchants also uses their vehicles for other commercial purposes.

About 63.4% of the transporters own buses/pickup vans/lorries / trailers which are the ones mainly patronized by produce merchants. The remaining 36.6% of the transporters do not own any vehicle. The vehicles they use belong to either civil servants or businessmen with whom they have an agreement on the mode of financial returns and compensation.

Table 3. Transport ownership

Transport Type	Farmers		Produce Merchants		Produce Transporters	
	Frequency	%	Frequency	%	Frequency	%
None	54	32.7	66	86.8	11	26.8
Bicycle	39	23.6	=	=		
Motorcycle	21	12.7	2	2.6	2	4.9
Car	9	5.5			2	4.9
Bus	18	10.9	4	5.3	12	29.3
Pick –up Van	18	10.9	4	5.3	9	22.0
Trailer/	6	3.6	=	=	2	4.9
Lorries	=	=			3	7.2
Total	165	100	76	100	41	100.00

3.3 Road Network, Conditions and Maintenance Culture

The routes available in the surveyed area include footpaths, unsurfaced roads and all weather roads. Farmers' access to these routes is presented in Table 4. The width of footpaths ranges from 700 mm to 1100 mm, which limit their use to pedestrians, bicycles and motorcycles. They are often divided into primary and secondary. The primary ones link farm plots, villages and in some cases link the plots to a tarred road. The secondary footpaths are mainly for movement within the plots. Earth, unsurfaced or seasonal roads are the major vehicular routes in the areas surveyed and the width vary from 3,600 mm to 4,000 mm. During the rainy season, the poor drainage system results in water logging and the road become marshy. This is further aggravated by the heavy traffic usually experienced at the peak of farming activities. The water puddles and potholes which develop on the road surfaces result in wear and tear of vehicle parts especially the tyres. Buhari (2000) reported that poor road maintenance multiplies the cost of repair by 200% - 300% after every rainy season, and increases cost to vehicle owners by more than 50% for paved roads and much more for gravel and earth roads. There is delay in rate of produce conveyance and losses are incurred while in transit. In a few cases, harvested cassava has been lost because of disappointment by transporters with whom previous arrangements have been made. In most cases, fares are indiscriminately raised which increase food prices and reduce the net profit accruable to farmers. (Klatzel, F., 2000) During the dry season, vehicles are enveloped in thick cloud of dust which constitutes health hazards to route users and contaminates the produce being conveyed. The few farmers, who have their farms in communities far away from where they live, make use of all weather or tarred routes except for the last stretch to their farms. There is no organized form of maintenance on most routes. The users do not show any commitment to road maintenance even though that is their source of livelihood. It is only on a few occasions when the route becomes almost impassable such as when a culvert or bridge collapses and it becomes impossible to use the route that they show concern and carry out some maintenance to enable the continuous use of the road.

Table 4. Types of routes and accessibility to farmers

Route Type	Type of Journey			
	Home - Farm		Home - Market	
	Frequency	%	Frequency	%
Untarred	102	61.8	45	27.3
Partly untarred/tarred	48	9.1	39	23.6
Tarred	15	29.1	51	49.1
Total	165	100.00	165	100.00

3.4 Transport Pattern and System

The farm transportation system between the farms and urban centers can be broken into two parts. The produce could be stored on-farm or in the villages from where it is taken to the village markets. This is done mainly by human portage and to a lesser extent by vehicles. Urban-based produce buyers adopt two methods in their operations; one method is to have a collection centre in a village where produce within that village and neighboring ones are purchased and kept before arrangement is made to convey them to the urban area; another method is to study the rural markets calendars and visit them for immediate purchase and transportation. This is done

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for produce with short shelf life such as vegetables, fruits and plantain. This second stage of transportation is essentially by vehicles.

4. CONCLUSIONS AND RECOMMENDATIONS.

The vehicles found on farm routes in the area surveyed include bicycle, cars, buses, pick-up vans and lorries. Most farmers are linked to their farms and markets through foot path and seasonal earth roads as a result of which produce are conveyed by human portage. 32.7%, 86.8% and 26.8% of farmers, produce merchants and transporters respectively don't own any form of transport and hence depend on commercial transport which are scarce and expensive. Most of the vehicles used are owned by public servants and businessmen. A few produce buyers own vehicles, which they also use for other commercial activities. Most of the routes are foot paths and earth roads which are often impassable especially during the rainy season when they are most needed.

The current situation is characterized by poor condition routes for the evacuation of farm produce, particularly in the important wet season transportation period. There is a shortage of appropriate low cost transport vehicles and services. Crops losses are significant, control of transport is largely outside of the control of the producers and unit transport costs are unnecessarily high. This constrains agricultural income and market potential

An effective farm transportation system depends on the availability of good condition vehicles and good routes that minimize the wear and tear to which vehicles are subjected. Towards the provision of an effective transport system, the following recommendations are made

a) In many instances, only a small obstruction such as the development of a gully across the road, the collapse of a bridge or culvert renders some roads impassable. Some of such problems require remedial measures within the technical and economic limitations of the road users but the problems are left to aggravate because the users feel it is a government property. There is lack of commitment even though they are served by the road. Communal participation has proved to be an effective means of maintaining rural infrastructures including roads. (Klatzel, 2000., CPSI, 2004,) It is recommended that Road users associations which should be able to mobilize labour and resources to handle such problems be formed.

