Transportation and agro-food distribution in sub-saharan africa

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Abstract

Transportation plays an important role in the movement and distribution of goods and services. It is an essential ingredient of development, since there is always a need to collect, assemble, move, transfer and distribute goods and services from spatially differentiated origins and destinations. Transportation creates market for agricultural produce, facilitates interaction among geographical and economic regions and opens up new areas to economic focus. Transport is a key to efficient and effective distribution of agricultural products at a cost and time convenient for both the producers and the consumers and it is regarded as a crucial factor in improving agricultural productivity. Agricultural production is very important to the economy of the world as a whole and Sub-Saharan Africa in particular. However, the rural transport is poor resulting in the high cost of transportation, inefficient distribution and delay in reaching the final markets. In adequate transport provision leads to waste of about 25% of total agricultural foodstuff produced. Hence, this paper evaluates transportation and agro-food distribution in Sub-Saharan Africa, examines rural transportation system and assesses the rural transport gaps. The conventional approach towards agro-food distribution in Sub-Saharan Africa focuses mostly on motorized transport. This approach is too narrow because it does not reflect the transport requirements and purchasing power of small-scale farmers. A broader approach that includes not only roads, but also paths and tracks; not only trucks but also intermediate means of transport such as donkeys, bicycles and animal carts in improving agro-food distribution in Sub-Saharan Africa is recommended.

Key words: Agro-food distribution, sub-Saharan Africa, rural transport, farm transition

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1. Introduction

Transport is regarded as an important factor involved in agricultural development all over the world. It is the only means by which food produced at farm sites is moved to different homes as well as markets. Transport creates market for agricultural produce, enhances interaction among geographical and economic regions and opens up new areas to economic focus. Transportation no doubt remains a catalyst for all aspect of socio-economic and environmental development. Without its singular significance of mobility and accessibility for farmers, agricultural produce will rot on farms, while efforts in providing food would be fruitless (Fasina *et al*., 2020). The development of smallholder agriculture in developing countries is very sensitive to transport strategies.

Many isolated farmers have little opportunity to escape poverty, as their potential marketing activities are hampered by inadequate or poor transport facilities. The rural transport planning must address the needs of people, as much as possible at the household level. Such well-planned transport system enables smallholders make the transition from subsistence to small-scale commercial farming. This helps them to harvest and market crops more efficiently, reduces drudgery and, by facilitating communication, helps stimulate social integration and improve quality of life. Availability of road infrastructure (that includes feeder roads, tracks, and paths), storage facilities and transport services increase mobility and encourage production (Gebresenbet and Oodally, 2005). The story of an adequate farm management begins and ends with efficient and properly managed transport. Transport takes a very important place in every industry, including agriculture**.** In order to produce food, farmers need certain resources, such as seed, fertilizers, pesticides, packaging materials, and many others. Precisely because of this, transport is an essential aspect of crop production that enables delivery of agricultural resources to a farmer. Furthermore, transport is a burning component of post-harvest crop management. Every harvested crop needs to be transported, either directly from the field to the market, or to the packing house and storage. Transport is a farm practice common to every farmer. However, regarding its purpose, it can be classified into two categories:

(i) Traditional: manual method of transport, used on every farm, usually includes very short distances (for instance, the transition from the field to the storage that is located on the farm).(ii) Mechanized and advanced transport**;** includes longer distances that require the use of certain means of transport.

2. Choosing the Right Path for Farm Transition

Farm transition can be managed regarding different modes of transport. Each transition mode has its advantages and disadvantages:

Mode of transport	Advantages	Disadvantages
Road	• Ideal for short distances; in that case, it's relatively cheap and fast enough • Loading and unloading is possible almost at any destination	• Expensive and less efficient for longer distances • Potential problems with traffic jams • Significantly contributes to air pollution
Rail	• Suitable for large quantities of goods that need to be transported on a long distance • Less dependant upon adverse weather conditions (such as heavy rain, snow, and fog)	• Less flexible than road transport mode (the infrastructure is not set everywhere, unloading and loading can be practiced only where it's allowed) • Expensive when practiced for short distances
Water	• Relatively cheap and efficient way of transporting large quantities of goods, as well as for long distances	• Relatively slow • The cargo can be loaded only in places with a suitable port
Air	• The fastest mode of transport • Efficient for long distances	• The most expensive • Not suitable for short distances

