

**THE INFLUENCE OF RURAL LOGISTICS AND RURAL TRANSPORT COSTS
ON FARM INCOME AND POVERTY IN KENYA: THE CASE OF KISUMU
AND NYANDARUA DISTRICTS, KENYA**

BY

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1.0 INTRODUCTION

1.1 Background

1.1.1 The Basic Concepts on Infrastructure and Productivity

Numerous models of development have generated explanations of growth and development that imply a strategic but often hidden role of infrastructure. Urban and rural growth rates are generally dependent on the physical transport and communication linkages. The ability of infrastructure to reduce the cost of marketing agricultural products has significant implications, especially in Africa.

Lack of infrastructure facilities is the principal source of market fragmentation and inefficiency in the transmission of price signals. As such, availability of infrastructure facilities will enhance diffusion of agricultural technologies and facilitate accessibility to farm inputs and credit to the rural farmers because agricultural service providers tend to frequent areas with adequate infrastructure.

According to Karugia *et al* (2004), substantial infrastructural, institutional, and policy constraints hinder the exploitation of market opportunities. These constraints undermine the development of food marketing system and lead to high marketing costs, barriers to entry and expansion by traders. The study recommended that the central and local governments should play a greater role in improving marketing infrastructure.

1.1.2 Road Connectivity and Transportation Costs in Kenya

Most of the roads constructed in the 1960s had deteriorated by the 1980s and emphasis had to be placed on reconstruction and improvement of secondary and minor roads. The sector has, however, continued to suffer negative growth in the 1990s. It is currently estimated that 57 percent of the classified roads are in good condition and can be maintained, while 43 percent are in poor condition and require rehabilitation (Kenya, 2001).

The landmarks in the road policy evolution include the formation of the Kenya Roads Board, the introduction of a road maintenance levy fund and axle-load limits, and moves towards increased private-sector participation in all facets of road service delivery. As noted by Wasike (2001) the overall road policy framework is not integrated to promote a positive impact and generate cumulative positive externalities. There is little progress towards instituting legal and regulatory frameworks for private-sector participation. The current policy challenge in road infrastructure development is to identify and catalyse institutional innovations that reduce transactions costs, increase financial liquidity, increase social capital, and reduce risks (Obare *et al*, 2003).

The key issues affecting the public transport sub-sector include: poor state of trunk road network; poor or lack of rural access roads; poor linkage between rural access roads and major highways; lack of efficiency and transparency in the use of road funds; lack of adequate quality control in execution of road works; misuse of road facilities; lack of adequate research and development; poor complementarity between road and rail transport; and lack of a coherent public transport policy.

The Kenyan road transport system has gone through a series of changes, from the initial lines of trails passing through a system of old tracks and dirt roads to a complex network of gravel and bitumen highways and today there are over 63,000 km of national classified roads and over 100,000 km of unclassified roads. Among the classified network system, about 8,600 km are bitumen roads. The state of the roads has deteriorated considerably over the years due to inadequate maintenance and overloading of vehicles. Road transport remains the country's primary transport system due to its flexibility and adaptability to changing circumstances but also because of the serious inefficiencies in railway transport. While most investment has been directed to upgrading the main road network, there is a significant expansion in the coverage of the unclassified rural road network through special crop-oriented programs (e.g., tea, sugar roads) and through the Rural Access Roads Program (RARP). The latter program was initiated in the early 1970s with the intention of constructing extensive network of all-weather rural access roads, using labor-

intensive construction methods. In all, about 12,000 km of rural roads have been paved and maintained under RARP.

Logistics is an important part of rural life, which is often the issue of bringing farmers to the markets. Indeed between 30 and 70% of the rural population in Kenya is living off year-round passable roads and therefore has to rely on intermediate means of transportation to bring inputs to the village or the field, and transport crops to the market.

In both Kisumu and Nyandarua, access to the markets is hampered by poor infrastructure, unreliability in the rainy season and limited or monopolistic transport services using means of transportation with limited capacity and high unit cost. The high costs of transportation in rural areas raise the transaction costs between the farmers, the middlemen and the final consumer. This reduces the farmers' profits or leads to entrapment in subsistence farming and hence impact negatively on income generation and poverty eradication efforts.

As will be discovered in the course of this paper, most of the constraints facing farmers in Kisumu and Nyandarua districts cut across all the sub-sectors. Farmers interviewed in Kisumu and Nyandarua districts cited lack of market access, high cost of production and lack of access to affordable credit as major factors affecting agricultural performance. These constraints could be addressed by improving infrastructure, especially the road infrastructure, making available to farmers cheap credit as well as creating a link between farmers and the market thus getting rid of exploitative middlemen.

There is a huge gap between producers and consumers (not under management of farmers as there is no link between the farmer and the market to which the control is with the farmer) in both districts. Hence the farmers are open to exploitation to existing chains. Gains are also marginal as a result of the existing chains and high production costs as already mentioned because the farmer has no control over his produce (i.e. setting the price). There is a wide margin between the value of farmers produce and the market price

and the profit ends with the fellows in the middle of the chain. The modes of transport in both districts are head loading, bicycles, donkeys, carts and vehicles, lorries and tractors.

Monopolistic practices, corruption, and excessive regulations add to the burden of the rural marketplace. The high costs, risks, and “friction” in rural agricultural markets prevents markets from achieving sufficient scale for efficiency and similarly prevent the low-cost and reliable supply of production inputs such as seed, fertilizer, and other goods to farmers. The very poor farmers also lack credit facilities, lack the political empowerment, market knowledge, and business knowledge to address these market roadblocks. Thus, poor rural farmer lack the capacity to improve and influence the markets upon which their lives depend. But some of these assets can be developed through effective organization, technical training, and means for assembly and communication.

A range of option exists, for example the support for and active participation in formation and functioning of trader associations, comprising not only of farmers but also traders, processors and scientists, support for organizations that link farm input supply with information dissemination. Inexpensive measures can be introduced to facilitate an improvement or even expansions of the existing road networks. For example, with assistance from government institutions and non-government organizations, rural communities can be mobilized to upgrade and maintain rural access roads. The impact will be an improvement in farmers’ marketing margins. Improved market margins will attract private input traders, leading to a more competition and input supply system and the widening of the choice of markets and inputs (G.A.Obare, *et al* 2003).

1.2 Objectives of the study

The first objective of this study was to provide an accurate understanding of the organization of logistics from the farmer to the main centers in two districts, Kisumu and Nyandarua; that is the sequence of the supply chain and participants. This sequence has implications on the revenues and income levels of the farmer and the prices of the final product, given the status of infrastructure.

The second objective was to reconstitute a value chain that allocates costs to various steps in the logistical sequence as specified in the Terms of Reference (TOR). The difficulty in this exercise is that most participants have no formal accounting with a detailed breakdown of operational costs. These costs have to be estimated indirectly, based on figures that participants can provide on earnings and payments. Also, some of the participants in the value chain were quite reluctant to talk to the author for a number of reasons, one being fear, that is fear that their livelihood would be jeopardized, that was mainly the middlemen and small traders in the market places.

The policy implication for a country such as Kenya whose agricultural sector is dominated by small holders is that she should invest in rural road infrastructure improvements. However, the government is in deep fiscal crisis and might not afford the high cost of major rural infrastructure investments.

1.3 Methodology

The following methods were used to collect information for the study:

Field Survey

Various participants in the rural supply value chain were interviewed. These included the following:

- * Farmers
- * Local providers of transport services
- * Local intermediaries/merchants
- * Region-level transporters
- * Farmer associations or cooperative organizations.

Desk Research

This involved search of secondary literature and websites to be able to obtain data and information for this study. In addition, the documents listed in the reference section were reviewed.

2.0 CASE I: KISUMU DISTRICT

2.1 DESCRIPTION OF THE STUDY AREA

2.1.1 Position and Size

Kisumu is one of the Districts in Nyanza Province. It lies within longitudes $33^{\circ} 20'$ East and $35^{\circ} 20'$ East and latitudes $0^{\circ} 20'$ South and $0^{\circ} 50'$ south. The District is bordered by Nyando District to the northeast, Vihiga District to the north, Siaya District to the northwest, Bondo District to the west and Rachounyo District to the south. The District covers a total area of 918.5 sq. km.

2.1.2 Topography and Climate

The district can be divided into two topographical zones namely the Kano plains and the midland areas of Maseno and Kombewa. The Kano plains lies in the floor of the rift valley, which is a flat stretch bordered to the North and east by the escarpment. The Kano plains formation due to the structure on the floor of these escarpments renders itself vulnerable to flooding by heavy rains especially the lower Kano plains and in particular the Nyando valley. There are three major rivers flowing into Nyanza gulf namely Kibos, Awach and Magada, all of which have been harnessed for small-scale irrigation.

The district has a long shoreline along Lake Victoria. This shoreline is 80 km long and has more than seventeen beaches all of which are fish landing bays. The mean annual rainfall varies with altitude and proximity to the highlands along the Nandi escarpment and Tinderet. Maseno has a mean annual rainfall of 1630 mm, Kisumu 1280mm, Kibos 1290mm, and Koru 1103mm.

The lowland area forms a trough of low rainfall, receiving a mean annual rainfall of between 1000 mm and 1800mm. This area has two rainy seasons, with the long rains occurring in August/September. During the short rains the average annual rainfall ranges between 450mm and 600mm. Their reliability is low and the rains are distributed over a long period, making the cultivation of second crops difficult. Although there is entirely

no dry month, the peak generally falls between March and May, with a secondary peak in September and November. The mean annual temperature ranges from 20^o and 30^o.

The district has a wide range of soils types but is mainly dominated by vertisols. In the Kano plains clay soils are commonly associated with swamps on the slightly elevated grounds. On the piedmont plains are planosols and its complexes, which are of moderate fertility. On the uplands are cambisols and luvisols of volcanic origin, which have low fertility.

2.1.3 Administrative and Political Units

Kisumu District is divided into four administrative divisions. The divisions are Winam, Maseno, Kombewa and Kadibo. The total area and population of the District by division is shown in Table in 1.

Table 2.1: Area and population of the District by Division

<i>Division</i>	<i>Area in km²</i>	<i>Population</i>	<i>Population density</i>
Winam	395.0	350,365	887.0
Maseno	168.7	69,336	411.0
Kombewa	192.1	63,969	332.9
Kadibo	162.7	51,901	318.9
Total	918.5	535,571	

Source: District Commissioner’s office, Kisumu 2001.

The district has three parliamentary constituencies namely Kisumu Town East, Kisumu Town West and Kisumu Rural.

Kisumu Town East constituency covers Kadibo division and part of Winam, Kisumu Town West constituency covers part of Winam and a small part of Maseno Division and Kisumu Rural constituency covers Kombewa and part of Maseno Division.

2.1.4 Population Size and Distribution

According to the 1999 censuses, Kisumu district has a total population of 504,359, with 248,735 male and 255,624b female. 42% of the population is below 18 yrs, 37% is between 19 and 37 years, 9% between 38 and 47 years, while 11% is 48 years and above. This is an indication that a large percentage of the population is youth. The youthful population puts a lot of pressure on the available resources and there is need to provide them with education and jobs. The population density is about 549 people/Km².

2.1.5 Settlement Patterns

Winam Division is the largest division in terms of area with 395 km² and has the highest density. It is the division, which holds the provincial and district headquarters. Kisumu city, the largest in western Kenya, is found in this division. The main attraction to the town is the availability of jobs and business opportunities, college and training Institutions. There are pockets of poverty in Kisumu city particularly in slum settlements such as Obunga, Bandani, Nyalenda, Nyawita and Manyatta. This has extended pressure on social amenities such as housing, water and sewage services. The town has a ready market for agricultural products thereby promoting growth and development of agricultural, industrial and service sectors. However, slum dwellers, street children and orphans and the unemployed youth are a threat to security.

Maseno Division has one main trading center, which is Maseno. It is in this division that Maseno University is situated. Approximately 45 percent of the population in this division is poor. This is due to the under-utilization of the available arable land despite the fact that the area has two rainfall seasons. However, 20 percent of the division lying along the lakeshore experience dry whether and hence has lower agricultural potential. Maseno division is the second most populous after Winam with a density of 411 persons per km².

Kadibo Division covers a large part of the lowland region. It is the poorest division of the district due to the unreliable and scanty rains coupled with seasonal flooding which destroys crops, houses, animals and exposing the population to water borne diseases and

malaria. Kadibo is the largest populated with an estimated population of 51,901 and a density of 318.9 persons per km².

Kombewa Division is the second largest in size after Winam but with a relatively sparse population having a density of 332.9 persons per km². This is because half of the population is dry and therefore of low agricultural potential. There also some incidences of livestock diseases like trypanosomiasis, foot and mouth and tick-borne diseases. Also infrastructure is quite dilapidated, hindering development of the fishing industry, which is the main economic activity. These are the major factors contributing to high incidences of poverty in the division.

2.1.6 Development Indicators

Socio-economic Indicators

Kisumu district has a total of 123,341 households according to the 1999 census. It has an average household size of 4. The number of female headed household are approximately 43,169, while the number of children headed households are approximately 1,233.

The district has an absolute poverty of 53 percent and Food poverty of 55 percent. This can be attributed to the poor infrastructure in the area especially road infrastructure, which limits the economic activities. The average household income is 7200 Ksh per annum. The general population has a low per capita income which affects their purchasing power.

Kisumu district has deficits in production of the main food like maize, beans, finger millet and sorghum and this has affected the food intake. Most of the residents rely on maize as a basic food crop. Fish that provides a cheap source of protein for the population and with a potential of further exploitation still displays a deficit production. The bulk produced is sold to the external markets. Access to these markets requires adequate infrastructure (road, power, telecommunication etc).

