

Effect of road transport accessibility on agricultural produce marketing and livelihoods of farmers in the Kasena-Nankana West District of Ghana

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Abstract: *For developing counties like Ghana, tackling existing internal economic and social disparities demands long term strategic solutions to mitigate the severity of poverty among some specific vulnerable groups within the society. By enabling the effective exchange of goods and services, the road sector makes a tremendous contribution to the economic development of rural societies and the eradication of existing rural-urban disparities. In many developing countries, however, rural road transport networks are generally of a low quality owing to little priority accorded to them. This paper, therefore, assessed the effects of poor road transport accessibility on the marketing of agricultural produce in the Kasena-Nankana West District of Ghana. The paper draws on the experiences of 150 respondents; farmers and transport operators from three communities (Babile, Chiana and Naania) and officials from the Feeder Roads Department of the District Assembly on the challenges of marketing agricultural produce in the District. Data collection was based on primary sources using questionnaires and interview guides. The analyzed data was presented in descriptive statistics such as percentages using tables and graphs. The condition of the road has engendered the practice of drivers overloading their vehicles. Utmost among the challenges confronting produce marketing is the issue of increased transport fares. The major impact of poor road transport network on the marketing of agriculture produce, identified by the study was the high incidence of post-harvest losses. Also, the increased cost of transportation compels farmers to sell their produce at farm gates at lower prices. The study, therefore, recommends that the District Assembly and Department of Feeder Roads improve the road networks within the area while storage facilities should be built and strategically sited in the communities to store farm produce.*

Key Term: Agriculture, Farmers, Produce, Road Transport

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Introduction

Globally, copious empirical evidence exists which proves that rural road connectivity is one of the key components for effective and efficient agricultural produce marketing, since it promotes efficient mobility (Tegebu and Seid, 2017 p. 611; Lokesha and Mahesha, 2016 p. 1; Iimi et al., 2015 p. 1-2; Iboku and Ekong, 2013 p. 30-31). Thus, the improvement of rural roads is broadly recognized as a fundamental precondition for the development of rural areas, and its absence heightens their vulnerability and perpetuates their poverty levels (Hettige, 2006 p. 8). Despite this, rural accessibility and connectivity remain a major challenge in developing countries.

Studies have indicated how quality rural transport systems, especially roads catalyze the easy conveyance of agricultural produce to market centers. Rural roads are the wealth of a nation, a tool for social inclusion and economic development through agricultural produce marketing (Shimokawa, 2007; World Bank, 2006). As pointed out by the World Bank (2006) rural roads are the

priority to link farmers to towns to facilitate market entry of smallholder farmers. Trajectories through which rural roads promote agricultural produce marketing include rapid and frequent access to market centers, accelerated delivery of farm inputs and products, easy movement of people, increased production and productivity, crop diversification and increased profitability (Ibok and Ekong, 2013; Tegebu and Seid, 2017).

The unavailability of rural infrastructure, particularly roads and other transport services, perpetually restrain farmers' incomes and their potency to adopt modern technologies (Banjo et al., 2012). Without an efficient road network, movement of people and agricultural produce are impeded hence stifling agricultural and economic growth (Hine et al., 2001). Rural transport infrastructure is crucial for agriculture; agri-business and marketing as well as agro-industries (Ostrom et al., 1993) as it affords farmers a conducive environment to supply produce to market centers (World Bank, 2000). Foot, animal and bicycle paths feed into rural roads as well as

secondary roads and are managed by local governments and communities and in turn link markets and peri-urban hubs (Lindsay and Kongolo, 2015; Fouracre and Dyson, 2006 cited in Lindsay and Kongolo, 2014). Despite their copious nature (about 80% of the total road network lengths), they carry only 20% of the total motorized traffic (Lindsay and Kongolo, 2015).

In Ghana, an improvement of rural road systems and transport services in general for many farming communities means improved access to market centers and expedite domestic and international trade (for communities sharing borders with neighboring countries). Through these, rural farmers will receive inputs needed to increase agricultural productivity and market their outputs with a resultant expansion of market linkages, commercialization of agriculture, diversification of livelihoods and expansion of spatial exchange (Narteh, 2012). Averagely, out of the 24,000 km of feeder roads in Ghana, only 50 percent are in maintainable condition due to a lack of local resources to fund road maintenance (African development Fund, 2003). Funding for road maintenance usually comes from general revenues and is thus the first to be cut during difficult periods (Gwillam, 2011; Addo-Abedi, 2007 cited in Ndichu, 2013). Local authorities also embezzle or misappropriate funds meant for rehabilitation of these roads (Auditor-General Department).