Source: https://blog.agrivi.com/post/transport-as-an-important-factor-for-a-farmer-s-success

When choosing the optimal mode of transport, farmers should consider a few important aspects:

- The distance and the accessibility of the destination
- Type of goods that are transported; for instance, there are different requirements for transition of perishable crops and packing material
- The size or the quantity of goods that need to be transported; determine the optimal mode of transport, as well as the price of delivery
- International or national laws and regulations
- Available infrastructure and farmer's financial possibilities

- Functionality and additional properties of any transport mode, as well as any means of transport

Properly managed transport is efficient in delivering farm resources and harvested crops as fast as possible. When considered as the final practice of delivering the crops to the market, transport is responsible for the preservation of crop yield and quality. If the transport services are infrequent, of poor quality, or expensive, it becomes a disadvantage for the farmer, leading to low farm gate prices. Further, if there are seasonally blocked roads, then it leads to losses of certain products like milk, fresh vegetables, and tea, which deteriorate quickly. This will also result in lower prices to the farmer. Road transport plays an important role in agricultural development. This is because it is the major means of transporting agricultural produce from the farms to the markets as well as to various urban communities. Road transport forms the most common and complex network and provides last mile connectivity to the consumer. It can transport wide-ranging products; it is physically convenient and highly flexible and usually the most operationally suitable and readily available means for the movement of goods. Consequently, to have an effective supply chain that can cut down the cost of logistics for agricultural products, reduce food loss along the chain, and ensure faster delivery of the products, then the road industry must not only be effective but thoroughly efficient.

3. Transportation and Agro-food Distribution in Sub-Saharan Africa

Transport is a key to efficient and effective distribution of agricultural products at a cost and time convenient for both the producers and the consumers. However, the rural transport is poor resulting in the high cost of transportation, inefficient distribution and delay in reaching the final markets in Sub-Saharan Africa. The consequences are high crop rot which affects farmer's income and subsequently their level of investment resulting in vicious cycle of low production. The middle men/women who buy directly from the farmers and sell at the urban markets are also affected by the deplorable rural roads. Sometimes, some of their products perish before reaching the market, occasionally, they sleep on the roads; however, the final consumers bear the brunt of some of these costs (Ipingbemi *et al.,* 2011). In Nigeria, poor and inefficient transportation services are some of the inhibiting factors in the rural areas and the agricultural economy (Obot68, 1986). They prevent the inhabitants from flexile movements, from transporting their products out and transporting equipment into the area. This has in turn affected the overall transport cost for moving agricultural products, amount of products available in the markets of both the rural and urban areas and the

final cost of agricultural products. Roads and transportation are essential for the sustainability of agricultural production in Sub-Saharan Africa, as it impacts positively factors such as mobility (John & Carapetis, 1991), the adoption of high yielding varieties, high productivity crops and bigger farm size (Sieber, 1999).

The conventional approach towards agricultural transport in Sub-Saharan Africa focuses mostly on motorized transport. This approach is too narrow because it does not reflect the transport requirements and purchasing power of small-scale farmers. A broader approach that includes not only roads, but also paths and tracks; not only trucks but also intermediate means of transport such as donkeys, bicycles and animal carts can considerably improve agricultural transport (Sieber, 2010). Even though the effects of an appropriate approach on agricultural production, marketing and income can be significant, it is more often rejected by decision-makers as primitive and backward.

Current rural travel and transport are dominated by head loading and walking (largely by women) to satisfy the daily travel and goods movement needs of rural populations in Sub-Saharan Africa (John & Carapetis, 1991). Starkey (2001) noted a low adoption of intermediate means of transport (IMT) in rural Africa compared to the rest of the developing world and sees this as a constraint to rural development. (Ahmed & Rustagi, 1987) stated that crops remain un-harvested or become spoilt once harvested because of unavailability of vehicles during harvesting. Tracey-White (2005) also, noted that mobility in rural areas could be hampered by the lack of transportation facilities and unavailability of good roads. Availability of transport facilities is a critical investment factor that stimulates economic growth through increased accessibility, its efficiency and effectiveness (Ajiboye, 1994). All affects the basic function of production, distribution, marketing and consumption in many ways. Transportation also influences the cost of commodity consumed and the purchasing power of the consumers (Ajiboye and Afolayan, 2009). Transport plays a significant role in the structure of food production and marketing, besides, easy transport to market can make all the difference in the level of rural incomes. Transport is seen as a necessary ingredient in all aspects of economic and social development. It plays a key role in getting land into production and in marketing agricultural produce. Poor roads characterize rural areas in Sub-Saharan Africa. In virtually all the cases, these roads are perpetually in a state of disrepair. Yet, it is on these deplorable roads that the rural dwellers trek daily to obtain water,