Sectoral contribution to Household Income

In Kisumu, Agriculture contributes to 75 percent of the total household income, wage employment contributes 10 percent of the income, urban self employment contributes 4 percent, while rural self employment contribute 3 percent of the income. 8 percent of the income comes from other sources. Approximately 104,657 persons are unemployed in the district.

Agriculture

Agriculture is the main economic activity in the district. Small-scale farmers own an average farm size of 2.5 acres. Large-scale farmers own an average farm size of about 10 acres. The main food crops produced are maize, sorghum, beans groundnuts, cassava and sweet potatoes. The total acreage under food crops is 1,546.3 ha, while the total acreage under cash crops is 6027.9 ha. The main storage facilities (on and off farm) are traditional granary, gunny bags, crib and hay barns. The main means of transportation to the market are by foot, bicycles (boda boda) and donkey carts. Very few people use vehicles to the markets since they are relatively expensive.

Of the agricultural population, 20% work in the livestock sector. The main livestock breeds are cattle, sheep, goats and poultry. Land carrying capacity is approximately 2.5 acres per L-unit. Fishing is also a major activity in the area. The main species of fish catch are *Lates niloticus* (Mbuta), *Oreochrom niloticus* (Ngege), *Rastuneobulsargentis* (Omena). Others are *propteru* (Kamongo) and *Claria* (Cat Fish-Mumi). Fish marketing is hindered by poor infrastructure (especially road and power).

Infrastructure

Transport facilities in the area are generally poor. A larger fraction of the roads in the area are either earth or graveled. According to the Central Bureau of Statistics, earth road is 60 km long, graveled 263.6 km while bitumen is 133.6 km. The available railway line has depreciated reducing the productivity of the rail transport. There is only one airport in the area. The poor road infrastructure increases the costs of transportation thereby reducing farmer profits and agricultural activities in general.

Power infrastructure (energy) in the area is not adequate. Of the 145 trading centers, only 14 have electricity. Out of the 123,341 households in Kisumu, only 14,335 households have electricity connections. Other sources of power such as solar are not well exploited. Only 1 percent of the rural households use solar power. 14 percent of the households use kerosene, gas or biogas. A relatively large fraction of households (85 percent) use firewood/charcoal. This clearly indicates how the area is poorly developed in terms of power infrastructure.

Communication infrastructure is very important in marketing of products. Kisumu district is relatively developed in terms this infrastructure especially in the urban areas. The area has 232,393 telephone connections. The number of private and public organizations with telephone connections is 4,382. Mobile phone coverage is 95 percent. The number of post/sub-post offices is 17. The number of telephone booths is 531; number of households with radios is 90 percent, while the number of cyber cafes is 3. There is still need to improve on communication especially internet facilities.

A summary of Indicators of poverty in Kisumu

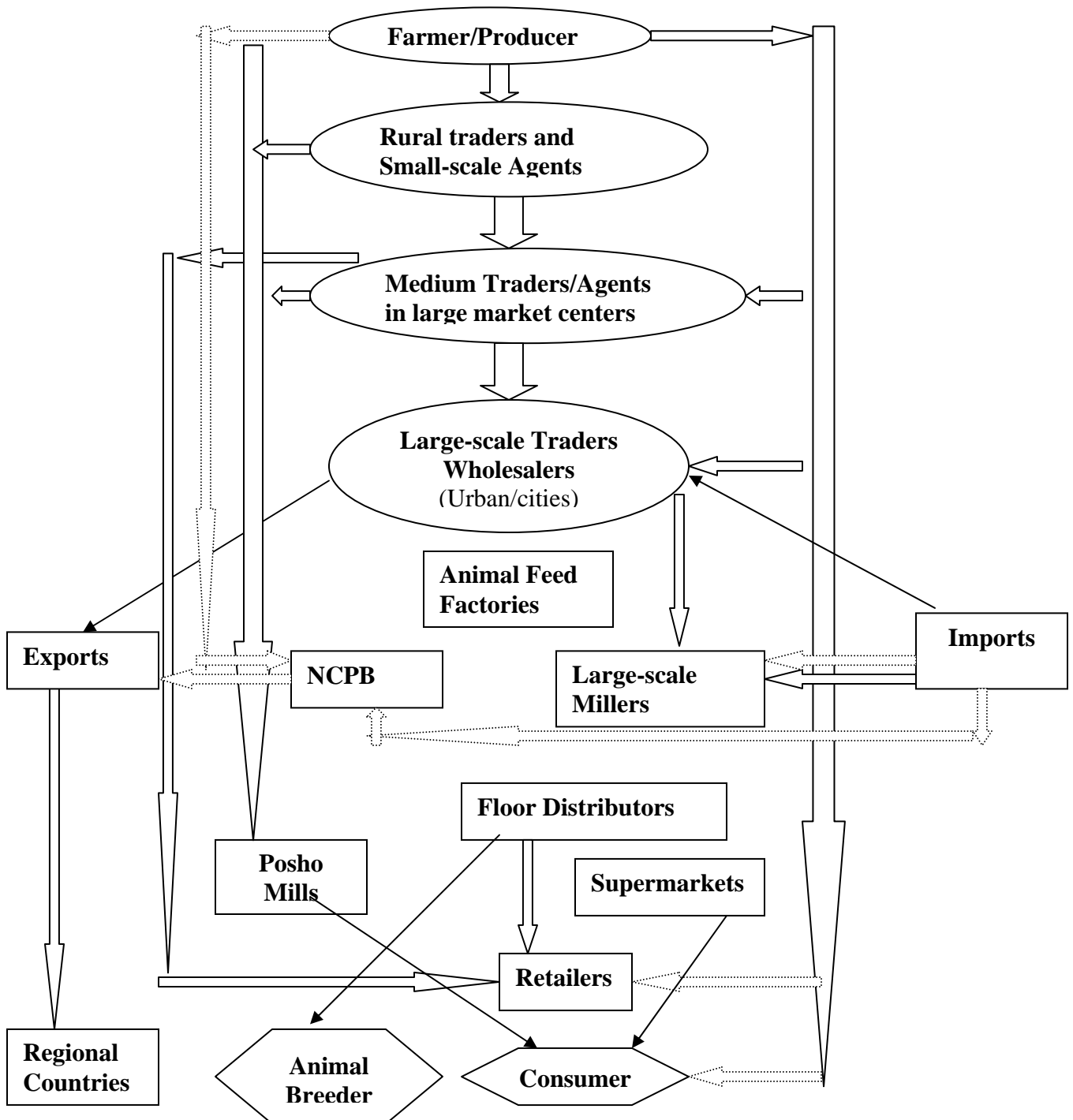
- * Lack of education
- * Lack of land/or insufficient land
- * Negative attitude-lack of foresight –planning for tomorrow i.e. what is planted in the event of poor rains can be feeder for cattle
- * Poor health and nutrition
- * Poor housing
- * Lack of health facilities
- * No role models i.e. successful farmer
- * Environmental diseases i.e. cholera, typhoid
- * Food inadequacy
- * Low farm productivity
- * Food scarcity
- * Low input level

- * Low technological base
- * Inadequate extension coverage
- * Farm lack credit facilities
- * Political interference
- * High environmental degradation
- * High levels of unemployment
- * Lack of market
- * High HIV/AIDS prevalence

Major problem is the weather condition and water scarcity for both domestic and irrigation purposes.

2.2 VALUE CHAIN ANALYSIS

Figure 2.1: Maize marketing Chain/Flow



Source: Nyameino, *et al* (2003)

Legend:

Oval-Main Players

Rectangular-market outlets

Hexagon-Final consumers + producers

As indicated earlier in figure 1, Kenyan agricultural products move from the farmer, to middlemen (brokers, manufactures (processors), wholesalers, retailers etc) and finally to the consumer. Throughout the movement of these products, marketing costs (transaction costs) are involved. The costs involved may result into a high or low final consumer price depending on the length of the chain. The longer the chain, the higher the consumer prices depending on the area. Long chains may also reduce the net revenues obtained by the farmers, since farmers do not have an opportunity to sell products at the market, but sell at farm-gate prices to middlemen. Table 2 shows how revenues which could have been earned by farmers are absorbed by middlemen in Kisumu district. Other factors such as the status of infrastructure also come into play. Poor infrastructure increases marketing costs, especially transportation costs. Agricultural products are marketed differently. Some are consumed within the country, while some fetch more revenues when exported. This study analyzed the value chain with reference to particular sub-sectors (e.g cash crops, food crops).

Table 2.2: Gross Margin Analysis for Various products in Kisumu District

Crop	Yield/acre	Farm gate price/unit (Kshs)	Market (Consumer) price/unit (Kshs)	Output		Production cost		GM at Farm gate Level (Kshs)	GM at Market level (Kshs)
				Farm gate	Market	Farm gate	Market		
Maize	10 bags	1200.00	1600.00	12,000	1,600	9,170	9,670	2,830	6,330
Beans	6 bags	2000.00	2800.00	12,000	16,800	6,240	6,540	5,760	10,260
Sorghum	6 bags	800.00	1600.00	4,800	9,600	3,930	4,230	870	5,370
Sweet potato	6500 kg	15.00	20.00	47,500	130,000	11,700	13,200	85,800	116,800
Cassava	3000 kg	10.00	15.00	30,000	45,000	8,540	9,540	21,460	35,460
Sunflower	3000 kg	16.00	16.00	48,000	48,000	31,640	31,640	16,360	16,360
Groundnut	270 kg	50.00	70.00	13,500	18,900	6,150	6,300	7,350	12,600
Banana	3 bunch/stool	100.00	200.00	75,000	150,000	38,700	42,450	36,300	107,550
Mango	300 fruits/tree	2 per fruit	5 per fruit	45,000	75,000	23,300	25,300	21,700	49,700
Kales	3200 kg	7	10.00	22,400	32,000	10,780	11,780	11,620	20,220
Onion	6000 kg	40.00	60.00	240,000	360,000	18,500	20,500	221,500	339,500
Tomato	8000 kg	15.00	40.00	120,000	320,000	17,940	19,940	102,060	300,060

Source: Authors Survey

2.2.1 Food Crops

The major food crops grown in Kisumu are maize, sorghum, beans, cassava and sweet potatoes. These crops are grown in the long and/or short season. The flow of food produce in Kisumu generally follows a similar chain. Farmers harvest their products and sell directly to consumers or sell to middlemen who finally sell to the consumers. Some of these middlemen include brokers, wholesalers, retailers and processors. Farmers interviewed in Kisumu preferred selling food crops to middlemen because of the poor road infrastructure and high transportation costs.

Most roads in Kisumu are in poor state. The roads are especially not accessible during the rainy season. This phenomenon interferes with the flow of food products to the consumer and reduces farmer revenues. An improvement of the status of these roads would increase farmer revenues and incomes.

In addition to the market constraints (high transaction costs), farmers also experience other field constraints in the production of food crops (Kisumu District Development Plan, 2002 – 2008). These include striga weed infestation, low soil fertility, storage pest infestation, inadequate and late land preparation, poor seeds, adverse weather conditions and soil erosion. These constraints should be addressed jointly with the market constraints.

2.2.2 Cash Crops

The major cash crops grown in Kisumu district are sugarcane, cotton, coffee and rice. These crops when well managed have a potential for generating high amounts of farmer incomes/revenue.

Sugarcane is grown in medium to large plantations, harvested and then transported to the factories (Muhoroni, Miwani and Chemelil) for processing. A major constraint in the production of sugarcane is the lack of market due to frequent closure of the factories and high cost of inputs. The problem of poor road infrastructure also raises transportation

costs. These constraints should be addressed jointly to improve the performance of the sector.

Cotton growing in Kisumu district has been affected in the past and present, by closure of processing factories and lack of prompt payment to farmers. This has discouraged farmers from growing the crop. However, with the emergence of the African growth and opportunity Act (AGOA), the confidence of growing crop has been revived. Even with the presence of AGOA, there is still need to diversify cotton markets to reduce market uncertainty and raise farmer revenues. Other constraints facing cotton growing include high incidences of pests and poor seeds. Addressing these constraints would improve cotton production and marketing.

Coffee is grown in Kisumu district but to a lesser extent. The coffee sector in Kisumu is still young and needs a proper identification of the constraints to be able to improve its production, processing and marketing. Coffee is harvested in the area, collected and transported to Kisumu town. Farmers normally do not know the price in advance. Coffee is faced by the problem of lack of operational factory and a weak marketing cooperative society. What is required, therefore, is to address production and marketing constraints. Farmers have in fact complained that before taking their coffee to Kisumu, they have to go to Kisii for a license thereby adding to transportation costs.

Rice is also important cash crop in Kisumu district. Generally, rice is harvested, threshed (processed) and then sold to the middlemen (wholesalers, retailers) or directly to consumers. Some of the major production constraints facing rice growing include inadequate water management and control structure, weak farmer groups that manage the schemes, inability of national irrigation board to manage West Kano irrigation scheme and lack of certified seeds. Farmers also experience high marketing costs (transaction costs) as a result of the poor road infrastructure in the area.

Other sub-sectors in Agriculture and Rural Development in Kisumu district are livestock the Livestock Development sub-sector (dairy, beef, poultry, sheep and goats, beekeeping,

pig production, donkeys etc), rural water supply, fisheries, land and settlement cooperatives. These sub-sectors are faced by both general and specific constraints as contained in the district development plan 2002-2008, which need to be addressed.

Another challenge is the market itself, a farmer could for example deliver produce to Kisumu, etc. but the middlemen would not allow them to sell, these middlemen have been referred to as “strange cartels”. These are strong forces at the market level that compel farmers to agree to prices which are exploitative. The farmers come early in the morning and cannot sell to the buyer unless the middlemen agree to the sale which results in farmers losing money that belong to them. This especially applies to horticulture products which are perishable and have to be got rid of quickly.