Inadequate rural roads make it challenging for farmers to expand the scale of their production due to mobility challenges confronting them emanating from the poor road network (United Nations. Economic Commission for Africa, 2010). The Kasena-Nankana West District is an area of interest for this study since 68.7% of the population is into farming (Ghana Statistical Service, 2014) but without commensurate road infrastructure. This raises a legitimate question; how does the existing poor transport system influence or affect agricultural produce marketing in the Kasena-Nankana West District? Unfortunately, empirical studies providing evidence on the effects of poor transport on agricultural produce marketing have been extensive in the Southern part of the country, but the Northern part is still lacking. It is therefore imperative to probe into ways in which transportation infrastructure influences the marketing of agricultural produce; due to its necessity in the attainment of SDG goals 1 and 2 correspondingly. Thus, this paper assessed the effects of poor transport on the marketing of agricultural produce and livelihoods of using Kasena-Nankana West District as a case study to better understand the situation in the Northern part of Ghana.

Profile of the Study Area

The research was conducted in the Kasena-Nankana West District (carved out of the Kasena-Nankana

Municipal in 2010 under a Legislative Instrument, L.I 1855) of the Upper East Region in Ghana. It has a total land area of approximately 1,004sq km. The District shares boundaries with Burkina Faso to the North, Bongo District to the North East, Bolgatanga Municipal to the East, Kasena-Nankana Municipal to the South, Builsa District to South West and Sissala East District to the West (Ghana Statistical Service, 2014).

The relief of the district is generally low lying and undulating with isolated hills rising to 300 meters above sea level in the western part of the district. The District falls within the interior continental climatic zone of the country characterized by pronounced dry and wet seasons. The two seasons are influenced by two air masses. First is the warm, dusty and dry North-East Trade Winds air mass which blows in the northeasterly direction across the whole district from the Sahara Desert (late November–early March) resulting into absent of rainfall, low vapour pressure (less than 10mb) and low relative humidity (which rarely exceeds 20.0% during the day but may rise to 60.0% during the nights and early mornings). Temperatures are usually modest at this time of the year by tropical standards (26°C–28°C) (Ghana Statistical Service, 2014).

During the wet season (May to October), the whole of West African sub-region including Kassena-Nankana West District is under the influence of a deep tropical maritime air mass (South West Monsoon Winds). This air mass together with rising convection currents provides the district with rains. The total rainfall averages 950 mm per annum. The above phenomenon adversely affects the water table and reduces underground water thereby making water harvesting a viable option in the district (Ghana Statistical Service, 2014). The two main soil types found in the district are the Savannah Ochrosols and the groundwater laterite. The Savannah Ochrosols are porous, well-drained, loamy, mild acidity and interspersed with patches of black or dark grey clay soils and it's suitable for cultivation of cereals and legumes (Ghana Statistical Service, 2014).

The district has a total population of 70,667 representing 6.8 percent of the population of the Upper East Region. With an area of 872.8 square kilometers, the district has a population density of 81 persons per square kilometer. The proportion of the female population (50.8%) in the district is slightly higher than that of males (49.2%). The Kasena-Nankana West District is an area of interest for this study since 68.7% of the population is into farming (Ghana Statistical Service, 2014) but without commensurate road infrastructure. It is therefore imperative to investigate ways in which transportation infrastructure influences the very economic activity (agriculture) of the rural people; due to its necessity in the attainment of SDG goals 1 and 2 on poverty and

hunger (end poverty in all its forms everywhere and end hunger, achieve food security and improved nutrition, and promote sustainable agriculture) respectively.

Methods

Research Design. Research design offers a blueprint for the collection, measurement, and analysis of data (Sanders et al., 2010; Mitchell and Jolley, 2010). The study is a pragmatic retroactive survey on the effects of poor road transport accessibility on the marketing of agricultural produce in the Kasena-Nankana West District of Ghana. The study adopted the case study design for reasons that: the design studies specific problem within its real-life context (Creswell, 2009 p. 14); offers a strong research technique for investigating individuals or small group of participants from a larger group (Shuttleworth, 2008); and provides flexibility for selecting and focusing on a single or few cases of a social group or phenomenon to be comprehensively investigated (Yin, 2009). On the approach of the study, it aligns with the mixed method (use of both quantitative and qualitative approaches) of conducting research.