firewood, farm produce and to secure services from such places as markets, schools and clinic. Rural dwellers also rely on the poorly maintained roads to transport crops, raw materials and foodstuff that are meant for consumption in the urban areas (Afolabi *et al.,* 2016).

Agricultural production is very important to the economy of Sub-Saharan Africa as a whole and Nigeria in particular. Despite the fact that Nigeria is basically an agrarian nation and the majority of the goods to be transported are mostly agricultural products which according to Igben (1977) are by nature often bulky, low-priced, highly perishable. They must be conveyed from their area of production to their zone of consumption with minimum delay. Ajiboye (1995) observed that inadequate supply and high cost of food stuff is as a result of inefficient transportation and distribution. Just like many other developing countries, Nigeria's agricultural value chain is majorly informal, comprising of smallholders in rural areas who produce at a very small quantity, and middlemen who purchase, and aggregate these products which are then sold to the end users(Alifa, 2019).

Plate1: Transportation of Agricultural Produce

Source:https://www.researchgate.net/publication/347922719_Agricultural_Solid_Wastes_Causes Effects_and_Effective_Management

Plate 2: Transportation of Agricultural Produce

Source: https://thefarmersmanual.com/fg-signs-mou-to-insure-transportation-of-agricultural-produce/

4. Rural Transportation System

Rural transportation mostly includes animal traction, car, truck, train and other intermediary means of transport (IMT) such as motorcycle, bicycle, boat and canoe mostly adapted for local transport problems with low and medium loads (Sieber, 1999).

Rural roads and transport are essential for sustaining agricultural development. Recognizing this, the World Bank and others in the donor community have provided financial support to African countries to improve their rural road infrastructure (John & Carapetis, 1991). Despite this, traffic on most rural roads still consists mainly of pedestrians often carrying head loads. African governments have relied on parastatal truck fleets for crop transport. Fuel subsidies, and other policy measures have not helped to improve rural transport services. Chronic scarcity of foreign exchange, lack of spare parts and low vehicle imports have also hampered the development of

motorized rural transport services. Moreover, the rural poor usually cannot afford these services. These factors call for alternative and affordable means of transport. Therefore, there is a need to explore the potential of bicycles and other intermediate and low-cost means of transport for improving rural access and personal mobility. The development of smallholder agriculture in developing countries is very sensitive to transport strategies. Many isolated farmers have little opportunity to escape poverty, as their potential marketing activities are hampered by inadequate or poor transport facilities. According to Gebresenbet and Bosana (2012), Rural transport is usually classified into on-farm and off-farm transport.

On-farm transportation includes:

a. transportation within fields

i. collecting harvested crops to one point for processing in the fields and temporary storage;

ii. distribution of fertilizers and seeds;

iii. transporting of firewood, timber and

iv. water,

b. transport of agricultural products from fields to homesteads,

c. transport of agricultural implements from homesteads to fields and vice-versa,

d. transport of seeds and fertilizers to the fields;

e. transport of implements between different plots etc.

Off-farm transportation includes:

a. transport of agricultural products including animals to local markets,

b. transportation to grinding mills

c. transport of industrial products (commercial fertilizers, implements, seeds, etc.) from markets to homesteads,

d. transportation to health centres and schools, religious centres, and

e. transportation to towns and bigger market

The Rural dwellers produce the food consumed in the cities and most of the agricultural raw materials used by industries. Rural infrastructure constitutes the substance of rural welfare; effort to raise rural welfare must necessarily go beyond the limited approach of rising per capital income through agricultural development but also to make provision for rural transport facilities. Rural areas serve as the base for the production of food and fiber, the major sources of capital formation for a country, and a principal market for domestic manufactures (Olayiwola and

