Factors Influencing Smallholder Dairy Farmers' Choice of Milk Marketing Outlet in Nandi North District, Kenya

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Abstract

Smallholder dairy farmers make up the bulk of milk producers in Kenya yet there is fragmented information on determinants of the choice of milk marketing outlet. The main objective of this study was to determine factors which influence smallholder dairy farmers" choice of milk marketing outlet in Nandi North District. Rational choice theory was employed and a conceptual framework developed to link the study variables. Survey research design was employed in this study. Simple random sampling was use d with a study sample size of 185 household heads. The study employed interview schedule as the data collection instrument. Descriptive and inferential statistics were used to analyze data and present the study result. Chi-square test was used to test the hypotheses with the level of significance set at 5 percent. The results indicated that there exist factors which influence smallholder dairy farmers" choice of milk marketing outlet in the district. The state of road infrastructure, ownership of means of t ransport and services offered by the milk chilling plants influences the choice of milk marketing outlet. The results revealed that smallholder dairy farmers look for both milk price and a market outlet offering other services. Farmers forego high milk prices in urban areas in order to access credit and farm inputs offered by the chilling plants. The study concluded that it is important to invest in rural infrastructure especially roads in order to reduce marketing cost. Moreover, there is huge potential in the farmer producer groups in marketing of farmers produce. The study recommended that the government needs to remove barriers inhibiting their functioning and increase their capacity by offering training. Further research should be carried out to come up with strategy to improve policy makers understanding of the dairy industry in Kenya.

Keywords*: Smallholder, Milk, Market Outlets, Kenya*

Introduction

Background Information

The study focused on factors influencing small holder dairy farmers' choice of milk marketing outlets in Nandi North District, Kenya. Efficient marketing structures has been quoted by the World Bank as one of the key indicators in improving farmers earnings which in turn has a potential of reducing rural poverty and inequality within regions (World Bank, 2008). Kenya is one of the largest producers of dairy products in Africa, with estimated dairy herd of 3.5 million improved breeds and 9 million Zebus (MOLFD, 2007). The country also has the highest per capita milk consumption in Africa, consuming about 90 kg per capita annually compared to average 25kg per capita annually in Sub - Saharan Africa (MOLFD, 2007). Dairy farming is one of the most developed sectors in Kenya with estimated annual revenue of close to Ksh. 160 billion. The milk industry represents between 6-8% of GDP and supports over 1 million smallholder dairy farmers' households (Land O'Lakes, 2009). There are about 600,000 commercial smallholder dairy farmers in the sector most of them in central highlands and Rift Valley. These dairy farmers on average keep 1-4 cows and deliver their milk to hawkers/milk vendors, their cooperatives or local milk cooling centers. Notwithstanding, 50% of the smallholder dairy farmers rely on daily milk sales as a source of income (Institute of Economic Affairs, 2001). Dairy farming contributes to poverty reduction and equity in gender distribution of incomes since it is easily undertaken in small scale by women. Based on dairy farming experience accumulated over 90 years, Kenya has a relatively large herd of improved dairy cattle compared to other countries in the region (Ngigi 2005). The traditional milk drinking culture and keeping of traditional cows have also helped in the development of the sector. Dairy production in the district is largely for the domestic market i.e. Kenya Cooperative Creameries, Chilling plants and Brooside dairies. Occasional surpluses may be exported to regional markets and shortfalls in Kenya are met through imports of milk powder most notably, droughts in 1980 and 1984 led to increased imports.