b) A number of non-governmental organizations such as the Farmers' Development union, have provided soft loans for farmers and farmers' associations for the acquisition of processing machinery which have been effectively managed and have improved the economy of such groups. It is suggested that such loans be extended to farm transportation since there are prospects of loan recovery if handled with seriousness as it has been done with other schemes.

c) The bad conditioned vehicles on farm routes are competed for by both produce and persons. If the state-wide transport services operated by the two states were to be extended to some of these remote but memorable areas, the pressure on the existing commercial vehicles will reduce and become more available for the conveyance of farm produce. This will reduce the cost of transportation and food prices in the urban areas.

d) Among the objectives the federal road maintenance agency are easy evacuation of farm produce from the point of harvest and enhancement of government poverty alleviation programme. (FERMA, 2003). If these objectives are to be achieved, its activities must be extended to the farming communities where there are either no routes or most of the existing ones are in a state of disrepair. It is only a good road network that can guarantee easy evacuation of harvested produce from rural areas. The rural areas have a pool of unemployed able bodied youth who can be engaged in its direct labour scheme thereby reducing poverty.

e). Local governments were created for grass route development including the provision of rural roads. There is apparent neglect of these roads by this level of government throughout the country. The local government must give priority to rural roads development through the recruitment of appropriate personnel and equipment to maintain existing routes and open up new ones.

f) While the bad conditions of the farm routes are recognized, the fares on farm routes are too exorbitant. Irrespective of economic indices, the wish of the national union of road transport workers and the road transport employers association of Nigeria is a major factor in determining the fares paid on any route in Nigeria. These bodies should regulate fares charged on farm routes taking into account the peculiar economic situation of the farming communities.

8. REFERENCES

- Adeoti, J.S and Kaul, R.N. (1988). 'Assessment of Available Vehicles for Small Farmers in Rural Areas of Nigeria'. In Proc. *CIGR Inter – Sections Symposium (ed. Oni, K.C.)*, 125 - 130 Ilorin Nigeria, 5 – 10 , September, 1998
- Babagana, M, Haque, M.A and Mustapha, A (1996). 'Transportation of Agricultural Produce by Farmers in Northern East Nigeria'. In Proc. *Maiden National Engineering Conference*, 22 – 28, Bauchi Nigeria 17 – 19, April, 1996.
- Buhari, M, (2000). 'The role of infrastructural development and rehabilitation in sustainable economic growth in Nigeria'. <http://www.anppusa.org/page14.html>
- Barwell, I.J, Edmonds, G.A; Howe, G.F. and De Veen, J. (1985). '*Rural Transport in Developing Countries*'. Intermediate Technology Publications, London.
- Centre for Public Service Innovation,(CPSI), 92004), 'Maintaining Rural Roads through Job creation.' <http://unpanl.un.org/intradoc/group/public/documents/cpsi/UNPano19298.pdf>
- Dennis, R and Anderson, M. (1994). 'Improving Animal Based Transport: Technical Aspects of Cart Design'. In *Improving Animal Traction Technology* (eds Stakey P, Mwenya, E and J. Stares) Proc. of first Workshop of Animal Traction Network for Eastern and Southern Africa (ATNESA) in collaboration with Technical Centre for Agriculture and Rural Cooperation (CTA), Wageningen, Netherlands, 255 – 259 , Lusaka, Zambia, 18- 23 January, 1992.
- Farmers Development Union, (FADU). (2005). 'Profile of FADU'. www.fadu.org

Federan Road Maintenance Agency (FERMA), (2003), 'Operation 500 Roads'.
<http://www.ferma.gov.ng/article.php?story=20041207153651135>

International Fund for Agricultural Development (IFAD). (2001). 'Rural Poverty Report 2001'
http://www.ifad.org/gender/learning/sector/infrastructure/p_road.htm105

Klatzel, F., (2000). 'Green Roads: Building environmentally friendly, low maintenance rural roads through local participation' <http://www.mtnforum.org/resources/library/klaf00a.htm>

Kraxberger, B (2003)., 'Transportation and movement of people in Nigeria, some tentative notes.' . <http://www.uni.edu/gai/Nigeria/Background/Transportation.html>

Oguntoyinbo, F: Areolu,O. and Filani, M (1978). '*Geography of Nigerian Development*'. Heinemann Educational Books Nig. Ltd., Ibadan.

Olanrewaju S.A (1992). 'The Rural Transport Problem'. In *Rural Development Problems in Nigeria*' Edited by S. A Olanrewaju and Toyin Falola. Avebury Ashgate Publishing Ltd, England.

Oluguna, D (1986).. '*The Story of Transport*'. Evans Brother Limited, Ibadan

Yusuf, M.O. 2004., 'Private Intiatives and Infrastructural Development in Nigeria'.
<http://www.cenbank.org/OUT/PUBLICATIONS/OCCASIONALPAPERS/RD/2004/JOS-02-4.PDF>

White, K.D. (1975) '*Farm Equipment of the Roman World*'. Cambridge University press, London