RESEARCH ARTICLE

ASSESSMENT OF THE STRUCTURE AND PERFORMANCE OF THE MILK MARKET IN WESTERN KENYA

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ARTICLE INFO	ABSTRACT
	This study sought to assess the structure and performance of the milk market in Western Kenya. Quantitative data was collected from 385 milk consumers in four counties, while qualitative data was obtained from officials of selected cooperatives, Ministry of livestock and Kenya Dairy Board. Frequencies, percentages, means, correlation and chi square tests were used to analyze data. The findings of this study revealed that farmers and traveling traders supplied 58% of total milk traded, with 70% of the milk passing through the informal channel. Problems associated with milk suppliers included adulteration with water (65.5%), addition of chemicals (18%) and physical dirt (13.5%). There was a significant correlation between channel and contamination of milk ($p<0.05$). The region's milk deficit was 177million litres/year, with demand estimated to be 392 million litres against a production of 215 million litres. The main milk markets included households, hotels, institutions who bought raw milk at USD 0.70 per litre while cooperatives bought at between USD 0.37 and USD 0.65. Consumers surveyed preferred quality (56%), price (27%), quantity (9%), packaging (5%) and reliability (3%) as attributes influencing choice of milk supplier. Based on these findings, milk marketing strategy in the region should prioritize quality and pricing. Though households, hotels and institutions offered good prices, they were unsustainable, scattered and unable to absorb increased volumes in an upgrading strategy designed to increase milk production. It is recommended that cooperatives, though comparatively buy milk at lower price, are the better option.

INTRODUCTION

Transformation of Kenya's smallholder agriculture from subsistence to market orientation is the focus of key policy documents which include Vision 2030 (GOK, 2007), the Agricultural Sector Development Strategy (GoK, 2010) and the National Agribusiness Strategy (GoK, 2012). In the dairy sector, the National Dairy Master Plan (GoK, 2010) has been developed to provide specific framework for dairy agribusiness. All these initiatives are intended to put markets at the centre of production, processing, product development and packaging. Milk marketing in Kenya is dominated by the informal chain which controls about 80% of marketed milk (Omore *et al*., 1999; Muriuki, 2003). Total annual milk production is estimated at 4.5 billion litres, and is mainly produced in the milk sheds of Rift valley and Central Kenya regions. Milk price in these regions is about KES 27-33 per litre and during glut season, there is lack of market leading to wastages or spoilage. In contrast, Western Kenya experiences frequent milk shortages and several studies indicate it is a milk deficit area, with high milk prices but dairy farmers in the area not responding to this attractive market by increasing

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production (Mudavadi *et al*., 2001; Waithaka *et al*., 2002; Wambugu *et al*., 2011). However, little is known about the milk market in Western Kenya, particularly its structure and performance. End market analysis is known to be important in accessing markets since it helps to determine consumer requirements, market characteristics and inform decision making by different stakeholders on participating in a particular market (USAID, 2008). The objective of this study therefore was to assess the milk market in the counties of Busia, Bungoma, Kakamega and Vihiga in Western Kenya in order to identify new ways to upgrade the milk value chain in the region.

MATERIALS AND METHODS

Study area

The study was carried out in Busia, Bungoma, Kakamega and Vihiga counties of Western Kenya. The area lies on the Equator between latitude 0.03^0N to 1^0N and 34^0 E to 35.30^0E longitude. It borders Trans Nzoia, Uasin Gishu counties to the North, Nandi county to the East, Kisumu, Siaya counties to the South, and Uganda to the West. The region has a total population of 4.3 million people and 904 000 households (GOK, 2009). The area has an estimated 99000 smallholder

dairy farmers keeping improved dairy cattle and produces about 215 Million litres of milk and is a deficit region (Waithaka *et al*, 2002; Wambugu *et al*, 2011).