Statement of the Problem

The dairy sector has undergone a lot of upheavals especially in 1990s. The Structural Adjustment programme of late 1980s and early 1990s forced the government to fully liberalize the sector in 1992. Liberalization was followed by entry of other milk processors ensuring a diverse market outlet to choose from by farmers. The dairy sector in Kenya has undergone a lot of changes and challenges before and after independence. Before independence and up to 1969, the dairy sector was largely unregulated with Kenya Co-operative Creameries (KCC) formed in 1925 playing a dominant role in milk processing and marketing. Indigenous Africans were not allowed to be involved in commercial dairy production until 1954 when the Swynnerton plan allowed them to produce and sell milk to KCC on quota basis (Jaffe & Morton, 1995). Starting with privatization of Artificial Insemination services in 1980s, the government fully liberalized the monopoly of the giant KCC in milk marketin g in urban areas in 1992 (MOLFD, 2007). With liberalization, there was entry of various processors and marketers in the sector bringing about competition and thus the start of decline of KCC and its eventual collapse in 1999. The collapse of KCC changed milk marketing system from a highly controlled production and marketing chain supported by the government to a market driven system subject to forces of demand and supply. The liberalization increased marketing opportunities for smallholder dairy farmers and the participation of the informal sector in milk marketing increased. With the collapse of the giant KCC in 1999, milk marketing was thrown into disarray with most smallholder dairy farmers losing out. Eventually, informal milk marketing or hawking grew tremendously and being preferred with the smallholder dairy farmers. With the revival of KCC into new KCC in 2003, the dairy industry started to pick up again with non -governmental organizations (NGOs) investing in milk chilling plants. Smallholder dairy farmers have had to contend with lows and highs in marketing their milk and at some point in late 1990s the dairy industry declined due to marketing problems. What influences a smallholder dairy farmer to choose one market outlet over another has not been known for a long time. Different studies had looked at the trends, growth and impact of the dairy sector in Kenya but none had conclusively analyzed the factors influencing smallholder dairy farmers‘ choice of a marketing outlet. Therefore there was an exist ing knowledge gap. Understanding the dairy marketing system and dairy farmers‘ choice of marketing outlet was seen to be critical in influencing policy, thus bringing about a more efficient dairy marketing system and improving incomes for smallholder dairy farmers. It is hoped that other researchers will find the resultant report a handy link to not only new knowledge but also a key to further research opportunities.

District Milk Production and Use

Small holder dairy farmers in the district	32, 409
Crosses and grade cattle	75,493
Zebu cattle	3,783
Total	79,276
Total milking cows	21,405
Total number of calves	17,125
Average production per lactating cow	7.6
Total daily milk production	164,597
Milk consumed by calves (1.2 litres per calf) 12%	20,548.3
Milk consumed by households (1.2 Litres per HH) = 24%	38,890.8
Formal - Milk Marketed – 43%	70,000
Informal – Milk Marketed	35,157

Source: MOLD, 2012

This study sought to determine the influence of the various selected factors in smallholder dairy farmers‘ choice of milk marketing outlet. It sought:

i. To determine the influence of the state of road infrastructure on smallholder dairy farmers‘ choice of milk marketing outlet.
ii. To determine the influence of means of transport to the market on smallholder dairy farmers‘ choice of milk marketing outlet.
iii. To determine the influence of services offered by the dairy marketing groups in smallholder dairy farmers‘ choice of milk marketing outlet.

The study was based on three hypotheses.

i. H_O2. The state of road infrastructure has no statistical significant influence on smallholder dairy farmers‘ choice of milk marketing outlet in the district

ii. H_O3. The means of milk transport to the market has no statistical significant influence on smallholder dairy farmers' choice of milk marketing outlet in the district

iii. H_O4. Dairy marketing groups and the services they offer have no statistical significant influence on smallholder dairy farmers' choice of milk marketing outlet in the district

Methods and Procedures

Theoretical Framework

The study was based on rational choice theory. Rational choice is a choice made out of many alternatives through rational thinking. Theories of rational choice are guided by the assumption that people are rational and base their decisions on what they perceive to be the most effective means of achieving their goals (Wallace, 1991). The theory was broken down into various concepts key to the study as presented in figure 1.