Sampling and Sample Size. On the sample size and procedure, a total of 150 respondents from the three communities (Babile, Chiana and Naania) were selected for the study by the use of a convenient sampling technique. Although recognized that a probability sampling technique such as simple random sampling would have provided an equal chance for all farmers to be included in the study, however, lack of adequate baseline data on farmers made adopting such a technique largely unviable. The convenient sampling technique provides flexibility (Etikan et al., 2016) for focus on participants who met the inclusion criteria (being a farmer, a transport operator and official of the Feeder Roads Department of the District Assembly) and were readily available to participate in the study.

Data Collection. Close-ended questionnaires were the major data collection tool used in soliciting information from the farmers. The questionnaire administration was purely interviewer-administered one rather than self-administered. The questions were read out to the respondents' since most of them could not read nor write. The questionnaire was used by the study for the reason that the instrument helps to obtain first-hand information as well as reach out to a variety of respondents (Krosnick, 2016). On the other hand, qualitative data collection techniques such as interviews and observations were used to gather qualitative data for a detailed description of the phenomenon, thoughts, feelings, beliefs and experiences (Patton, 2002).

Data Analysis and Processing. Statistical Package for Social Science (SPSS) was used to analyze quantitative data obtained from the farmers. Descriptive statistics (frequency and percentages) were used to summarize the data gathered from the respondents. The results of the analyzed data were presented using tables and graphs. The audio-recorded interviews were transcribed verbatim by the researchers. The content approach of analysis was used to analyze the qualitative data based on the objectives of the study and driven by the original accounts and observations of the people (Srivastava and Thomson, 2009; Gerrish et al., 2007).

Results

The Socio-Demographic Characteristics of Farmers. Table 1 depicts the socio-demographic characteristics of the respondents. There were more male (63.3%) than female (36.7%) participants among the respondents sampled. In all, most respondents (66.3%) were youthful, within the age cohort of ≤ 41 , as many as 50% have no education at all whereas 33.3% schooled up to the basic. The low level of educational accomplishment essentially mirrors the fact that agriculture is still underdeveloped and the sector being perceived as a venture for the uneducated. The average household size was 5.4.

Table 1: Background characteristics of study participants

Variable		N=150	Percent (%)
Gender	Male	95	63.3
	Female	55	36.7
Age	18-25	30	20
	26-33	45	30
	34-41	50	33.3
	42-49	20	13.3
	50 and above	5	3.3
Educational Level	Non-formal Edu.	75	50
	Basic	50	33.3
	Secondary	25	16.7
Size of Household	Mean	5.4	
	Minimum	2	
	Maximum	11	

Nature/Condition of Roads in the communities. All the roads within the three communities surveyed in the district had the same conditions. The Kumasi-Paga (major route) was where all these roads converged. These roads are rough and slippery; dusty; full of potholes; they are untarred and are without storm drains to channel surface runoffs. The roads are not motorable all year round, especially during the rainy season. Vehicles usually get stacked in the mud while trying to negotiate

their way to destinations and in some instances, the vehicles overturn due to overloading. Nonetheless, the Babile-Paga road is relatively better compared to the other two roads. It has channels and cohorts which collect and transport rainwater from the road unlike that of Chaana and Naania roads which do not have drains and channels to collect and disperse rainwater. Therefore after a heavy downpour, the road is accessible although not always.

Table 2: Nature/Condition of Roads in the study communities

Road name and length	Condition/Nature
Community A (Babile) 2.2km to the main road	Rough and slippery Dusty
Community B (Naania) 1.6km to the main road	Potholes Untarred
Community C (Chaana) 4.1km to the main road	No storm drains

Means of getting farm produce to market. It was observed that the most common mode of transporting farm produce to market was by tricycle as indicated by 47% of farmers. The tricycle was used often because they had enough carriage space to carry ample produce at affordable costs. Head portorage (28.7%) is also rampant particularly in Naania where the distance to Paga is not so far relative to the other communities. However, in the other two communities (Babile and Chaana), head

portorage was used only to convey produce from farms to the roadside for transport to the market center by other modes of transport. Head portorage as a means of transporting farm produce to market occurs usually during the rainy season because vehicles were not always available for use and all these can be attributed to the fact that road condition is poor, especially in rural areas, coupled with the general lack of feeder roads over which agricultural products can be transported.