Most farmers cannot afford to transport their produce so they concentrate on crops that do not depend on the market and instead sell in surrounding area. Also, farmers concentrate on perishable products of low value mostly for domestic consumption due to existing constraints in the market. There is lack of export activities due to logistics of ferrying produce to Kisumu or Nairobi which as already mentioned is a huge cost which the farmer cannot afford.

It would be better if farmers had:

- Financial wherewithal to hire structures i.e. cold storage facilities to lengthen the lifespan of perishable produce
- Reliable transport mode, Kisumu-Nairobi not logistically far. The area has potential; however, it is only the logistics of transport that makes farmers not to transport to Nairobi, etc.
- Promotion of market oriented cassava, sweet potatoes; these have a higher chance of survival-shelf length -not perishable. If buyer is under-quoting farmer can hold onto the produce unlike perishables which do not have the same advantage.

- There should be a radical operation to remove middlemen or cartels. As one farmer put it should be a free market for everyone i.e. it is a free market for traders and not farmers.

The other problem facing farmers is that tractors are not available, Ministry of Works tries to make them available, but half the time, there is a breakdown. On the other hand, Ministry of Agriculture has one tractor for the whole district and maintenance is also a problem with the ministry. If tractors could be made available and affordable to farmer groups, it would certainly help in cutting cost and time used in ploughing, etc.

Most farmers complained that they lack market information that is they do not know where to take or market their produce. They also indicated that access to market facilities need to be improved. Farmers' perception and most of those interviewed were that farmers are poor because of marketing problems and bad roads and middlemen. As already mentioned it is difficult for farmers to access markets in Kisumu and elsewhere because of cartels established by middlemen who have been accused of operating mafia-like. In addition farmers have complained that they have no direct link with the market as some middlemen go from house to house. As such, a poor farmer with transport problems worrying that his products are perishable and not having enough market information sells his product at throw away prices. Middlemen lure farmers as seemingly they have ready cash and farmers do not have to wait and end up selling their produce at throw away prices. Some farmers have established links after a long struggle but these are very few and far between.

There are a lot of middlemen in the business and a lot of cartels that prevent farmers from penetrating the market. The solution is to destroy this cartels or for the government to come up with operational guidelines for the middlemen and cartels to rescue farmers. The local government collects cess (tax) and as such should not only give guidelines to middlemen on how to operate but also give services to farmers i.e. farmers need education on market information and better roads.

Selling of produce at throw away prices is attributable to delay in payments to farmers. For example for coffee farmers, Kenya Planters Cooperative Union (KPCU) delays in paying and farmers are forced to plant other crops such as maize, means, bananas, potatoes and fruits. Delay in payment results in their being unable to send their children to school, or afford healthcare etc. Farmers normally take their coffee in January/February but get paid in December.

A question that a farmer posed is that: why do the existing cooperatives or government not stop middlemen? This would however be somewhat difficult as mentioned middlemen operate clandestinely and do not give the right picture and even those well known to be middlemen refused to grant this author an interview and claimed they were farmers and not middlemen.

The other problem mentioned is that information and agriculture extension officers are not enough. The Kenyan government policy after liberalization is for the farmer to go to extension offices for help but again transportation problems emerge here as well. In addition farmers cannot afford to take time off from farm activities. Extension officers on their part lack transport and end up stuck in their offices. Those interviewed indicated they would prefer making farm visits as they end up doing nothing and getting bored. The solution to this problem is for the extension officers to be provided with motorcycles and fuel allowances to be able to make farm visits as well as a four wheel car per office to facilitate the officers going to meetings together, etc. The four wheel car is because during rainy season most of the roads in the district are inaccessible.

Pricing is a problem as well, for example cotton is not doing well because of low prices resulting in farmers getting discouraged. The amazing fact is that there is a market as ginneries have not crushed to capacity. Farmers sell cotton at 22sh per 1 kg but the recommended price is 28 for them to make a profit, but the ginners say they cannot pay that as they in turn would not make any profit.

There was a cotton stakeholder meeting in the district in 2003 bringing together farmers and ginners and cotton steering committee chaired by district agricultural officer, the local administration, i.e. the area chief, Ministry of Cooperative and agricultural societies. It was agreed that the price of cotton should be 22 Ksh. Farmers reluctantly agreed to this. However, it must be mentioned that ginners have an alternative as there is import of cheaper cotton from Tanzania and Uganda as cotton is produced expensively in Kenya. What was discovered during this research is that farmers do not know the price for 2004 but are expecting more than 22sh per kg. Some farmers have accused middlemen of going round in farms trying to buy cotton cheaply and the farmers are convinced that these middlemen have been sent by ginners to exploit them. In addition cotton farmers feel ginners have let farmers down because they dictate prices without consulting them.

A recommendation coming from farmers was that cooperatives societies could help by trying to bring farmers together to give them bargaining strength. It is therefore prudent to look at the role of cooperative societies. The role of the cooperative society according to an official of a cooperative interviewed is:

- * helping farmers in the production of cotton
- * Avail protective chemicals
- * Help to discuss price and marketing
- * Provide storage facilities

Some cooperative societies arrange for transport or either collects the cotton or ginner comes to collect. The farmer's role is to bring the cotton to the collection centre. In certain cases, the ginner comes to collect from the farmers nearest place. The farmers negotiate with the cooperative and if for instance farmers get 22-the cooperative gets 2 Ksh per kilo as commission.

The cooperative personnel interviewed indicated that the main problem they face is financial; cooperatives do not have enough money to run the society or cooperative. They depend on commission from farmers. The societies also face the challenge of perception

as farmers do not trust them. This is because of past mismanagement and corruption. Some farmers interviewed said that they prefer for their produce to rot instead of selling to cooperatives as some of the cooperatives as already mentioned have been corrupt in the past and have not been known to pay farmers for their produce. Another complaint from farmers is that cooperatives sometimes do not pay farmers adequately and if they do, the payments take too long i.e. it takes several months and sometimes up to a year. Farmers have, as a result lost interest in cooperatives, but to motivate them, cooperatives should try and pay cash on delivery as suggested by the farmers interviewed.

As mentioned cooperatives need to buy produce in cash from farmers but however, most times they have no money to do that. This is why farmers sell to middlemen as middlemen pay cash, however little. Due to poverty farmers need prompt payment on delivery to meet their basic needs.

The other problem faced by farmers is the over-politicization of issues in Kenya. For example in Kadibo Kisumu, rice production which is not fully exploited was revived after a long dormant spell by a local NGO, Relief Environmental Africa Care (RECA), a micro-finance NGO. RECA acts as marketing agents. There is however political interference with the claims that RECA is exploiting farmers as the NGO charges 3% as interest on loans per season (a season is 3 months). The belief from some of those interviewed however, is that the executive director of the NGO is a young man from the area and the sitting Member of Parliament is afraid that he will be popular and vie for a parliamentary seat. As a result there have been murmurs of exploitation which is a pity taking into account that RECA helped farmers revive rice growing after almost five years of nothing happening and no other help forthcoming.

Apart from the local politics, farmers believe that rice production is not fully exploited due to water problems and old machines that are not efficient. They suggest that overhaul is needed to rehabilitate the machines. There is also rice coming from Tanzania resulting in competition for the local rice producers.

Constraints Faced in Failing to Meet Production Targets by Farmers

1. Late land preparation as a result of:

- lack of oxen for ploughing resulting from cattle death
- Lack of proper farm tools e.g. digging with worn out hoes.
- lack of capital

2. Lack of credit facilities

- the conditions for accessing credit are too stringent
- the farmers lack security against which credits can be offered
- there is no concession when crops fail due to poor weather
- the interest rates can be quite high

3. Crop preference

- Farmers have test and preference
- Many farmers consider food base strategy (subsistence level)

4. Farm inputs are usually costly, especially for the common farmer

- seeds
- fertilizer
- fungicides
- insecticides

* Note: The above lead to high cost of production and at times farmers do not use the recommended times for spraying etc. resulting in low quality yield.

5. Lack of market information on specific crops and market.

6. Unreliable weather (due to unreliable rain, sometimes are erratic and short-lived)

2.2.3 Estimating the Amounts of Transaction Costs in the Value Chain

There are a number of transaction costs incurred in the marketing of agricultural products at each stage of the value chain. The major costs involved in the movement of these products include packaging, loading, transportation and off-loading costs. These costs can be estimated per unit at each level of the value chain for various regions within the

districts. To be able to do the estimation, various players in the value chain were interviewed on the transaction costs incurred for the major agricultural products (maize and beans and rice). The status of the road infrastructure between two regions (trading areas) were evaluated to determine whether it influences the volume of transaction costs between regions. The following results of the amounts of approximate transaction costs incurred at each level can then be tabled in the following form.

Table 2.3 Transaction Channels in Kisumu District

Transaction Channel	Maize (90 kg unit measure)-Kshs	Beans(90 kg unit measure)-Kshs	Rice (90 Kg Unit Measure)-Kshs	
Farmer to Rural trader	1,125	1,800	900	
Rural trader to Urban trader	1,400	2,700	-	
Urban trader to Miller	1,575	3,150	-	
Miller to Retailer/Irrigation Board for Rice	2,250	-	2,250	
Retailer to Consumer	2,475	3,600	3,600	
Transportation costs Per Bag (90 Kgs)				
	Pick-up	Lorry	Bicycle	Donkeys/Oxen
Farm gate to Rural market/Trader (Radius 5 Km)	-	-	-	50
Rural Trader to Urban trader (30-35)	100 ¹	100	70-80	-
Urban trader to miller (5 Km)	50-60	50-60	--	-
From Miller to Retailer (5 km)	50	50	-	-
Nature of road infrastructure		Poor		

Source: Author's Survey, 2004

2.2.4 The Influence of the Status of Road Infrastructure on Transaction costs

The direct impact of the resultant high transportation costs has doomed most farmers in Kisumu to subsistence agriculture; only a small part of the harvest is sold to raise cash. Rural roads across Kisumu are inadequate in coverage and quality; and they are also poorly maintained and therefore served by low cost transportation providers such as bicycles, donkey, and donkey carts and a times matatus². The impacts of the resultant

¹ Price per bag + fare for farmer.

² Matatu is a term used to describe a form of transport widely used in Kenya where small omnibuses and vans are used to ferry both people and goods to and from various urban centres. Unlike buses, these type of vehicles ply almost all areas within the country.

high transportation costs are high farm gate input costs; low farm gate output prices; low traded volumes; volatile markets; low productivity.

Table 2.4: Kenya Schedule of Classified Roads (1994-1995)

Class of Roads	Area Covered			
	Bitumen	Gravel	Earth	Total
International (A)	68.1	0.0	0.0	68.1
National Trunks (B)Rds	55.2	0.0	0.0	55.2
Primary Roads (c)	162.7	7.9	0.0	179.6
Secondary Rds(D)	12.9	85.2	50.0	148.1
Minor Rds (E)	0.0	454.1	743.0	1,197.1
All Classes (R+)	298.9	574.2	793.0	1,639.1

Source: Ministry of Roads and Public Works, Kenya

Table 2.4: Area Covered in Kisumu District

	Bitumen	Gravel	Earth	Total
Minor Rds	0.0	254.0	130.1	389.1
Government Access Rods	0.0	2.2	1.6	4.8
Settlement Rds	0.0	0.0	0.0	0.0
Rural Access Rds	0.0	156.9	106.3	196.9
Tea Rds	0.0	0.0	6.6	6.6
Wheat Rds	0.0	0.0	0.0	0.0
All Classes	0.0	454.1	743.0	1,197.1

Source: Ministry of Roads and Public Works, Kenya

As already mentioned, in Kisumu most of the roads are in poor state and many feeder roads though graded after some period of time, are however affected by rain which erodes them and render some inaccessible. The distance from farms to the nearest market place is approximately 5 kilometers and the cost of transportation including loading and off-loading would be an average of Ksh 100. The mode of transport used by farmers to transport their goods is public transport (matatus); bicycles; donkeys; oxen and donkey carts.

The farmers interviewed in Maseno Kisumu, for example, were selling their produce to the local university and schools while the others would sell at the nearest trading centre. Others would sell to middlemen i.e. cotton farmers etc while for example the rice farmers in Kadibo would sell to the National Irrigation Board and traders from the area which is near the farms.

It was indicated by farmers that they did not sell their produce to the markets in Kisumu or Nairobi because of the transaction costs resulting amongst other things from poor roads. This shows that subsistence farming is a rational response to high farm to market transaction costs. It must be mentioned that in some areas in the district the roads are so bad during rainy season that only 4 wheel drive cars can pass. In fact when bicycles are used, in some stretches, one has to carry the bicycle as the road is impassable.

2.3 THE IMPACT OF HIGH TRANSACTION COSTS ON POVERTY LEVEL

2.3.1 The Poverty Status of the District

Poverty is a multi-sectoral phenomenon cutting across all sectors of development in the district. The people who live below the poverty line in the district are estimated to be 57 percent (267,310 people). In poverty Assessment Report for Kisumu District in May 2000, it was established that more than half of the population are poor. The welfare monitoring surveys for 1994 and 1997 also indicate that the poverty levels have been increasing over-time.

The main causes of poverty in the district can be identified as environmental, economic, HIV/AIDS menace and socio-cultural factors (Kisumu District Development Plan, 2002-2008). Inadequate and unreliable rainfall pattern has immensely affected agricultural activities, which is the source of livelihood of about 90% of the population. On the other hand, during the rainy season, persistent flooding from the major rivers in the low lying areas destroys crops, causing water-borne diseases, both human and livestock. This is mainly felt in Kadibo division. Many factories i.e textile and sugar have been closed regularly rendering many employees redundant.