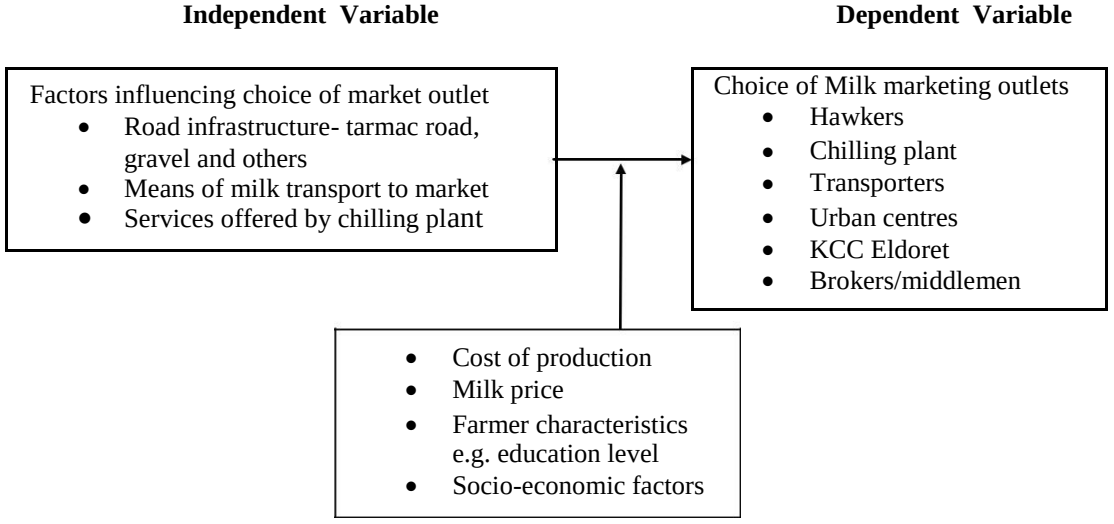

Figure 1. Conceptual Framework

Procedures

This study was done in Nandi North District. The dairy industry is the most popular, valued and highly developed enterprise in the district. Most farmers keep dairy crosses, few have high -grade animals and there are few Zebu cattle in lower parts of the district where agro -ecological conditions are hot and dry. Dairy cattle are kept for both subsistence and commercial use. Survey research design was employed as the data gathering technique. The population of study constituted household heads who were either male or female and practiced mixed farming .i.e. both dairy and crops farming. The population of study was rural based and made up of large and smallholder farmers. The study used a sample size of 185 dairy farmers; simple random sampling procedure was then employed before actual interviews in the field. The study used questionnaire and interview schedule to collect data from the respondents. The validated interview schedule was pilot tested with a sample of 30 household heads within the district. The completed study instruments were serialized, coded and double checked to ensure quality control. Data was analyzed using SPSS where inferential statistics, chi square test (X^2) and descriptive statistics were applied in data analysis. Measures of central tendency were derived to show the most common reason for choosing a marketing outlet. Frequency distribution tables were used for descriptive presentation of the data. Chi-square test (X^2) was chosen because of its appropriateness where data is nominal or ordinal.

Results and Discussions

Introduction

This section presents the results and discusses the key findings of the study in line with its stated objectives.

Descriptive Results

Category	Description	Percentage
Gender	Males	73%
	Female	27%
Age	18-27 Years	7%
	28-37 Years	38%
	38 -47	38%
	48 - 57	11%
	58 - 67	5.5%
	>67	0.5%
Household head	Male headed	78.9%
	Female headed	21.1%
Marital status	Single	13%
	Married	71.4%
	Separated	1.1%
	Widowed	14.6%
Education	Primary	39.5%
	Secondary	30.3%
	Middle level colleges	26.5%
	Bachelor‘s degrees	1.6%
	Masters	0.5%
	No formal education	1.6%
Occupation	Farmers	61.1%
	Professionals	22.7%
	Businessmen	14.1%
	Stay at home	2.2%

Source: Field Data 2012

Table1. Milk Marketing Outlets in Nandi North District

Characteristic	Number of farmers	Percentage (%)
Chilling plant	116	62.7
KCC	3	1.7
Transporters	4	2.2
Brokers	6	3.2
Hawkers	55	29.7
Other farmer	1	0.5
Total	185	100

Source: Field Data (2012)

The finding of this study indicate that formal market absorbs 81% of milk while informal market absorbs 19% of all milk produced by both smallholder and large scale milk farmers indicating a tremendous growth in the past three years. The formal milk marketing outlet has been growing over the years especially after the establishment of Tanykina dairies in 2005. Farmers prefer an organized marketing outlet that offers more than just a good price but also stable prices, credit and input supply. But still, the data indicates that some farmers access more than one market outlet at a time with the same farmer selling his milk to the chilling plant and to the hawkers in order to maximize the benefits of different marketing outlets.

Table 2. Market Outlet with Impassable Feeder Roads

Variable	Chilling plant	KCC	Transporters	Brokers	Hawkers	Other farmers
Frequency	114	3	1	6	54	1
Percentage	60%	1%	2%	3%	29%	5%

$\chi^2 = 21.92$, $df = 1$, *Cramer"s V* = 0.747, $p < 0.05$ ($p = 0.015$)

Source: Field Data (2012)

The chi-square (0.015) is less than 0.05 indicating existing relationship between choice of market outlet and road status. The Cramer's V value is 0.747 indicat ing a strong relationship between the two variables.