Table 3: Means of transporting farm produce to the market

Mode of Transport	Chaana	Babile	Naania	Frequency	Percentage
Head portorage	6	14	23	43	28.7
Truck	15	11	7	33	22
Taxi	-	3	-	3	2
Tricycle	29	22	20	71	47.3
Total	50	54	45	150	100

Taxis usually were not seen making trips within the study area due to their small carrying capacity. A significant proportion of the farmers (22%) used trucks because they were always available for use as some farmers within the various communities owned and hired their trucks for use. The variation within communities relative to means of transporting farm produce to the market can be attributed to the distance from the farms to the markets.

Influence of Road Conditions on Loading Practices (Passenger and Freight). Table 4 reveals that 70% of the road users said overloading of vehicles is often done. Also, 23.3% of the farmers noted that overloading is done infrequently while only 6.7% indicated that

overloading is not done under any circumstance. It was realized that poor road conditions accounted for the practice of overloading through an interview with some drivers. A forty-seven-year-old driver who has been driving on the Babile-Paga road for the past 15 years had this to say, “most often, overloading is inevitable because the passengers carry many goods which they travel with and since there is no much space for many goods, the goods are forced into the smallest spaces thus overloading the vehicle”.

Another driver had this to add “I am forced to undertake few trips hence for every one trip, I have to overload to make ends meet”.

Table 4: Influence of Road Conditions on Loading Practices

Road condition	Loading practice (overload)	Frequency	Percent (%)
Poor road condition (Potholes, untarred, dusty and no storm drains)	Often	105	70
	Sometimes	35	23.3
	Not at all	10	6.7
Total		25	100

Some respondents also indicated that when it rains, most drivers are unable to go to communities to load passengers and farm produce. This, in most instances, lasts up to a week when the rains are continuous. In this case, only a few trucks can take the risk which adversely affects the loading capacity of the vehicles. Due to poor roads, few vehicles ply the routes and sometimes drivers overload because a limited number of vehicles have to pick an array of stranded farmers and goods. Nonetheless, a truck driver indicated that when the road is good commuting to communities can be done at any time even in the night provided there are passengers and goods.

Effects of road conditions on the marketing and livelihoods of the farmers. Figure 1 shows some problems confronting the farmers and traders concerning the poor condition of the road. Paramount among them is the issue of post-harvest losses (53.8%), increased transport expenses (30%) among others. The dilapidated nature of the roads connecting the communities possesses threats to the safety of the farmers since accidents were recorded frequently on these roads. Similarly, the roads impeded mobility particularly in the rainy season results in loss of product due to lack of storage facilities to keep the product safe. Also, the overloading of the vehicles results in the damaging of some food products especially the perishable ones.