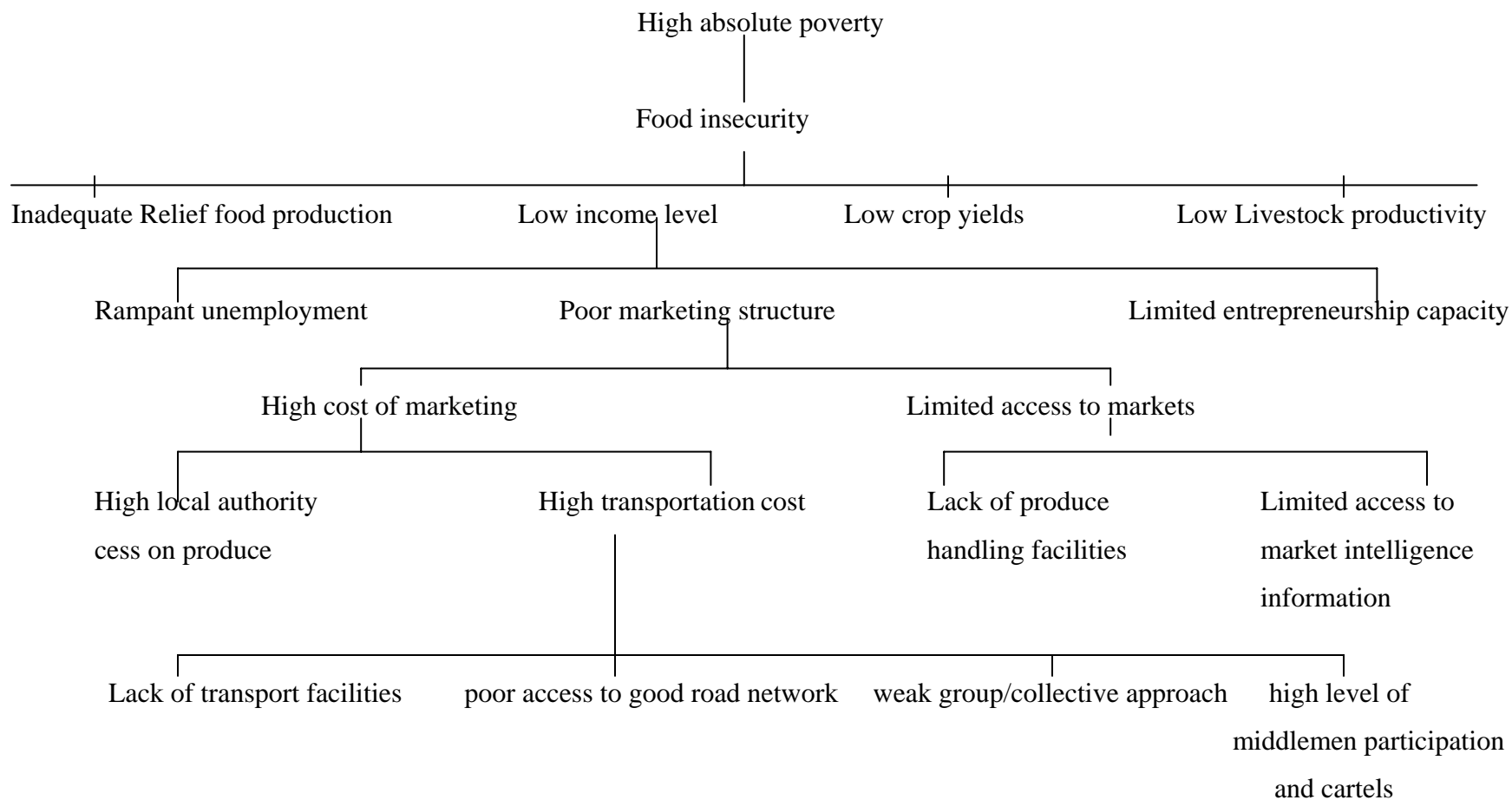
Economically, the district lies heavily on the agricultural related activities, such as growing rice, sugarcane, cotton, coffee and fishing as stated earlier. However, due to lack of market and dilapidated infrastructure, no sufficient income is realized from these activities. The roads leading to the beaches and major feeder roads from farms to the factories are inaccessible.

2.3.2 The Link between High Transaction Costs and Poverty Level in the District

According to Maseno Divisional Extension office, there are generally four major causes of high transaction costs (transportation costs included) in Kisumu district. These include lack of transport facilities, poor rural access road network, weak group/collective approach and high level of middlemen participation and cartels. These raise the transaction costs which results into a poor/inefficient market structure. The ultimate result is reduced farmer income levels. Since the amount income determines the purchasing power of an individual, lower income level reduces the ability of people to afford adequate food resulting into food insecurity. Income is also necessary to acquire other basic needs such as clothing and shelter. Inability to acquire these basic needs result into absolute poverty.

The poverty status in Kisumu district is a vicious cycle and unless reversed, shall persist. Urgent intervention is therefore needed to break this vicious cycle of poverty. One way to solve part of this problem is by focusing on major constraint, “high transaction costs”. This constraint can be addressed through improving the currently dilapidated road infrastructure.

Figure 2.2: The poverty tree in Kisumu district



Source: Divisional Extension office – Maseno division, Kisumu District.

2.4 CONCLUSION AND RECOMMENDATIONS

2.4.1 Conclusion

Kisumu District is one of the poorest districts in Kenya. According to this study, there is a direct link between high transaction costs and the poverty level in the district. The study also identified the various causes of high transaction costs which include lack of transportation facilities, poor rural access roads, weak group/collective action and high level of middlemen participation and cartels. To reduce the high transaction costs experienced by the farmers and other market players in the district, there is need to re-examine the factors resulting into this phenomenon and give appropriate policy recommendations.

2.4.2 Recommendations

In order to address the problem of high transaction costs experienced by farmers and market players in Kisumu districts, there is need to tackle four major causes.

1. Lack of credit facilities: ensure adequate and affordable credit is available to the farmer and other market players.
2. Poor rural access road network: the government and other stakeholders should construct new rural access roads and repair those that are dilapidated.
3. Weak group/collective approach: farmers and other market players in the areas should be encouraged to form organizations/groups to assist them in addressing the major production and marketing constraints for the various sub-sectors.
4. High level of middlemen participation and cartels: the local and central authorities should come up with appropriate strategies for streamlining the market conduct of these players

In addition to solving the above constraints, farmers should also be trained on marketing research and farming methods to be able to understand the market structure, conduct performance and determine the future market prospects amongst other things and produce quality goods.

3.0 CASE II: NYANDARUA DISTRICT

3.1 DESCRIPTION OF THE STUDY AREA

3.1.1 Position and Size

Nyandarua District is the largest of seven districts in central province with a total land area of 3,304Km². It lies between latitude 0° 8' north and 0° 50 south and between 35° 13' west and 36° 42' east. The district borders Laikipia district to the North, Nyeri and Murang'a district to the east, Kiambu district to the South and Nakuru district to the west.

3.1.2 Topography and Climate

The district mainly consists of the Kinangop plateau, Ol kalou/Ol Joro Orok Plateau and Ol Kalou/Ol Joro Orok Salient. There are several year round rivers; the Malewa, the Ewaso Nyiro, the Pesi and Lake Ol Bolossat, which is the only large water mass in the district. The district has the eight agro-ecological zones as shown in table 1:

Table 3.1: Agro-ecological Zones in Nyandarua District

<i>AE Zone</i>	<i>Remarks</i>
LH5	Relatively dry zone with regular crop failure
LH4	Also dry- a ranching zone but settled
LH3	Receives a moderate amount of rainfall
LH2	In Ol kalou Salient
UH4	Also in Ol Kalou Salient
UH3	Found in nearly all divisions
UH2	A high rainfall zone
UH1	Receives a relatively high rainfall

Source: Nyandarua District Agricultural Office

The district was affected by vulcanicity and faulting which gave rise to two major landforms, the Great Rift Valley to the west and Aberdare ranges to the east. In between the two physiographic features, there is Kinangop and Ol kalou Salient plateau.

From the Eastern wall of the district, the Aberdare ranges have a height of 3,999m above sea level. There are steep slopes that have undergone great transformation through weathering, creating shallow valleys and gorges. The ranges drop gradually in series of faults giving way to an escarpment that has been broken into sharp valleys occasionally by change in levels of the river courses.

The soils in the district are volcanic in origin and vary in both fertility and distribution. Shallow soils are formed in hilly areas while deep well drained soils are found on the slopes and plateaus. These soils provide different crop production potentials.

The escarpments and steep slopes that characterize the eastern part of the district hinder effective communication. Roads construction is confined to the plateau and areas served by roads on slopes are occasionally cut off due to poor soil structure. The permeable rocks with impervious bedrock system in the district raise potentials in underground water.

The district has four major rivers; Persi, Malewa, Ewaso Nyiro and Turasha. Malewa flows from the Aberdare ranges into Naivasha in the south. Ewaso Nyiro drains from Bahati escarpment through Ol Joro Orok to Laikipia. Turasha flows downwards to Laikipia. Most small-rivers are drying up and this adversely affects the livelihood of the people in the district and beyond.

Lake Ol Bolossat is the only natural water mass in the district. It is fed by streams and underground water seepage from the Aberdares and Dundori hills. Human activities and clearing of catchment areas for settlement has affected its natural refilling system and its existence is threatened.

The district falls in the highland Savannah zone, characterized by few scattered trees with expansive grass cover. Most of the natural vegetation has been cleared giving way to

man made environmental hazards. There are four gazetted forests, which have both natural and planted strips.

The district has moderate temperatures. The highest temperatures are recorded in the month of December, when the mean average is 21°C and the lowest temperature is recorded in the month of July, with a mean average of 7.1°C. The district also experiences temperatures with adverse effects. The cold air that is generated during clear nights on the moorlands of Nyandarua Ranges flows down the Kinangop Plateau and Ol Kalou Salient causing night frost nearly every month making cultivation of maize too hazardous. The valleys west of the plateau occasionally provide outlet of the stream of cold air. The temperatures range between 1.2°C to 10°C. The low temperatures last some few hours before sunrise.

Rainfall in Nyandarua District decreases from east to west. Areas close to the range receive high rainfall ranging between 1,000mm to 1,400mm and decreases on plateaus. The amount received in the plateau is too minimal to support meaningful agriculture i.e. maximum of 400mm. The rainfall pattern is varied and falls in two peak seasons. Long rains start in March to May while short rains are received between September and December. The rainfall intensify varies according to the location. Areas near Aberdare slopes receive sufficient rainfall with the plateau receiving scanty erratic rainfall. Kinangop plateau has two rain seasons with sufficient rainfall that can least be compared with the Ol Kalou and Ol Joro Orok plateau.

3.1.3 Administrative and Political units

The district is divided into six administrative divisions namely; Ndaragwa, North Kinangop, Ol Kalou, South Kinangop, Ol Joro Orok and Kipipiri divisions.

Table 3.2: Area of the District and Administrative Units of Nyandarua District

<i>Division</i>	<i>Area (Km²)</i>	<i>Locations</i>	<i>Sub-locations</i>
Ndaragwa	683.6	6	19
Ol Joro Orok	381.9	4	12
Ol Kalou	592.2	6	14
Kipipiri	543.8	5	13
South Kinangop	348.1	3	13
North Kinangop	475.3	2	8
Total		26	79

Source: 1999 Population and Housing Census

The district is divided into the 6 divisions, 26 locations and 79 sub-locations as shown in table 1. The district has four constituencies and 26 wards with 30 councilors as shown in table 2. It has two local authorities namely Nyandarua and Ol Kalou, both consisting of 26 electoral wards and 30 councilors. Nyandarua county council has 19 wards and 21 councilors while Ol Kalou town council has 7 electoral wards and 9 councilors. The two local authorities have 2 nominated councilors each.

Table 3.3: Political Units of Nyandarua District

<i>Divisions</i>	<i>Constituency</i>	<i>No. of wards</i>
Ndaragwa	Ndaragwa	6
Kipipiri	Kipipiri	5
North and South Kinangop	Kinangop	5
Ol Kalou and Ol Joro Orok	Ol Kalou	10
Total		25

Source: Electoral Commission of Kenya (ECK), Nyandarua

3.1.4 Population size and distribution

According to the district development plan (2002 – 2008), Nyandarua district has a population size of more than 529,844 people. Out of this, 270,331 are female while 259,513 are male. Female/male sex ratio is 104:100. The total number of youth population (15 – 25) is 119,930. The district has a total labour force of 267,086 people, a dependency ratio of 100:1.07 and a population growth rate of 3.3%.

3.1.5 Settlement patterns

The population density in Nyandarua has been increasing in the last 40 years. The density was 52 persons per Km² in 1969. It increased to 69 persons per Km² in 1979 and then to 102 and 145 persons in 1989 and 1999 respectively.

The current settlement patterns have historical origin from colonial times. The pattern is dichotomous in nature i.e. urban and rural with difference in both economic and spatial characteristics. The rural settlements are generally homogenous and engage in primary production with agriculture as the dominant economic activity. Urban settlements are heterogeneous, densely populated and engage in non-agriculture economic activities such as commerce and industry and also service delivery.

The settlement schemes in Nyandarua district were initiated in 1960's and 1970's. One of the factors that have had a major impact in settlement development in the district is the rapidly growing population without corresponding development of off-farm economic opportunities. Roads network also attracts a lot of settlements along the main highways and all weather roads.