Data collection

Both qualitative and quantitative data was collected using a semi structured questionnaire administered by trained enumerators to 385 milk consumers randomly selected in Busia (72), Vihiga (72), Bungoma (120) and Kakamega (121) through proportional sampling technique. Out of 385 respondents, 253 (65%) comprised households, 107 (25%) hotels and 25 (5%) institutions (universities, schools, hospitals). The questionnaire sought information on sources of milk supply; marketing channels; consumer requirements in terms of: products, quantity, quality, price, reliability, packaging; market coordination, consumer preferences, consumption trends, and SWOT (Strengths, Weaknesses, Opportunities and Threats) of the market. Additional data was collected through visits, informal interviews and secondary data obtained from officials of selected dairy cooperatives, Ministry of livestock and Kenya Dairy Board to establish the general context of the milk market including drivers and trends.

Data analysis

Data was entered in SPSS version 19 (IBM, 2010) and, frequency counts, percentages and means were calculated to produce tables and bar charts, while correlations and chi square tests were done to establish differences observed in some attributes (Mugenda and Mugenda, 2003; Kothari, 2008). To make choices on markets, USAID End market research tool kit (USAID, 2008) was used in prioritization and ranking.

RESULTS AND DISCUSSION

Structure: Suppliers and channels

The findings of this study showed that farmers and traveling traders are the main suppliers of milk in the region accounting for about 58% of total milk traded (Fig 1). Considering that cooperatives and milk bars together account for 12%, the informal channel which deals in raw milk controls over 70% of marketed milk in the region. These results are consistent with several studies done in the country and in Eastern Africa indicating the dominance of the informal channel in milk trade (FAO, 2011; National dairy Master Plan, 2010; Omore *et al.*, 2000). According to the officials of ministry of livestock development and Kenya dairy board interviewed, the milk market in the region is largely unorganized due to its informal nature. This in itself is a point of weakness as it affects quality. Lack of coordination and governance structures has been reported by Ruben *et al.* (2007) as a key issue affecting performance of tropical food chains, especially quality management.

Performance: Quantity and price

The results obtained showed 53% of milk marketed comes from outside the region with acute shortages of milk experienced for a period of three to four months between December and March. About 92% of respondents surveyed reported experiencing low milk supply.
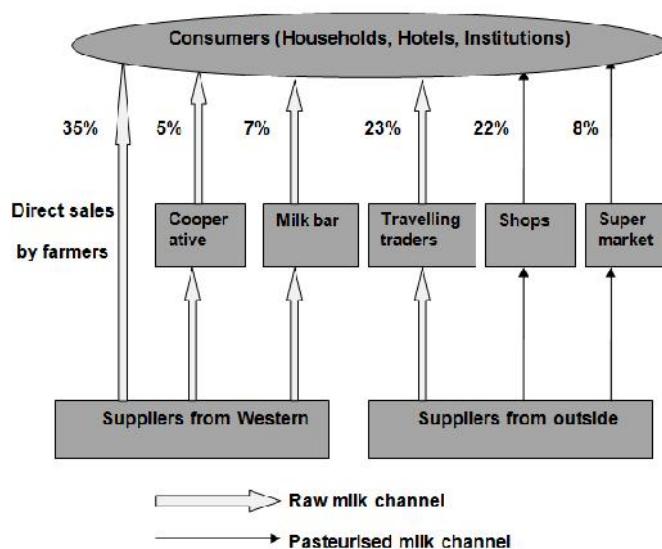

Fig. 1. Milk marketing channels in Western Kenya

Source: Compiled from survey data, 2013

This implies that the counties of Busia, Bungoma, Vihiga and Kakamega are predominantly milk deficient. This result is consistent with Waithaka *et al* (2002) who reported similar results a decade ago. The milk deficit problem if not addressed could be more serious since with increasing population and urbanization demand is likely to grow considerably. In Western Kenya Consumers buy 1 litre of raw milk at KES 60 (Table 1) whereas milk cooperatives pay between KES 30 and KES 55 per litre of milk delivered by farmers (Table 3). In Central Kenya the same quantity is sold at KES 35, while Cooperatives and major processors buy raw milk at between KES 27-33 (Muriuki 2003). Globally, 1 litre of raw milk is sold at between KES 30- 33 in the European Union, KES 29 in both USA and South Africa (MPO, 2010). The finding that insufficiency of milk has been persistent in a region that offers the highest raw milk price in the country warrants further investigation to find out why farmers are not responding to favorable market signals by increasing production.