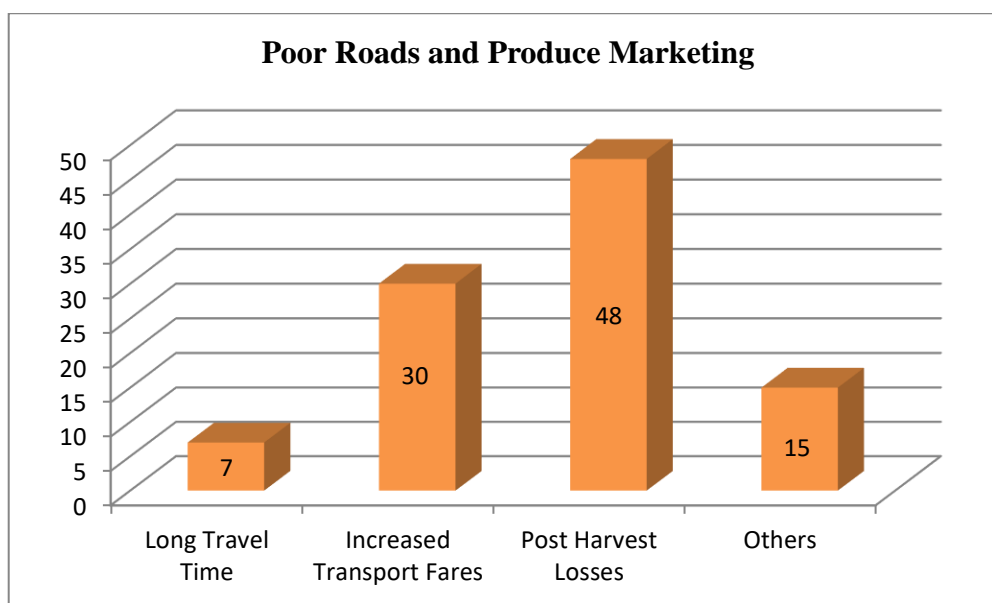


Figure 1: Poor Road conditions, marketing, and livelihoods of the farmers

Long travel time to the market center creates discomfort and inconveniences such as waist pains and general weaknesses when they get to their destinations (home or market) resulting from long sitting during a long travel period. Another problem identified was increased transport expenses which sometimes compel farmers to sell their produce at farm gates which has lower patronage and lower prices as compared to the main market. One trader at Babile said this to buttress her plight in marketing her produce “when it rains on a market day, the drivers overload and when they get to the

muddy part of the road, the vehicle balances in the direction overloaded and this makes them (traders) very uncomfortable and frightened. This makes some of us not to sell at the main market in Paga but our local communities although this does not attract high prices.”

Discussion

Nature/condition of roads in the study communities. All the roads within the three communities surveyed in the district had the same conditions, they are rough and slippery; dusty; full of potholes; untarred and without

storm drains to channel surface runoffs. In general, the nature of road conditions within the study communities (Chiana, Babile and Naania) affirms the assertion of Aikins and Akude (2015) that; existing modes of transporting agricultural produce to the market is inadequate. Most of the roads are not motorable all year round mostly during the rainy season. Vehicles usually get stuck in the mud while trying to negotiate their way to destinations. These findings are analogous to that of Hine et al. (2001), where they noted that poor road networks affect the marketing of farm produce thus resulting in post-harvest losses.

Means of getting farm produce to market

The tricycle was used often to transport farm produce to market because they had carriage space enough to transport abundant produce at affordable costs. This finding, however, contradicts the findings of Yeboah (2015) where he noted that head portage is the dominant means of transporting goods to the market. The variation can be a result of the distance from the farms to the markets within the different communities' understudy. Studies have reported worldwide the huge growth in tricycle use, resulting from the increased availability of relatively cheap Chinese motorcycles (Kassali et al., 2012; Starkey, 2016; Hine and Ellis, 2001). It has been emphasized that tricycles use is relatively cheaper, capable of plying bad roads characterizing most farming roads and timely availability of the transport service. A significant proportion of the farmers use the trucks because they were readily available for use as some farmers within the various communities owned and hired their trucks for use. Head portage is rampant also particularly in Naania where the distance to Paga is not so elaborate. However, in the other two communities, it was used only to convey produce from farms to the roadside for transport to the market center by other modes of transport.

Easterling et al., (2008) asserted that most smallholder farmers carry their products as head loads to the nearest road before they can be transported to the market due to their remote locations and poor roads leading to their farms. However, the study confirms that of Angmor (2012) where he noted that other modes of transporting farm products include the use of trucks and head portage. Head portage occurred usually during the rainy season because vehicles were not always available for use due to poor road conditions. The modes of transporting agricultural produce to the market (trucks, tricycles, and minibusses) confirm those proposed to exist by Sieber (1999) within rural areas where farming is predominant.

Influence of road conditions on loading practices

In all the communities surveyed, the road condition influences the loading practice. A greater section of the farmers and drivers noted that the overloading of vehicles

is a common phenomenon. It was realized that poor road conditions accounted for the practice of overloading because some drivers shared some views. Overloading is inevitable because the passengers carry many goods which they travel with and since there is no much space for many goods, the goods are forced into the smallest spaces thus overloading the vehicle. Some also indicated that when it rains drivers are unable to go to communities to load passengers and farm produce lasting up to a week when the rains are continuous. In this case, only a few trucks can take the risk which adversely affects the loading capacity of the vehicles. Due to poor roads, few vehicles ply the routes and sometimes drivers overload because a limited number of vehicles have to pick an array of stranded farmers and goods.