Table 3.4: Population Distribution/Density by Division in Nyandarua District in 1999

<i>Division</i>	<i>Population</i>	<i>Density</i>
Ol Kalou	98,806	167
Ol Joro Orok	65,229	171
Kipipiri	78,893	145

South Kinangop	84,393	242
North Kinangop	67,356	142
Ndaragwa	85,245	125
Total	479,902	145

Source: 1999, Population and Housing Census

From the above table, it can be observed that the highest population density is in South Kinangop Division while the lowest is in the Ndaragwa Division. Pockets of rural poverty are mostly observed in squatter villages mostly in Ndaragwa, Kipipiri and Ol Kalou divisions.

The population distribution in the district is uneven. There is a high population concentration in urban areas like Mairo Inya and the agricultural productive areas of South Kinangop i.e Magumu and Geta in Kipipiri Division.

The areas with low population include Kahutha and Kanyagia locations in Ndaragwa Division and Mikaro sub-location in North Kinangop. The low population has been caused by low land potential and insecurity especially in Ndaragwa close to Nyandarua and Laikipia borders. The population level in the district has also been increasing due to life-time net migration. In 1979, there were 54,122 in migrants and 42, 130 in 1999. The challenges in the current human settlement patterns include; uncontrolled sub-division of land into uneconomic sizes, reduction in agricultural production, environmental degradation, limited provision of land for public utilities and squatting which has continued to be a problem.

3.1.6 Development Indicators

Socio-economic indicators

Nyandarua district has 104,401 households according to the district development plan for 2002-2008. The average household size is 4.6. Out of the households in the area, 41%

are female headed. According to the welfare monitoring survey, 2000, the district has an absolute poverty (rural and urban) of 27%.

Sectoral contribution to household income

In the district, about 75% of household income comes from agriculture, 5% of household income from rural self-employment, and 10% of the household income from urban-self employment.

Agriculture

The average farm size for small-scale farmers in the district is 3.05 ha. Large-scale farmers have an average farm size of 100ha. The main food crops produced are maize, wheat, beans, peas, potatoes, cabbages, carrots, kale's, onion and tomatoes. The main cash crops produced are wheat, pyrethrum, and cutflowers. The total acreage under food crops is 45,000ha. The population working in the agricultural sector is more than 380,000 (72%). The district generally has 1 ranch, with a size of 300ha.

The main livestock bred are cattle, goats, sheep and chicken. The land carrying capacity of the district is 2 livestock units/ha. The population working in the livestock sector is about 304,000. Fishing also takes place in the district. Main species of fish catch are trout, tilapia, cap and lodfish. However, the area has a low population of fish farmers.

Infrastructure

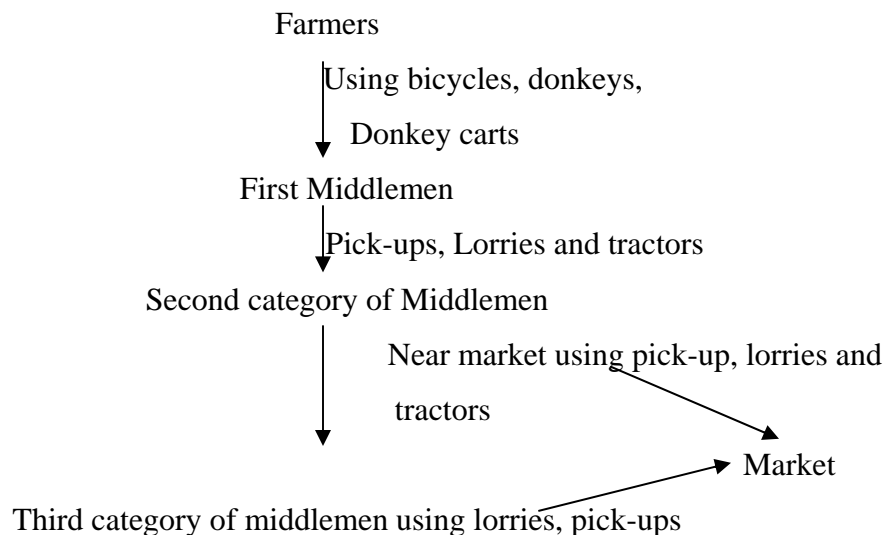
Transport facilities in the area are poor. The district has bitumen road of 141km, gravel road of 192km and earth road of 671km. This clearly indicates that a large percentage of the roads in the district are earth roads. The district also has a railway line of 70km, with 3 stations. There is only one airstrip. The status of road infrastructure in the district is not up to standard and this justifies the need for more improvement. There is need to tarmac the roads and build more airstrips to facilitate trade especially that of cut-flowers and other cash crops.

Power infrastructure in the area is still poor with only 10,000 households with electricity connection. This does not augur well especially for the production sensitive crops such as cut-flowers. Communication is also still poor with only 250 households with telephone connections (Nyandarua district development plan, 2002-2008). There is need to improve the telecommunication network in the area.

3.2 VALUE CHAIN ANALYSIS

In Nyandarua district, agricultural products are generally sold by the farmers to first category of middlemen who use bicycles, donkeys and donkey carts as major means of transportation. These middlemen then sell the products to second category of middlemen who are nearer the market. The second category of middlemen can sell directly to the market or sell to a third category of middlemen who have vehicles. Generally, the products pass through three or more categories of middlemen before they reach the final consumer. These raises the final prices of these products i.e. a large difference between the farm gate price and the market price. The price differences (farm gate and market) are even higher because of the poor roads infrastructure between different regions, raising the transportation costs. The following figure shows the supply value chain experienced by most of the farmers and other market players.

Figure 3.1: Supply Value Chain for Nyandarua District



Source: Author's Survey

As a result of the need to explain the supply value chain in details, this study analyzed major food crops, cash crops and animal products specifically.

3.2.1 Food Crops

The major food crops grown in Nyandarua district are maize, beans, potatoes, cabbages, carrots and peas. Part of the harvest of these crops is consumed and the rest sold to the market. The supply value chain for these crops is generally similar. However the individual marketing costs (transaction costs) incurred for each crop may be different. There is therefore need to evaluate each crop.

Table 3.5: Gross Margins for Major Enterprises in Nyandarua District

<i>Type of Enterprise</i>	<i>Output /Acre in units</i>	<i>Market price per unit in Kshs</i>	<i>Gross Output in Kshs</i>	<i>Total Variables Costs</i>	<i>Gross Margin/Acre/Season in Kshs</i>
Maize/Bean	Maize -10 Bags, Beans- 2 Bags	Maize- 750/ bag Bean- 2,400/bag	12,300	11,240	1,060
Potatoes	70 bags	500/bag	35,000	21,780	13,220
Cabbages	11,000 heads	4/head	44,000	8,600	35,400
Carrots	120 bags	300/bag	36,000	6,320	29,680
Peas (green)	40 bags	400/bag	16,000	8,880	7,120
Wheat	13 bags	1,500/bag	19,500	10,420	9,080
Pyrethrum	-	-	-	-	44,081 (Net present value for 3 years)
Tomatoes	250 crates (50 kg)	500/crate	125,000	97,416	27,832
Arabicum	230 boxes	1,268/box	291,640	145,170	146,470
Wool sheep	40 ewes +	Sale of	110,635	31,260	79, 375 /year

	followers	products			
Meat	40	Sale of	106,635	30,260	76,375/year
sheep/goats	Does/Ewes/ Followers	products			
Layers	205 layers	Sale of	354,384	212,253	142,130/year
		products			
Dairy cow (grazing)	1 Dairy cow	Sale of	44,480	15,495	28,985/year
		products			
Dairy cow (Semi-Zero Grazing)	1 Dairy cow	Sale of	56,080	20,357	35,693/year
		products			
Dairy cow (Zero grazing)	1 Dairy cow	Sale of	90,980	30,901	60,079/year
		products			

Source: Nyandarua District Agricultural Office, 2001

Maize and beans are generally intercropped in the area. These crops are produced in the long and short seasons. During the production stage, various variable costs are involved in the production of these commodities. These include ploughing costs, fertilizer, and seed, labour for planting, weeding, harvesting and threshing. As will be seen farmers do not benefit because of the high cost inputs during the production stage. In addition to the high cost of production, other constraints which affect the enterprise include erratic rainfall, poor road infrastructure and lack of access to credit facilities among many others. After harvesting, part of the maize and beans is sold. Because of the poor road infrastructure, farmers shy away from transporting maize to the market and therefore sell to the middlemen who come to them. According to this survey, farmers sell maize to local middlemen at a price of Kshs 1200 per 90kg who then sell the maize to other middlemen (second category middlemen). The second category middlemen then sell to the Nyahururu and Nyeri maize Millers. Within the value chain, various transaction costs are involved and these costs are even increased due to the poor infrastructure in this area.

Beans are normally sold to middlemen between Kshs 2500-3000 per 90 Kg. These middlemen then transport the produce to the market where they sell at higher prices. Farmers prefer selling the beans to the middlemen due to the high transportation costs which result from poor road infrastructure. An example is given of 1 cabbage that costs 5ksh in Kinangop while the same goes for 35 Ksh in Nairobi.

Table 3.6 Estimating the Amounts of Price and Transportation Costs in the Value Chain

<i>Maize Unit 90 Kg</i>		<i>Price in Kshs</i>
From Farmers to 1 st Middlemen		1100-1150
1 st middle sells to market		1200
2 nd with small store		1300
3 rd sells to those with vehicles		1400
NCPB & Millers		1500
Millers to Consumer	Maize	1400 – 1680
	Maize meal	2100
<i>Wheat Unit 90 Kg</i>		<i>Price in Kshs</i>
Farmer to Middlemen		1,600-1700
Middlemen to millers		1800 – 2000
<i>Beans Unit 90 Kg</i>		<i>Price Per 90</i>
Farmer gate		2500-3000
NCPB Selling		2850
<i>Milk Unit litre</i>		<i>Price in Kshs</i>
Farmers Sell		13
Processors		16-17
Retail		46-48
<i>Pyrethrum Unit Kg</i>		<i>Price in Kshs</i>
Farmer to Middlemen		30-40
Middlemen/farmers to Cooperative		45-50
Farmers to NPB		100
<i>Transportation Costs(Maize, Beans) Per 90Kg</i>		<i>Cost in Kshs</i>
Ndaragwa to Othaya (Nyeri-100 Km)		50-60
Ndaragwa to Nairobi (250 Km)		110-120
Ndaragwa to Nyahururu		20-30
Cart wheel from Rural area to Ndaragwa		250 Per Trip

Source: Authors Survey

Another major crop in Nyandarua district is **potato** (*Solanum tuberosum*). During the cultivation of this crop various production costs are involved. These include ploughing

costs, ridging costs, seed and fertilizer costs. Other costs are incurred in earthing up, spraying, harvesting and grading. Research has shown that the Gross margin/acre for the crop was Kshs 13,220. This is higher than maize/bean intercrop and demonstrates the fact that this crop is very important in the area. Potatoes are affected by horizontal constraints which include high cost of production, lack of access to credit, lack of extension, unavailability of planting material among other constraints. When marketing potato, farmers are also faced with packaging problem. There is no legislation on the packaging problem. Brokers act as cartel and if you don't package the way they want, they don't buy from you. Legislation should be in place to standardize packaging for potato. For example the standard packaging is supposed to be 90 kg but potatoes are packed in 130-250 kgs. Potato is harvested then sold to the middlemen. According to the farmers interviewed, farmers generally sell potato to these middlemen at a price as low as Kshs 300-400 per 90 kg bag, while the right price that could reflect the cost of production is Kshs 800-1000 per 90 kg. A major problem that prevents farmers from taking their products to the market is the poor road infrastructure which increases the transportation costs. For those who opt to take their products to the market, the major means of transportation are donkey carts and wheel barrows. These means of transportation cannot carry large amounts of produce and are labour intensive. Those who do not possess any of the above means have to hire. Hiring is however very expensive for local farmers. For example, hiring a cart for a short average distance of 10 km (from farm to where broker can access vehicle) costs the farmers Kshs 20 per 90kg sack. Matatus charge Kshs 50 per sack for a distance of 40 Km. This is very expensive for the ordinary farmers. There is need to improve the rural road infrastructure in order to reduce the transportation costs and encourage farmers to take their potato to the market.

Other food crops of importance in the district as stated earlier are **cabbages, carrots and peas**. Farmers incur expenses when growing these food crops. Some of the costs incurred include ploughing costs, seed and fertilizer costs, transplanting costs, weeding and chemical costs and picking costs. These products also experience horizontal constraints mentioned above. Farmers normally have the alternative of selling these products directly to the market or sell to the middlemen. However the first option of

selling to the market is constrained by high transportation costs due to poor infrastructure. Farmers reckon that transportation becomes more complicated during the rainy season since most of the roads are earth roads.

3.2.2 Cash Crops

The major cash crops grown in the district are wheat and pyrethrum.

Farmers growing **wheat** in Nyandarua district have to meet a high amount of variable cost. The total variable cost /acre for wheat production in the district was estimated as Kshs 19,500. The components of this variable cost include ploughing costs, seed and fertilizer costs, harrowing costs, spraying costs and harvesting costs. The Gross margin/acre for the crop was estimated to be Kshs 9,080. This is generally lower than other that for food crops such as potato, cabbages and carrots. During the cultivation of this crop, farmers experience production constraints. These include lack of affordability and timely access to seed and fertilizer, Unavailability of planting materials, unpredictable weather conditions, pest and diseases among other constraints. Some of the marketing constraints faced by the farmers include low producer prices offered by middlemen (brokers) and poor road infrastructure. In terms of the value chain, farmers sell their produce to the brokers who sell their wheat to the millers. The farmers sell wheat to the middlemen at a price of Kshs 1600 per 90 kg while the middlemen sell the maize to millers at a price of Kshs 1800-2000. Farmers in the area complain about the high transportation costs which result from poor road infrastructure. Because of the inability of the farmers to afford the high transportation costs, the middlemen exploit the farmers since the farmers cannot bargain the prices offered to them. There is a clear indication here that poor road infrastructure is a horizontal constraint and relaxing this constraint will improve the marketing of almost all the agricultural commodities. The reduction of transportation costs through improved road infrastructure will also result in reduced final consumer prices and hence the competitiveness the agricultural products.