Table 3. Market Outlet when Feeder Roads are Improved

Variable	Chilling plant	KCC	Transporters	Brokers	Hawkers	Other farmer
Frequency	127	27	0	2	28	1
Percentage	68.7%	14.6%	0	1.1%	15.1%	0.5%

χ^2 = 26.452, *df* = 8, *Cramer"s V* = 0.867, $p < 0.05$ ($p = 0.001$)

Source: Field Data (2012)

The chi-square value indicated that there exist a relationship between road status and choice of milk marketing outlet. The Cramer's V value is 0.867 indicating a strong relationship between the two variables. There is a change in respondents view on the choice of milk market if the road would be improved. 68.6% would market their milk to the chilling plant, 24.6% would market their milk to KCC Eldoret indicating 23% change in market preference, 1.1% would market their milk to brokers, 5.2% to hawkers and 0.5% to other farmers.

Table 4. Market Outlet if Feeder Roads are Worse

Variable	Chilling plant	Transporters	Brokers	Hawkers	Other farmer	Local hotel
Frequency	92	31	2	53	1	6
Percentage	49.7%	16%	2%	28.6%	0.5%	3.2%

χ^2 = 26.623, *df* = 10, *Cramer"s V* = 0.668, $p < 0.05$ ($p = 0.003$)

Source: Field Data (2012)

The chi-square value shows that there exist a relationship between road status and choice of milk market outlet. The Cramer's V value is 0.668 ind icating a strong association between choice of milk market and the status of road. The respondents' view on market choice if the feeder roads would be worse changes with less people preferring chilling plant at 49.7% and more smallholder farmers preferring hawkers 28.6%, transporters 16.8% and a new variable local hotels at 3.2%. Brokers scores 1.1% and other farmer 0.5%. KCC scores 0% indicating that the further a market outlet is, the less likely it is preferred with bad roads. Some development thinkers have even argued that the reason for failure of SAPs in Africa was because most governments misinterpreted their disengagement in economic activities to even neglecting building of rural roads to facilitate agricultural growth. This has been emphasized by International Food Policy Research Institute, (2011) that, lack of investment in roads results in high transportation costs and forcing farmers to remain within a traditional subsistence mode of production. The study results indicated that the state of road infrastructure in the district is bad especially during the rainy season. This limits the smallholder dairy farmers' choice of milk market outlets. The freedom to choose a market outlet among existing outlets is drastically reduced because of the transport barriers as well as the high cost of transport that might accrue due to the bad roads. A survey of rural roads in Kenya in 2002 indicated that only 60% of the rural roads which service the poorest sectors in Kenya were found to be in maintainable conditions (Rabinowitz, 2008). Recently, there has been an increased investment in road construction but this has not been extended to the rural feeder roads where the poor are found. This scenario can be found in the district where the road network is in bad con dition especially during the rainy season.

Table 5. Market Choice with Ownership of Means of Transport

Variable	Chilling plant	KCC	Transporters	Hawkers
Frequency	95	60	0	30
Percentage	51.8%	32.2%	0%	16%

χ^2 = 13.404, *df* = 2, *phi*, *Cramer"s V* = 0.697, $p < 0.05$ ($p = 0.0406$)

Source: Field Data (2012)

The p (0.0406) value is less than 0.05 thus the null hypothesis is rejected and alternative accepted implying that ownership of means of transport to the market influences small holder dairy

farmers choice of milk marketing outlet in the district. The Cramer's *V* value of 0.697 indicates a strong association between ownership of means of transport and choice of milk market outlet.

Table 6. Market Choice without Ownership of Means of Transport

Variable	Chilling plant	KCC	Transporters	Hawkers
Frequency	160	0	20	5
Percentage	86.5	0%	10.8%	2.7%

$\chi^2 = 14.16$, $df = 6$, *Cramer"s V* = 0.616, $p < 0.05$ ($p = 0.035$)

Source: Field Data (2012)