Adeleye, 2005). Ogunsanya (1981) observed that there are three types of routes in the rural areas via; bush paths, unsurfaced rural roads and surfaced rural roads. However, the bush path is very common but the least developed of all the routes. Bush paths link villages with farmsteads and they are usually narrowed, winding and sometimes overgrown by weeds especially during the rainy season. In adequate transport provision leads to waste of about 25% of total agricultural foodstuff produced (Olayide, 1972). Poor rural people often have to spend much time and effort to access necessities and the reduction of isolation and inaccessibility are fundamental to poverty reduction. Accessibility depends on mobility (ease and frequency of movement) and proximity (distance). Access may improve by greater mobility and improved proximity to services (piped water, local health center). Rural transport depends on appropriate infrastructure (path, road, waterways, bridges, railway track and their associated maintenance and traffic management system). The infrastructures include path, trail, track, access or feeder roads, secondary roads and primary truck roads. These may vary in quality, depending on weather, season, construction and maintenance and some means of transport require certain infrastructure standards to operate effectively. Improved rural transportation reduces travel time thereby, increasing the time available for economic and social activities while also promoting access to basic facilities (Afolabi *et al.,* 2016).

Efficient and effective rural transportation serves as one of the channels for the collection and exchange of goods and services, movement of people, dissemination of information and the promotion of rural economy. Effective transportation eases accessibility to inherent potentials of rural areas, which could be harnessed for the development of its economy. In other words, rural transportation provision forms an intrinsic part of rural development strategies, serving as a mechanism and catalyst for rural transformation through the reinforcement of rural development and contributes to poverty reduction by enhancing both equity and efficiency outcomes. In developing nations problems of rural accessibility are experienced not only in terms of linkage between settlement, but also exit within the agricultural settlement as well as links roads from rural settlement to urban center in term of daily trips (Afolabi *et al.,* 2018).

The provision of infrastructure as an approach to rural development is one of the methods mostly used by developing countries of the world. Ajiboye (1994) noted that availability of transport facilities is a critical investment factor that stimulates economic growth through increased accessibility. Paul *et al.* (2009) pointed out that the impacts of road infrastructure on agricultural

output and productivity are particularly important in Sub-Saharan Africa for three reasons. First, the agricultural sector accounts for a large share of gross domestic product (GDP) in most Sub-Saharan countries (Paul *et al.,* 2009). Second, poverty is concentrated in rural areas. Finally, the relatively low levels of road infrastructure and long average travel time result in high transaction costs for sales of agricultural inputs and outputs, and this limits agricultural productivity and growth. According to Mabogunje (1971), some of the variables that determine the level of development in a given environment are easy accessibility and mobility. Transport affects agricultural marketing because it is the only means by which farmers can transport their produce to the market. Poor transportation in the rural areas has resulted in low productivity, low income and a fall in the standard of living of rural residents and high rate of poverty (Aloba, 1986). Ogunsanya (1988) identified a strong relationship between transportation, underdevelopment and rurality. He indicated that the greater the degree of rurality, the lower the level of transport development. When the distance of farm to the market is far and the road is rough perishable crops may be destroyed and farmers may run at a loss (Tunde and Adeniyi, 2012).

5. The Rural Transport Gaps

Like most developing countries, Sub-Saharan African countries face two major rural transport gaps: a) The rural and feeder roads connecting villages and farming areas to each other and to market centers are usually inadequate, poorly maintained and costly to use; and b) Poor and inadequate rural transport services, caused by the lack of intermediate means of transport (IMTs) and appropriate infrastructure for their use, has meant that the carrying of goods between and within villages and between fields, villages, roads, and markets is dependent almost entirely on walking and head - or shoulder-carrying (John and Carapetis, 1991). By far the majority of transport and travel activity in sub-Saharan African countries occurs in rural areas. The greater part of transport in rural areas -- in terms of both distances and amounts carried is usually off-road. Almost all this transport, in turn, is non-motorized, in fact, nonwheeled -- and dominated by head-carrying by women and children of loads of up to 30 kg.

6. Role and Importance of Transportation

Transportation is the means to carry people and goods from one place to another. This has become very important in each stage of human civilization. Transportation has contributed much to the development of economic, social, political and cultural fields and uplifting their condition.