Pyrethrum growing also entails a number of expenses to be able to produce a good product. Since the crop remains in the field for 3-4 years, these costs are spread over the

period. The costs include ploughing costs, transportation of planting materials, fertilizer and seed costs, weeding expenses, harvesting expenses and others. Seeds are normally available from Pyrethrum Board of Kenya (PBK) field offices. An analysis done by the Ministry of agriculture district office (2001) show that the net present value for pyrethrum in the district is Kshs 44,081 at a rate of 4% for 4 years. This is quite high compared to the gross margin for wheat. Some of the constraints facing pyrethrum production and marketing in the district include mismanagement of cooperative societies, lack of adequate labour in potential growing areas (i.e picking, weeding), competitive enterprise i.e horticulture, dairy, cut flowers, poor road infrastructure, perennial grass weeds particularly during heavy rains and middlemen who exploit farmers. Presently, there four methods of marketing pyrethrum i.e

1. Societies
2. Self help groups.
3. Pyrethrum Board of Kenya (PBK) collection centres.
4. Individual grower licence.

Societies used to be major marketing agent but presently most of them have been abandoned by farmers who have formed self help groups under the Ministry of Services. Others have joined PBK centres while others who have over three acres of pyrethrum have been given individual grower licences. Currently, only a few societies are operating. Individual growers are major producers of pyrethrum, followed by PBK, self help groups and finally societies. Some growers prefer selling pyrethrum to middlemen instead of selling to the Board. Middlemen collect the product at low prices, as low as 30-40 per kg. The board offers constant prices which is 100Ksh per kg. Normally, those who sell to the Board complain of delayed payments. In fact from interviews with farmers and PBK officers it emerged that the last time the board paid farmers was October 2002. The PBK does not buy pyrethrum from middlemen at all. The advantage of farmers selling to PBK is that it offers extension services i.e. advising the farmers on crop variety field days as well as selling seedlings, etc. They also offer advances to farmers so long as a farmer has delivered produce. The PBK also has a number of collection centres in the district where

they go to pick the produce and charge the farmer around 4 Ksh per kilo as transportation cost.

3.2.3 Dairy

Dairy enterprise is one the most flourishing enterprises in Nyandarua district. According to analysis, 1 dairy cow yields a Gross margin/year of Kshs 60,079 which is fairly higher compared to other enterprises. This clearly explains why dairy is very popular in the area. Smallholder Dairy Project (SDP) estimated the gross margin for the dairy enterprise for Nyandarua district in 2000 at Kshs 38,700 per household per year. According to analysis by the Ministry of agriculture (2001), out of the three districts studied by the project (Kiambu, Nakuru, Nyandarua), Nyandarua had the highest unit profit for milk. The study by the Smallholder Dairy Project (SDP) determined the following as the determinants of milk prices:

- Fluctuations in supply that may result from seasonal variations in milk production.
- Road infrastructure also plays a key role, especially in the informal market that dominates the dairy subsector. For instance, farmers 75 kilometres or more from Nairobi may get 22 percent less for their milk than farmers close to the urban areas. Additional analyses indicate that each additional kilometre of poor feeder road that separates a farm from the main road reduces the milk price by some 0.5 shillings per litre, or about 3 percent per kilometre.
- Competition from milk powder imports has been blamed for falling producer milk prices, particularly in some major milk-producing areas in the country. However, while it is true that Kenya has been a net importer of milk (especially in powder form) since 1997, these imports have been minimal compared with national production, which has risen considerably over the same period. It seems unlikely, therefore, that such imports are significantly contributing to low farm-gate prices for milk.

Table 3.7: Comparison of average cost of milk Production, price received, and profit across Kiambu, Nakuru and Nyandarua

<i>Kshs</i>	<i>Kiambu</i>	<i>Nakuru</i>	<i>Nyandarua</i>
Cost per litre	17.20	13.28	11.93
Price per litre	17.63	15.19	14.30
Revenue per litre	21.29	16.88	16.68
Profit (Kshs per litre)	4.09	3.60	4.75

Source: Smallholder Dairy Project (SDP), 2000.

Some of the constraints facing the dairy sub-sector in Nyandarua district include Poor infrastructure (which is also supported by this study and the SDP study), Low milk price, Inaccessibility of A.I services, Inadequate fodder supply during drought spell, Poor fodder quality and Worm infestations and diseases. In terms of the value chain, farmers normally have an option of selling the milk to their regular customers directly or sell to dairy societies. Some of the dairy organizations interviewed in the area include Nyala Dairy (Ndaragwa), Brookside Dairy Headquarter (Ruiru), New Kenya Creameries Corporation (KCC) and Spin Knit Dairy Limited (Tuzo). Different dairy organizations play different roles. According to this survey it was revealed that Nyala Dairy are generally transporters and do not process milk. They normally buy milk from the farmers at a price of Kshs 16.80 per litre and transport to the processing firm. Brookside dairy normally buy milk from farmers for processing at a price of Kshs 15.80 per litre. They collect milk using tractors from Naitawa to Ndaragwa for example and charge farmers transportation costs. They also offer credit facilities to farmers. However, farmers complain that their prices are too low. Spin Knit (Nyahururu) buys milk from farmers at a price of Kshs 16 per litre per delivery. Farmers who deliver directly use vehicles, bicycles or by foot. There are also brokers who buy milk from the farmers. From Ndaragwa to Nyeri, about 100 km, the transporters charge between Kshs 1-2 per litre. For Spin Knit Dairy, farmers normally make their own arrangements of how to deliver their milk. Farmers can make arrangements with those with vehicles or with cooperative societies which at the end deduct the agreed amount from the selling price. Generally, these deductions does

normally do not exceed Kshs 3 per litre. The balance goes to the farmer. Another chain followed by dairy market players is from the farmer to transporter to new KCC and then finally to the consumer. Transportation costs vary depending on the distance and nature of the road infrastructure. The longer the distance to the final destination and the poorer the road infrastructure, the higher the transportation costs. The distances average is between 3 to 30 kilometers to the nearest shopping centre. For example Ole Kalau to Nairobi is approximately 200 Kilometers and hiring of a lorry would cost 12 000 Ksh. The average for the mode of transport used would be 70% of the produce is taken by lorry to Nairobi while local market absorbs 30%, with donkeys taking 20%, 5% bicycles and 5% women carrying on their back. The average price for donkeys would be 300 Ksh and bicycles 200 Ksh for 90 Kg bag or slightly more while women charge 5 Ksh per sack.

In one of the small trading centers, the author observed a number of people with lorries and pick-ups and talked to them. It emerged that they were waiting for farmers to bring milk with bicycles and the distance from the farms to the trading centre was an average of 25 km according to the traders. The traders had their own vehicles and those who hired pay 1 Ksh per litre to the owner of the vehicle and the milk carried is around 80-100 kg. These traders would in turn sell to Spin Knit in Nyahururu. They mentioned that they paid farmers 15 Ksh which should be taken with a pinch of salt as the farmers interviewed mentioned that they were paid 13 Ksh. This assertion (13 Ksh) was supported by the district extension officers. These traders in turn sell to Spin Knit at 17 Ksh. Per litre and 16 ksh when there is influx of milk. From the trading centre to Nyahururu is about 15 kilometers. The traders complaint was the status of the roads otherwise they were quite happy with their business.

The author also interviewed a transporter with donkey cart. He was transporting milk from Umiririe to Ndaragwa (Nyala) which is about 4 kilometers. He bought milk at 13 Ksh from farmers and sold at 16 Ksh. He carried around 160 kg of milk daily, once a day. One of the problems he faced is lack of capital forcing him to use old tires for the donkey cart. In addition, there was a problem of his being pushed out of the road by vehicles- bad

road usage by vehicle users. He feared for life and limb. His dream was to make enough money to buy a pick-up or may be even a second donkey cart.

The other main constraint faced by dairy farmers is that milk is transported/sold once a day. The cows on the other hand, are milked twice a day resulting in the evening milk being wasted as most farmers do not have cooling storage facilities. Some farmers keep the milk until following morning and the way it is kept is not good/hygienic resulting in low quality milk. Sometimes the farmers mix this milk with fresh and when eventually delivered rejected and as such it is wasted. Some of the farmers even put some chemicals to avoid being rejected i.e. peroxide. As can be deduced something needs to be done about this constraint i.e. setting up of cooling plants.

There are also a number of cooperatives marketing milk for farmers. Some of these cooperatives have own tractors and others hire vehicles that collect milk from farmers and charge between 1-3 Ksh per litre from farmers as already mentioned. The cooperatives interviewed cited the lack of financial resources. They would like to extend credit services to their members but cannot do so. Credit is extended to those members who have contributed to the society and the loan is deducted upon delivery of produce. The security for the loan therefore is the produce. The cooperatives also indicated that they would like to offer A.I services and training as well monitoring and evaluating the progress of farmers. The cooperatives have indicated that if they had the financial resources, they would make own animal feeds, dairy meal supplement, establish AI services and get quality cows. This is because private people giving AI charge farmers expensively and at times give poor semen because it is sometimes cheap and the farmer cannot afford better quality or sometimes there is imported semen which is bad. The suggestions from the cooperatives on how to get rid of middlemen are that brokers could not provide a service if

1. There were no marketing problems.
2. Farmers were paid favourable prices.
3. Farmers were paid on time and
4. If they were good roads.

3.3 THE IMPACT OF HIGH TRANSACTION COSTS ON POVERTY LEVEL

3.3.1 The Poverty Status of the District

The poverty situation in Nyandarua district indicates that 27 percent of the total population lives in absolute poverty. This amounts to 0.9 percent of National poverty level. The largest proportion of the poor resides in the rural areas (Nyandarua District Development plan, 200-2008).

This means that about 27 percent of the people cannot meet their minimum food requirements which is set at 2,250 calories per day per adult equivalent in Kenya. 17.3 percent of the people are so poor that even if they were to spend their entire income on food they would still not have enough to eat (i.e. the hard core poor).

The causes of poverty in the area include poor infrastructure i.e. poor road network, lack of electricity, inadequate water and communication services, inadequate land where some people are rendered squatters while some own very small farms, inadequate and lack of access to markets to farm produce and Jua kali products (informal sector), exploitation by middlemen, mismanagement of various cooperative societies such as KCC in the past, Kenya Farmers Association and Agricultural Finance Corporation, inadequate credit facilities, consumption of illicit brews; HIV/AIDS pandemic, insecurity and high cost of farm inputs.

In many parts of the district, squatters who have settled on private and public land are most affected by poverty since they do not have land of their own to cultivate. The youth also have no land of their own to cultivate or use as collateral to secure loans. On the other hand, small scale farmers produce only enough for their domestic consumption.

Ranking of the divisions in terms of levels of poverty beginning with the poorest is as follows: Ndaragwa, Ol Joro Orok, Ol kalou, Kipipiri, South Kinangop, North Kinangop. Poverty in the district has been increasing over the years as is the rest of the country.

3.3.2 The Link between High Transaction Costs and Poverty Level in the District

The infrastructural facilities in the district are not well developed especially roads where most of them are impassable during the rainy season. This hinders the marketing of agricultural products since most of them cannot reach the market due to poor road conditions. The farmers are therefore forced to sell their produce at throw away prices. These throw away prices are in most cases below the cost of production. The problem of poor infrastructure (resulting into high transaction costs) especially the road infrastructure is a major cause of poverty in the area. Therefore, improving the roads in the area through tarmacking them would encourage the farmers to take their products to the market and obtain better prices. Improving information technology e.g. postal and telecommunication services in the area would also assist the farmers to get information about better markets to sell their produce and the various seasons when they could fetch good prices. If this is met, there will be a considerable reduction in transaction costs between regions and eradication of poverty. Policies aimed at improving infrastructure should target all the poverty stricken areas in Kenya. This will reverse the increasing rate of poverty in the nation.

Table 3.8: Schedule of Classified Roads (1994-1995) Nyandarua District

	Bitumen	Gravel	Earth	Total Km
International	4.3	0.0	0.0	4.3
National Trunk Rds	27.8	0.0	0.0	27.8
Primary Roads	94.8	146.5	8.0	249.3
Minor Rds (SPR) ³	12.1	211.5	55.1	284.0
All Classes	149.5	547.8	565.5	1.2899.8

Source: Ministry of Roads and Public Works

Table 3.9: Area Covered in Nyandarua District

	<i>Bitumen</i>	<i>Gravel</i>	<i>Earth</i>	<i>Total Km</i>
Minor Rds	10.0	46.8	162.2	219.0
Government Access Rds	5.5	4.3	1.1	10.9
Settlement Access Rds	0.0	70.1	294.6	364.7
Rural Access Rds	0.0	85.3	44.5	129.8
Sugar Rds	0.0	0.0	0.0	0.0

³ Special Purpose Roads.

Tea Rds	0.0	0.0	0.0	0.0
Wheat Rds	0.0	0.0	0.0	0.0
All Classes	10.5	211.5	502.4	724.4

Source: Ministry of Roads and Public Works

There is a problem of marketing of produce because farmers find it difficult to transport their produce to the market. Some cooperatives or societies acts as marketing agents but these also incur a lot of costs because of repair of vehicles due to bad roads. Most of the roads are impassable during the rainy season and there is for example a lot of milk and produce going to waste. There is also a lot of sticking of the vehicle because of the type of soil in the area that is planosols and the problem of drainage as when it rains there are no drainage channels.