The p value (0.035) indicates that choice of milk market is dependent to the ownership of means of transport to the market i.e. farmers base their decision on choice of milk market to ownership of means of transport to the market. The Cramer's *V* value of 0.616 indicates that there is a strong association between ownership of means of transport and choice of milk market. Transport of agricultural produce to the market is closely linked with the road infrastructure. It is hard to discuss transport issues in agriculture without touching on road infrastructure, they both affects and complement each other. An improvement in road leads to better performance of the transport and most development literature discusses these at the same time. The better the road conditions the easier it is to transport produce to the market and vice - versa. Thus road status eventually has an influence on the smallholder dairy farmers' choice of the me ans of transport to the market. The data also indicates that the most preferred means of transport is the pick-up truck 47.6%, followed by tractor at 40%, then motor cycle at 11.9% and bicycle at 0.5%. The status of the road within the area has a big influence on the preferred means of transport to the market. Most farmers indicate their preference of either the tractor or the pick-up truck because of their ability to be used on bad roads and to carry more milk. Despite the fact that most farmers own bicyc le which they use to transport milk to the market, most of them would prefer to use either the pick-up truck or the tractor in order to overcome challenges brought by the bad roads and to enable them access farther markets in urban centers.

Table 7. Preference of Services Being Offered by Chilling Plant

Variable	Frequency	Percentage
Dairy management training	23	19.2
Subsidized A.I	7	5.8
Subsidized inputs	34	28.3
Access to credit	56	46.7
Total	120	100

Source: Field data (2012)

Table 8. Milk Market with Low Prices but Services Retained in the Chilling Plant

Variable	Dairy trainings	subsidized A.I	Subsidized feeds	Access to credit
Frequency	12	2	27	24
Percentage	7.8	1.3	17.5	15.6

$\chi^2 = 4.140$, $df = 3$, *Cramer"s V = 0.747*, $p < 0.05$ ($p = 0.047$)

Source: Field data (2012)

The p value of 0.047 is less than 0.05 thus the null hypothesis is rejected while the alternative hypothesis is accepted indicating that the services offered by the chilling plants have an influence on small holder dairy farmers choice of milk marketing outlet. The Cramer's V value of 0.747 indicates a strong association between services offered by the chilling plant and smallholder dairy farmers' choice of milk marketing outlet. Farmers prefer a marketing outlet that offers more and with added services. In terms of the reason for joining the chilling plant, 5,8% joined because of the stability of milk price, 32.5% joined because of the good/high milk prices while 61.9% joined because of the services being offered. A majority of the smallholder dairy farmers indicated that the services offered by the Dairy Management Groups were the main attraction. The chilling plant offers a variety of services which are not offered by other market outlets and since smallholder dairy farmers would want more than just a good price, they end up joining the chilling plants. Among the services being offered, most respondents 46.7% indicated that they preferred easy access to credit facility, 28.3% indicated their preferred service was affordable

inputs, 19.2% indicated they preferred the free trainings on dairy management while 5.8% indicated they preferred the affordable A.I services.

Conclusions and Recommendations

The study found that the state of road infrastructure has an influence on smallholder dairy farmers‘ choice of milk marketing outlet. Farmers‘ access to market outlet is hugely influenced by the state of roads within an area. It determines if one can access a near market or a further outlet depending on preference. Thus, roads play a critical role in marketing of milk and other produce. The better the roads the more price benefit for farmers and the more the buyers thus competitive prices are offered by different buyers. It is therefore important that road infrastructure is improved within rural areas in Kenya especially the high agricultural potential areas. The study also found t hat most farmers who own pick-up trucks accessed further markets in Eldoret such as KCC while those with motor bikes and bicycle delivered their milk to chilling plant or transporters. Some who do not own any means of transport sold to hawkers or transporters despite their preference for KCC in Eldoret. A farmer‘s ownership of appropriate means of transport put him at an advantage to access any market outlet he prefers which is not the same with those who do not own any means. Finally, the study found that the services offered by milk chilling plants have an influence on smallholder dairy farmers‘ choice of milk marketing outlet within the district. From the study finding, farmers are looking for more than a better price. Most of the farmers who joined the Dairy Management Groups did so because of the services being offered with credit availability being the major attraction. They are able to offer credit to poor farmers because of low transaction cost involved compared to large commercial bank which fears the high transaction costs and risks involved in giving loans to farmers. At the same time, their role in providing inputs and trainings to farmers is also of importance and an alternative way of availing extension to farmers. Producer organizations have a major role to play in marketing of farmer‘s outputs as they avail other services to farmers as well as giving the smallholder farmers a bargaining power in marketing their produce. Yet still challenges exist for these organizations which face high transaction costs and a low bargaining power in product market. Thus they need support in-order to be able to overcome these challenges. These organizations have also given smallholder farmers avenues to air their voices in policy forums where issues that affect th eir survival are being discussed.

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