Essentially, the whole economic, social and political life of a nation depends upon an efficient system of transport (URL3). Speedy industrialization is impossible without development of transportation. It is unavoidably necessary to promote transport system for the proper development of agricultural sector and rural areas. Without development of transportation neither mass production nor distribution is possible. The contribution of transportation is very important to transport commodities to nooks and crannies of the world in a little time. If the development of transportation was not made, market would be limited in local areas and production would be limited to meet local needs only. As a result, economy of each country would remain in undeveloped condition.

Transport is life; it nurtures life and keeps life going. Transport plays a significant role in the efficient running of modern societies. It is also the engine of growth and development of societies. Transport makes possible movement of goods from one place to another with great ease and speed. Thus, consumers spread in different parts of the country have the benefit of consuming goods produced at distant places. Transport provides employment opportunity to individuals as drivers, conductors, pilots, cabin crew, captain of the ship, etc. who are directly engaged in transport business. It also provides employment to people indirectly in the industries producing various means of transport and other transport equipment. Transport is a key necessity for specialization allowing production and consumption of products to occur at different locations. Transport has throughout history been a spur to expansion; better transport allows more trade and a greater spread of people. Economic growth has always been dependent on increasing the capacity and rationality of transport.

Transportation helps much to the development of different industries, which produce perishable goods, such as fisheries, poultry firms, horticulture, dairy etc. Transport carries the perishable goods produced by such industries to the consumers living in different distant places in time. Otherwise, such products would not be possible to supply to the consumers.

A reliable and efficient transport system has a remarkable impact on agricultural marketing by taking agricultural products from the point of production to the point of demand. Transport enables agriculture and emboldens the farmer to invest more and increase production. And without this transport system, large quantities of painstakingly farmed produce would be laid to

waste. On the contrary, if an efficient transport system exists, and the agricultural produce is handled with care, the farmer can get the best possible returns.

Many farmers are cash-strapped and would like to dispose of the produce at the earliest. This means that even if the harvest is plenteous, the farmer can still be left in the lurch if the product cannot be reached beyond the boundaries of his town. His produce also needs to reach the consumer at a reasonable price and within a reasonable time. Keeping transport costs low helps the farmers earn a margin, as well as make it affordable for the consumer. On the contrary, if transport costs are high, then not only domestic marketing, but the potential for agricultural exports will also decrease as compared to countries with more efficient transport.

7. Conclusion

The conventional approach towards agricultural transport in Sub-Saharan Africa focuses mostly on motorized transport. This approach is too narrow because it does not reflect the transport requirements and purchasing power of small-scale farmers. A broader approach that includes not only roads, but also paths and tracks; not only trucks but also intermediate means of transport such as donkeys, bicycles and animal carts can considerably improve agricultural transport.

The rural transport planning must address the needs of people, as much as possible at the household level. Such well-planned transport system enables smallholders make the transition from subsistence to small-scale commercial farming. This helps them to harvest and market crops more efficiently, reduces drudgery and, by facilitating communication, helps stimulate social integration and improve quality of life.

An improved transportation will encourage farmers to work harder in the rural areas for increased production, add value to their products, reduce spoilage and wastage, empower the farmers as well as having positive impact on their productivity, income, employment and reduce poverty level in the rural areas since it will be easier to move inputs and workers to farm as well as products to markets and agro-allied industry.

8. Recommendations

- There is an urgent need to improve the rural-urban means of conveying agricultural produce from various producing centers to urban area to reduce poverty and hunger in Sub-Saharan Africa.

- There is the need for the development of reefer vehicles or vehicles with refrigeration facility in Sub-Saharan Africa. Such a transport system brings down the enormous wastage of fruits and vegetables and allied products, poultry, fish, meat, milk, and dairy products.
- Road transport should be improved upon so as to improve agricultural production in Sub-Saharan Africa
- There should be provision of appropriate transport facilities in Sub-Saharan Africa to prevent food deterioration and contamination of perishable products such as fish, meat and dairy products.
- There is the need to enhance fast technological driven evacuation measures through smart distribution and supply methods of agricultural produce and general freight to consuming places in Sub-Saharan Africa
- In improving agro-food distribution in Sub-Saharan Africa, this paper recommends a broader approach that includes not only roads, but also paths and tracks; not only trucks but also intermediate means of transport such as donkeys, bicycles and animal carts should be utilized.

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