Due to bad roads farm inputs sell expensively. Just as discovered in Kisumu, poor farmers do not follow the proper recommended number of times for spraying, etc. It has been suggested that if farmers could be in a position to get good markets of produce it would uplift their standard of living. For example for milk producers there is the possibility of exploitation of markets in Japan, Rwanda but this would need financial investment which small farmers do not have.

Poverty is exacerbated by lack of knowledge. Training for members in the district is required i.e. on how to use chemicals. The problem with training, it was mentioned that often times that there was no follow up to see whether farmers were practicing what they had been taught. A need for regular monitoring and evaluation was mentioned by a number of farmers.

Marketing organizations fail to pay the farmers which for example have led to milk production going down. It was mentioned that for example that the national production level has gone down to 5 kilo from 10. This was also partly because KCC collapsed and there was no steady buyer. There was also as already mentioned lack of AI services as this is expensive, etc and low quality animals which produce little milk compared to grade cows.

There was also the problem of insecurity. One of the millers interviewed cited lack of insecurity as one of the reasons why he did not buy produce from farmers. He bought from middlemen and those farmers who could afford to bring the produce to him at their own cost. The other problem raised by the traders and millers was that, they did not buy from farmers because of the bad roads as maintaining of vehicles was very expensive. They said they would rather pay more at their business premises than venture out to the farms. The worst affected are farmers in the interior due to the inaccessibility of the roads, vehicles do not venture there at all. Farmers use donkey carts and bicycles and these alone cannot carry all the milk or produce. In fact during rainy season it is only 4 wheel drives that venture into the area.

Most of the farmers had in the past taken their children to university when pyrethrum, potatoes, milk were fetching good prices. They were of the opinion that the previous government emasculated them for them to toe the government line, which is why things do not work in the area, i.e. roads and communication. It must be mentioned here is that the district during the Moi Regime was an opposition area and the people in the district refer to Moi Regime as “the dark ages”. A story was given that in one of the local elections in the past where the previous government had promised residents of a certain area of electricity if they voted for the government candidate. They residents promised to do so and got electricity. However, they voted for the opposition candidate. The day after elections, the government employees came and removed the electricity, i.e. poles etc. From this anecdote, one can see the seriousness of politicization of development issues in the country.

A suggestion to eradicate poverty in the area was that the small scale farmers should switch to horticulture and floriculture. However, the problem of European Union (EU) standards such as Euro Gap (this has been described as from farm to fork) is hindering small farmers. A number of big of horticulture producers used to have out growers or would buy from the local areas but most have stopped because of the EU standards. Carzan, a flower farm in Nyandarua, for example, used to have 300 farmers and bought produce from local areas but stopped. These companies cited the dangers of buying from

out growers were the rejection of produce. They felt that what was needed was to educate the farmers on Euro Gap as they could not do this by themselves as it was very costly as this would require getting experts and consultants. The author visited one of the out growers who had managed to build a good house with piped water and electricity. His annual income was around 600, 000 per year from selling horticulture. However, he could no longer continue to sell his produce to his neighbour (big flower farm) because of as mentioned of the EU standards. It must be mentioned that rejection of produce occurs because of inadequate facilities in the farms.

As can be deduced from above, for the small scale farmers, the main problem is the EU standards; farmers have to incur a lot of cost in coming up with i.e. soil and analysis report, water analysis, grading shells etc i.e. holding facilities which requires a lot of resources, etc. The suggestion is that the .Ministry of Agriculture should enlighten and train the farmers on what to do but have not done so. Some big farmers mentioned that if they could get funding from donors or the government they would be willing to train and buy from the small scale farmers.

Some companies still buy from out growers, i.e. Everest. The farmers' interviewed mentioned that some companies were prompt in paying farmers while some delayed. Therefore, the question of payment depended on individual companies. To meet the EU standards, farmers have tried to come together and hire teachers but these teachers are not qualified. This is because of financial constraints farmers cannot afford to hire proper teachers.

When it comes to middlemen, they have been accused of bringing confusion to farmers. Example was given of produce being taken to Nairobi by brokers. Brokers would come back and say that certain percentage of the produce had been rejected. Since farmers have no knowledge of such matters they cannot prove or disprove the claim or cannot even prove what had been rejected was their produce.

Why brokers are attractive to farmers is that they come with their own vehicles or hire. But the problems associated with brokers are the question of price, they come with terrible price. Also farmers have accused them of cheating i.e. by coming with their own machines which they adjust up or down, getting more in terms of kilograms if one is not careful

The biggest problem of flower farmers is that brokers buy produce for a couple of days and stop buying after asking the farmers to grow the flowers, as a result brokers have destroyed farmers' confidence and trust and thereby frustrating them.

It was suggested by one large scale farmer in the district that there are credible middlemen as well as briefcase (like briefcase NGOs) middlemen. The credible middlemen can be link with the market but briefcase middlemen buys for a short period and exploit the farmers. What is needed is a link between the rural farmer and the market and the credible middlemen provide this link.

The recommendations suggested by those interviewed were:

1. Improvement of roads
2. reduction of taxes on farm inputs etc
3. Improvement of prices and marketing.
4. Improvement of communication network i.e. telephone booths around for peoples to call and electricity.
5. Government to give assistance in terms of technical know-how from the Ministry of Agriculture. It was felt that the government was doing little to encourage small farmers.

All in all, Nyandarua district has been described as the basket case for Nairobi. The district feeds Nairobi population and has a lot of potential if the constraints experienced were solved.

3.4 CONCLUSION AND RECOMMENDATIONS

3.4.1 Conclusion

Nyandarua District is the largest of seven districts in central province. The main food crops produced are maize, wheat, beans, peas, potatoes, cabbages, carrots, kale's, onion and tomatoes. The main cash crops produced are wheat, pyrethrum, and cutflowers. In addition to the crops grown, dairy farming is also a major activity in the region. During the production of these commodities, farmers face a range of horizontal and specific constraints. Some of the major constraints experienced in crop development include unavailability of certified seed/planting materials, low producer prices of agricultural produce, high cost of inputs, Poor road network and high post-harvest losses. According to this survey, poor road network stand out to be the most pressing. This hinders the marketing of agricultural products since most of them cannot reach the market. The farmers are therefore forced to sell their produce at throw away prices. These throw away prices are in most cases below the cost of production. In fact if the bottlenecks were removed, these farmers would be able to educate their children, afford healthcare, etc.

3.4.2 Recommendations

The study findings show that the major constraint in marketing of agricultural produce in Nyandarua district is high transaction costs. Poor rural infrastructure raises farm-to-market transaction costs and lowers farm income by increasing costs of using markets to acquire and dispose of goods and services (as stated in Omamo and Mose, 1999). To be able to reduce the high transaction costs this study recommends the following:

1. Repair and tarmacking of all earth roads to facilitate efficient and cost effective transportation of commodities especially during the rainy season. This can be done by the Government in collaboration with the local community.
2. Training of farmers on marketing research and EU standards to be enable them understand the market structure, conduct performance and determine the future market prospects amongst other things.
3. Encourage the formation of marketing groups to assist farmers in marketing their products.

4.0 POLICY RECOMMENDATIONS

The study findings show that poor infrastructure is a major cause of high transaction costs (especially transportation costs) in Kisumu and Nyandarua. High transaction costs increase the poverty level in the rural areas as a result of reduced farmer incomes. To be able to reduce high transaction costs and thereby reduce poverty in the two districts, the policy recommendations are:

1. The government and other stakeholders should facilitate proper and frequent repair and construction of rural access roads.
2. Farmers and other market players in the areas should be encouraged to form organizations/groups to assist them in addressing the major production and marketing constraints for various sub-sectors.
3. The local and central authorities should come up with appropriate strategies for streamlining the market conduct and to regulate the high level of middlemen participation and cartels:
4. Farmers should be trained on marketing research and better farming practices to be able to understand the market structure, conduct performance and determine the future market prospects.

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APPENDIX

Appendix 1: Sub-sector Priorities, Constraints and Strategies (Kisumu District)

Sub-sector	Priorities	Constraints	Strategies
Crop Development	Improve food crop production (maize, sorghum, beans, cassava and sweet potatoes etc)	Striga weed infestation; Low soil fertility; Storage pest infestation; inadequate and late land preparation; poor seeds; adverse weather conditions and; Soil erosion; lack of credit facilities; costly farm inputs; crop preference; lack of market for specific products; lack of adequate extension	On farm trials of sorghum, maize etc; Introduce high yielding, early maturing suitable crops; Hold crop demonstrations using fertilizer; Improved land management for soil and water conservation; Collaborate with other NGO's and CBO's involved in extension services; ensure affordable credit and farm inputs; improve rural infrastructure (road and power); employ and train more extension workers; strengthen the link between research and extension
	Sugar cane Improve sugar production	Lack of market for sugarcane due to the closure of Miwani sugar mills; High cost of inputs	Government intervention to revitalize the factory; Lower tariffs on farm inputs; Formation of rural farmers' SACCOs to enable farmers access credit at a lower cost
	Cotton Improve cotton production and marketing	Market uncertainty and low prices; High incidence of Pests; Poor seeds	Liase with the local research stations and NGOs dealing with National performance trials on cotton varieties; Liase with ginneries to coordinate cotton marketing
	Coffee Improve coffee production and	Lack of operational coffee factory; Weak Marketing cooperative society; lack of access to markets	Set demonstration on coffee husbandry; Mobilize all the stakeholders

	processing		involved in the revitalization of the factory-farmers, cooperators, credit institution, NGOs etc.
	Rice Improve rice production	Inadequate water management and control structures; Weak farmer groups that manage the schemes; Inability of National Irrigation Board to manage West Kano irrigation scheme; Lack of certified seeds	To mobilize the community and other stakeholders to construct new and maintain existing structures; Liase with researchers and other collaborators to facilitate seed production and distribution at low cost to farmers; To design structures that will use gravity flow as opposed to the current facilities that are pump fed and hence expensive
Livestock Development sub sector	Dairy Increase milk production	Poor genetic potential of the herd; High disease incidence; Inadequate AI services; High cost of pedigree cows; High cost of farm inputs (e.g drugs); Drought spell hence lack of feeds; Lack of initial capital; poor management skills	Upgrading of the local stock through use of grade bulls and/or AI services; Improve husbandry practices to reduce the calving interval and ensure survival of the calf as this is the replacement stock; Mobilize Dairy coops to start AI schemes as an enterprise; Encourage fodder conservation during periods of plenty through publication and provision of simple manuals to farmers on techniques of conservation for use during dry spell (hay, silage, stovers straws etc); Hold demonstration on simple on farm ration making using available resources; Equip and supervise community animal health maintained assistants

			(CMAHAS); mobilize farmers groups to come together and form strong rural SACCOs to enable them access credit facilities; encourage communal spray crushes; organize seminars on dairy management
	Beef cattle Improve beef cattle production	Lack of breeding beef bulls; Poor selection of breeding stock by farmers Long lactation periods with low milk production; Slow growth rate; Heavy tick load	Importation of Breeding bulls for meat; Demonstrate to farmers on simple selection criteria for breeding animals; Encourage farmers to use communal spray crushes to control ticks; Improve on general husbandry practices to increase production.
	Poultry Improve poultry production	High mortality rates due to NCD; High cost of feeds; Lack of initial capital; Incidence of new castle diseases Lack of markets; poor management skills	Step up vaccination campaigns against NCD, fowl typhoid and gumboro; upgrade the local flock through use of exotic cockerels; Formulation of home made rations; Promote keeping of emerging birds such as ducks, turkeys etc; organize seminars on poultry unit management; ensure availability of affordable credit
	Sheep and goats Improve production of goats	Lack of improved breeding bucks and rams; Lack of adequate housing facilities hence exposure to adverse weather mainly during the rain season; Inadequate milk for the smallholder	Introduce dairy goats in the district; Train farmers on the importance of proper housing and husbandry practices; Introduce breeding bucks/rams to upgrade the locals for faster

			growth.
	Beekeeping Increase honey and wax production	Expensive bee equipment and honey harvesting kits	Train local artisans on bee equipment making so that they are locally available; Involve all collaborators in bee keeping industry to sensitize farmers so as to increase the number of hives hence honey and wax production.
	Pig production Promote pork consumption amongst the community; Housing of pigs to be encouraged	Socio-cultural beliefs and religion; Poor housing	Teach on the importance of pork consumption; To encourage farmers to confine pigs as per the vet requirement; Open more butcheries for selling pork
	Donkeys Improve the nutritional status of the donkey hence body condition	Inadequate feed provision, mismanagement and overburdening of the donkey	Advocate for good husbandry practices; Control the workload for the donkey
	Tick Control – Dipping and/or spraying	Lack of awareness by the livestock farmers; Non-operational dips; Lack of acaricide; Inadequate staff to teach farmers; Poor dip distribution in the district Low income; Poor dip management by the beneficiary	Creating awareness and importance of dipping; Rehabilitation of all non-functional dips; Avail acaricide by stockists and even the department of Veterinary services; Train more extension staff who will teach the farmers on the economic importance to tick born disease; Construction of more dips through self-help groups with assistance of NGOs and other stakeholders;