Consequences of road conditions on produce marketing and livelihoods

Marketing efficiency and the amount of income generated by farmers from the sale of their produce are moderated by the availability of transportation networks and regular vehicular movements on these roads (Tracy-White, 2005). Evidence from the study supported this as most farmers lamented on the hustle they go through to market their produce thus affecting productivity. Utmost among them is the issue of post-harvest losses. Roads connecting the various farms were footpaths as well as unpaved roads leading from the various communities (Babile, Chiana and Naania) to the market. These roads are characterized by potholes, dust, and mud especially when it rains, thus impeding mobility and creating post-harvest losses due to lack of storage facilities to store their produce safe. This makes the farmers run at a loss. This manifestation conversely does not augur well for food security and the global agenda of ending poverty and hunger. These occurrences however epitomizes the fact that globally, rural roads connectivity is a key component of efficient agricultural produce marketing (Tegebu and Seid, 2017; Lokesha and Mahesha, 2016; Iimi et al., 2015; Ibok and Ekong, 2013) but are not always available (Karthikeyan, 2016; Magesa et al., 2014; Gwillam, 2011). Good transport can be expected to raise the output price of the producers and lower production costs through the reduced transportation cost of goods and services (Kiprono and Matsumoto, 2014).

Long travel time to the market center creates discomfort and inconveniences such as waist pains and general weaknesses when they get to their destinations (home or market) resulting from long sitting during a long travel period. Tracey-White (2005) noted that the mode of transportation used, length and time of the journey and the costs of transport all affect the efficiency of the marketing system and therefore farm output. Poor transport infrastructure, high transport cost and missing links in the transport network pose a challenge for the marketing of agricultural produce (Fungo et al., 2017). Transport assures the supply of agricultural inputs and

facilitates the delivery of farm outputs to the markets (Fungo et al., 2017).

Another problem discussed was increased transport expenses which compel farmers to sell at farm gates which have low patronage and lower prices as compared to the main market. Due to this, a direct link between producers and traders is missing, leading to the introduction of intermediaries (Roy, 2012) who provide a link negotiating the prices with the farmers and delivering the produces to the markets and traders. Their presence has not been seen as a positive development by many. Intermediaries constitute a "real face" in the otherwise "hidden hand" of the market (Keys, 2005). However, one of the most effective ways that farmers get the best price for their produce is for them to sell it directly to final consumers in rural or urban markets, and thus bypass the normal marketing system (Hine et al., 2001). The poor road network in the district does not provide for this instance thereby making the farmers receive lower returns on their investments.

Conclusion

Rural transport systems, especially roads are seen to be a catalyst for access to agricultural to market centers' and its improvement is broadly recognized as a fundamental precondition for the development of rural areas. However, rural accessibility and connectivity remain a major challenge in developing countries. Rural roads are still of very poor quality and inaccessible across Ghana which makes it hard for farmers to produce more and to transport to market centers for revenue. This paper, therefore, assessed the effects of road transport accessibility on the marketing of agricultural produce in the Kasena-Nankana West district.

The findings indicated that poor and unpaved road conditions linking the various communities to the market and the road situation worsen when it rains. Most vehicles could not ply the roads during rainy seasons thus affecting the marketing of farm produce. The condition

of the road affected loading practices in the various communities as overloading of vehicles was widespread. Ultimate among the challenges the poor road network pose is the issue of post-harvest losses. Another problem has to do with increased transport expenses which compel farmers to sell at farm gates despite the lower prices they attract. The possible attainment of SDG goals 1 and 2 respectively is contingent on providing avenues where people can improve their productive capacity. This can only be achieved in Kasena–Nankana West district through the implementation of the following recommendations to meet the needs of farmers.

The study recommends that the District Assembly and Department of Feeder Roads improve the road networks within the area. The paper recommends that prioritization of the rural roads should be done through multi-criteria analysis and social equity (impacts of personal, economic or social characteristics) and multi-dimensional poverty should be highly prioritized. Relying on a purely economic model of road project allocation will potentially lead to a vicious circle being created where investments widen the income gap (World Bank, 2005). The allocation of road funds to the various implementing agencies should be streamlined through modeling such that, the roads are not used as political tools. This will promote agricultural produce marketing through rapid and frequent access to market centers, accelerated delivery of farm inputs, effective movement of people, increased production and productivity, crop diversification and increased profitability. The paper also recommends that the Ministry of Food and Agriculture in collaboration with the District authorities should build storage facilities that are suitably placed within these communities to store farm produce. This will help alleviate the issue of post-harvest losses usually encountered by the farmers. This will also safeguard the farmer's earnings by reducing the occurrence of the paradox of bumper harvest; where they tend to earn less due to reduced prices emanating from excess supply.

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