			Farmers to be encouraged to keep high grade cattle which will enhance their income
	Disease Control; Surveillance and vaccination programmes	Lack of resources; Inadequate staff to carry out the exercise; Uncontrolled livestock Movement and free grazing; Lack of farmers awareness; Inadequate/unavailability of vaccines	Avail the vehicles, fuel, others logistics on time when the vaccination is to start; Train enough staff who will handle the programme; Strict control on livestock movement; Farmers to be informed on importance of disease control and how the diseases affect them; Enough vaccines for all common diseases should be stocked by the department of Veterinary Services and other private companies.
	Clinical services	Lack of know how to diagnosis cattle diseases; Lack of enough qualified personnel in the department; Farmers failure to report disease incidence in time; Unqualified personnel (quacks) who give under dose or wrong treatment; Lack of drugs either in the chemists shops or the department; Use of local herbs by farmers, which ends up not treating the livestock	Technical staff to be posted to cover all farmers adequately; Farmers should be taught basic information on the livestock diseases and how to diagnose them; They should report cases for treatment as soon as they notice the symptoms; All relevant drug companies and chemists to stock the correct drugs for treatment, which farmers can buy at anytime; Private practitioners are encouraged to take up the services.
	Meat Hygiene	Lack of enough trained personnel in the department;	Training of technical staff in the department on meat inspection,

		<p>Inadequate resources like transport;</p> <p>Lack of awareness by the public on the importance of meat inspection;</p> <p>Poor state of most slaughterhouses and slabs, as well as meat carriers.</p>	<p>who should in turn create public awareness on the importance of meat inspection;</p> <p>Availing enough resources so that the whole districts covered;</p> <p>Strict inspection by the department on the state of meat transportation equipment.</p>
	<p>Artificial Insemination Services</p>	<p>Lack of awareness where the services are offered;</p> <p>Poor infrastructure like roads,</p> <p>Poor coverage due to lack of trained personnel in A.I;</p> <p>High number of un castrated bulls roaming with cows in the communal grazing;</p> <p>Poor heat detection;</p> <p>Un timeliness for successful conception;</p> <p>Poor semen keeping facilities in the field</p>	<p>Encouraging and creating awareness to farmers on A.I</p> <p>Access roads should be maintained by the relevant department in conjunction with the local communities;</p> <p>The department to train more staff to cover a large number of farmers;</p> <p>Castration of local zebu bulls to control breeding;</p> <p>Timelines in heat detection and insemination is of paramount importance for conception to take place;</p> <p>Modern semen equipment for proper transportation, keeping and usage to be used.</p>
	<p>Hides, skins and leather improvements services</p>	<p>Lack of transport;</p> <p>Competition among the traders themselves while collecting raw hides from producers</p> <p>Low flaying skills by the flayers in the slaughterhouse;</p> <p>Inadequate trained staff to offer services to all hides and skin handlers</p>	<p>Serviceable vehicles should be availed to ease movement;</p> <p>Traders should give time for producers to prepare and dry the hides and skins properly before collection;</p> <p>Flayers should be taught proper flaying techniques and to be regularly supervised;</p> <p>The department should train more staff and post them to</p>

			cover the district adequately.
	Tsetse control services	Lack of resources to mobilize the staff; Uncontrolled bushes which harbour the tsetse flies; Lack of chemicals for control of the tsetse flies; Few staff in the field	Mobilizing the available resources to facilitate the staff to move; Bush clearing by the local communities to reduce hide outs of tsetse flies; The department and other companies to avail the chemicals for use in the field, as well as other equipment needed; To train more staff to counter the growing number of tsetse flies.
Rural Water Supply	Improve water quantity – and quality	Inadequate water at source; Inadequate funds for operation and maintenance.	Rehabilitation of existing water supplies at intakes, Pumping equipment, pipelines, treatment works facilities and storage tanks.
	Conserve water for domestic, livestock and industrial use.	Inadequate funds for new projects	Water conservation through construction of dams/pans.
	Provide safe water to consumers.	Lack of awareness in hygiene practices; Insufficient tools for maintenance; Delay in spare parts Procurement	Rainwater harvesting or rural communities; Spring protection for small community water supply projects; Train skilled manpower
	Improved water quality at source	Lack of awareness in anti-pollution measures;	Protection of water catchments areas through afforestation
	Ensure non-pollution of water source.	Lack of awareness in anti-pollution measures	Protection of water catchments areas through afforestation
	Ensure non-pollution of water source	Inadequate skilled personnel; Lack of reliable transport for monitoring	Water quality monitoring

	Improvement on revenue collection	Many un-metered water consumer connections; Lack of sensitization of the people Infrequent water supply to consumers	Strengthen revenue task force; Provision of water meters to consumers; Improve transportation for monitoring; Improve water supply
Fisheries	Protection and sustainable utilization of fishery resource	Limited facilities e.g. boats for lake surveillance; Rampant rural poverty which encourages the use of destructive fishing gears and methods; Fisheries legislation does not adequately protect the fisheries resource; Fish farming is too poorly developed to supplement the declining catches from the lake.	Source for water vessels to facilitate surveillance activities; Sensitization of fishermen on good fishing practices; Review of fisheries legislation to provide for stiffer penalties to offenders; Promote fish farming to supplement declining catches from the lake; Encourage fishermen to contribute towards management of lake fishery; Protection of fishing grounds; Re-introduce closed fishing seasons.
	Reduction of post harvest losses of fish	Poorly constructed fishing crafts. Lack of ice for on-board chilling of fish Lack of proper fish handling facilities at landing beaches; The use of improper fish catching methods, which accelerate fish spoilage	Improve the design and construction of fishing boats through a boat building project; Put up ice making machines at selected fish landing beaches to produce ice for fishermen; Provide recommended fish handling bins, trays, crates, cooler boxes etc; Develop and use catch methods which do not accelerate loss of fish quality.
	Revitalize fishing industry	Mismanagement of fisheries cooperatives; Lack of credit facilities;	Reactivate the existing fishermen cooperative societies to enable them make savings

		Lack of cold storage facilities at beaches for fish preservation; Exploitation of fishermen by middlemen	and avoid middlemen exploitation by taking over the marketing of fishermen produce; Encourage fishermen to form rural SACCOs; Reactivate the fishermen loan scheme; Provide governmental loan guarantee.
	Improvement of sanitation at landing beaches	Almost all the beaches are located far from the nearest water supply scheme hence there is no piped water in those beaches; Lack of water at the beaches; Fishermen's lack of knowledge on hygiene and sanitation at landing beaches; Lack of funds to put up sanitation facilities	Rural communities to be encouraged to join hands and develop water supplies; Local Authorities and NGOs to be encouraged to assist in developing water supplies at landing beaches
	Promotion of Aquaculture to supplement declining catches from the lake.	Small number of fish farmers; Low staff farmer ratio Poor harvests from existing fish ponds; Lack of awareness amongst most prospective fish farmers; Lack of certified fish seed; Expensive fish feed	Sensitization of community to venture into fish farming; Provision of motorcycles and bicycles to field staff; Transfer fish farming technology to fish farmers in order to improve pond management; Rehabilitation of government owned fish ponds to serve as demonstration ponds; Produce certified fish seed for distribution to farmers; Conduct research for cheaper fish seeds.
Lands and Settlement	Registration of titles	Lack of information on the part of landowners	Have the Provincial administration hold more barazas to educate people on

			their land rights and the importance of having title deeds
	Proper land management	Traditional and ignorance	To educate people the to sub divide land into small pieces is not to their interest, but against them; Small pieces in the rural areas are not conducive to agriculture and therefore food security.
	Reduce land disputes	Lack of motor vehicles to transport the land officer to the field to solve the boundary disputes	Avail new all terrain vehicles and plenty of fuel; In-calculate in the populace the need to live in harmony with neighbours
	Credit facilities	Inadequate fishing gears, low farm inputs, lack of security for loans and poor book keeping and management	Formation of rural saccos, trainings on management skills and involvement of stakeholders for support
	Increase milk production	Inadequate supply of milk; transportation problems from production area	Farmers to increase milk production; Training farmers in production strategies; Open up for stakeholders
	Marketing of farm products	Poor infrastructure (i.e. poor roads) Cheap imports from other parts of the country; Inefficient marketing strategy and research	Liasing with public works for road rehabilitation; improve quality of products; training farmers on marketing research.

Appendix 2: Sub-sector, Priorities, Constraints and Strategies (Nyandarua District)

Sub-sector	Priorities	Constraints	Strategies
Crop development	Avail quality farm inputs to farmers; Put in place efficient marketing structure; Promote extension and service delivery	Unavailability of certified seed/planting materials; low producer prices of agricultural produce; high cost of inputs; Poor road network; high post-harvest losses	Promotion of on-farm seed production and multiplication; Encourage the formation of marketing groups; Designate market days for major trading centers; Provision of market information especially for horticultural crops; Encourage the production and use of organic fertilizer; Mobilizing local communities towards improving their feeder roads; Train local communities on post harvest management
Food Security	Promote usage of drought tolerant crops; Provision of ration for critical malnutrition	Insufficient food supply after prolonged drought periods; Nutrients imbalance especially for those under five years old.	Promote drought tolerant crops in the drought prone of parts of the districts (sweet potatoes, sorghum, finger millets); Train the local communities on nutritional aspects and population education.
Livestock Development Dairy cattle	Promotion of extension services Fodder establishment and conservation; Disease and pest control; Livestock products marketing.	Poor infrastructure; Low milk price; Inaccessibility of A.I services; Inadequate fodder supply during drought spell; Poor fodder quality; Worm investigations and diseases (cattle, goats, sheep)	Encourage self-help groups to start up A.I. services within their locations; Encourage the private sector participation in offering A.I services; Promote on farm fodder production and conservation; Train farmers on deworming and disease control and encourage farmers to revive cattle dips by acquiring them and managing them
Agriculture Research and Development	Develop and promote the use of suitable animal and	Low adoption of research output; Poor farmer extension	Strengthen the research and extension liaison for steady flow of information to the farmers;

	crop varieties; Accelerate the adoption rate of research findings.	research linkages	Involve farmers in developing research agenda
Irrigation Development	Exploit the water resources for irrigation; Develop small holder irrigation system; Extension services to irrigation farmers	Inadequate water supply; Poor roads; High capital outlay; Poor production planning	Encourage the construction of water reservoirs where appropriate; Promote cost effective methods like bucket and manual pumps; Provision of market information and training on enterprises selection
Environmental Conservation	Operationalise the Environment Coordination and Management Act; Public awareness campaign on farm forestry; Promote and encourage alternative energy sources; control forest fires	Land degradation; inadequate tree seeds especially for the desired seedlings; Expensive materials for nursery establishment and lack of know how on the establishment and management; Land ownership problems e.g. on who should plant trees; Lack of credit facilities for farm forestry fires and inadequate budgetary allocation	Promotion of sound land husbandry practices (physical/biological/cultural) soil and water conservation measures; Promote on farm agro-forestry practices; Encouragement to have on farm tree nursery; Farmers to be encouraged to use locally available materials for raising seedlings; Farmers to be trained on nursery establishment, management and seed handling; Farmers to be trained on nursery establishment, management and seed handling; Provision of good quality seed by Forest Department, KEFRI; Enhance policing of all forest areas; Educate people on proper use of fires to avoid forest fires and develop and implement fire management and seed handling; Provision of good quality seed by Forest Department, KEFRI;

			Enhance policing of all forest areas; educate people on proper use of fires to avoid forest fires and develop and implement fire management plan
Lands and Settlement	Settlement of people in squatter villages; Plan the squatter villages for their legal ownership; educate the public on Settlement Fund Trustees loan requirements; Settle the land disputes; Streamline planning of urban and market centres; Create inventory of and computerize land properties	Large number of squatters vis-à-vis little land available; Disputes over ownership of land; Displacement of some squatters in order to provide public utilities such as roads of access; Inadequate transport; Unpaid Settlement Fund Trustee (SFT) long delay of registration of land; Lack of approved development plans for various urban centres, and others which require revision, delay issuance of leases to land; Land disputes; Inadequate transport for site visits; Presence of settlements of unplanned centres; Lack of updated information on properties; Use of manual methods	Consider the most needy first; Speed up settlement of disputes; Plan spill-over areas for relocation of the affected squatters and ensure minimal disruption of the settlement; Sensitize beneficiaries to chip in (cost sharing); Liase with the physical planning department and the councils to speed up the process; Speed up settlement of disputes; Request for facilitation from Ministry headquarters; Re-organize the settlements through planning; Strive to create a data bank on property particulars; Request for computerization.
Rural Water Supply	Rehabilitate and construct water conservation	Scarcity of water resources due to inadequate sources and	Construction of reservoirs for regulating river flows to synchronize them with the water demand patterns;

	structures; Exploit ground water potential; Effective water resources management	the uneven distribution of the resources both in space and time	Rehabilitation of existing water supplies; Develop water users association
Co-operatives Development	Provide management skills for commercially viable cooperatives; Encourage marketing to external markets; Mobilize and diversify savings for credits	Mismanagement; Illiteracy of leaders; political interference; High interest rates on credit; Inadequate markets; Uncontrolled imports of locally produced goods.	Training on management skills and enforcement of Cooperative Act; Management courses for members and manager; Control on interest rates; Produce for export; Enforcement of import duty on locally produced goods.
Fisheries Development	Community sensitization on importance of fish; Acquire modern fishing gear; Construct hatcheries.	Cultural attitude towards eating of fish; Inadequate fishing facilities; Uncontrolled fishing from water masses	Encourage education, training and demonstration on the importance of fish consumption; Community sensitization and NGO's involvement in buying of the fishing gear; Desilting and restocking dams and rivers with fish.
Agriculture and Other Rural Financial Services	Establishment of affordable and accessible credit; Revive and strengthen the credit institutions; Increase income levels for savings	Closure of formal financial Institutions; Low income levels; Collapse of agricultural financial institutions e.g. KFA, AFC; Non performing loans and bad repayments records; High interest rates on credit to the farmers; Lack of collateral	Raising productivity for higher incomes; Creating markets for agricultural products; Training farmers on importance of savings and business management; Revive the collapse financial institutions.