Table 1. Quantities of milk (litres) purchased by consumers on daily basis in the study area

Consumer	Respondents	Min. (l)	Max. (l)	Mean	Price/litre KES
Households	253	0.25	5	1.0	60
Hotels	107	0.5	100	10	60
Institutions	25	2	115	23	55

Source: Compiled from field data

Quality of marketed milk

Problems associated with milk suppliers as perceived by consumers shown in Table 2 included adulteration with water (65.5%), addition of chemicals (18%) and physical dirt (13.5%). There was a significant correlation between channel and contamination of milk (p<0.05). Direct sales from farmer to consumer and farmer- trader-consumer channels had the greatest addition of water, dirty milk and perceived chemical contamination. This is due to the fact that these channels have no quality checks. A small proportion of respondents felt that

Table 2. Problems associated with milk suppliers as perceived by consumers

	Source of milk							
Problem	Farmer	Travelling trader	Dairy Cooperative	Milk bar	Supermarket	Shop	Respondents	Frequency (%)
Adulteration	79	55	12	15	5	48	214	65.5
Physical dirt	22	11	2	2	2	5	44	13.5
Addition of chemicals	8	17	2	5	11	15	58	18
Milk turns sour	0	1	0	0	3	2	6	6
Milk clots on boiling	0	0	0	0	3	0	3	3
							N = 325	100 %

Source: Compiled from field data

pasteurized milk purchased from shops and supermarkets also had high frequency of chemical contamination. This finding was confirmed by the dairy board officials through our interviews who attributed the situation to informal marketing as well as limited certification of all market actors due to inadequate staff. The problem with adulteration is that it cheats the consumer by increasing the volume. Together with physical dirt and addition of chemicals, ostensibly to preserve milk over long distances, the risk to public health through bacterial contamination and drug residues is real. Thus low quality milk and safety concerns are major problems in Western Kenya milk market. A study by Omore *et al.* (2001) through the smallholder dairy Project (SDP), identified similar critical control points along the dairy value chain which to date have not been adequately addressed through policy and quality surveillance system.

Consumer preference

The findings of this study revealed the majority of consumers (Households, Hotels and institutions prefer fresh unpasteurized milk (63%) compared to fresh pasteurized (25%) and UHT (12%) milk (Fig 2a). This result was significant at $p<0.05$. Previous study by Ouma *et al.* (2000) reported consumer preference for raw milk traded through informal channel than other dairy products. There was also a significant difference between consumers and preferred attribute ($P<0.05$) since out of the respondents surveyed (N=385), 56% prefer quality, 27% price, 9% quantity, 5% packaging while 3% would go for reliability as preferred attribute influencing choice of milk supplier (Fig 2b). The implication of this result is that a milk marketing strategy in the region should prioritize quality and pricing.

Status of dairy cooperatives

The study found out that only 9% capacity of the region's milk coolers were utilized. Out of total of 23000 litres capacity, cooperatives received only 2100 litres of milk on daily basis delivered by farmers (Table 3). In addition, our visits and informal interviews established that coolers in all cooperatives surveyed were either grossly underutilized, broken down and had power supply disconnected due to inability to pay bills. Despite the huge idle capacity, more coolers were still being supplied in the region by development agencies. We argue that in a milk deficit region such as Western Kenya, the investment policy and priority is to target and focus on increasing volumes and capacity building of both farmers and cooperatives on management / agribusiness skills rather than expansion of more storage facilities. The study also revealed that cooperatives buy milk from farmers at between KES 30 to KES 55, which as already mentioned, is the highest price offered by cooperatives in the country, yet unlike their counter parts in Central Kenya

who are paid much lower price, farmers in Western are not responding positively to this attractive milk market. Constraints facing cooperatives were identified as:
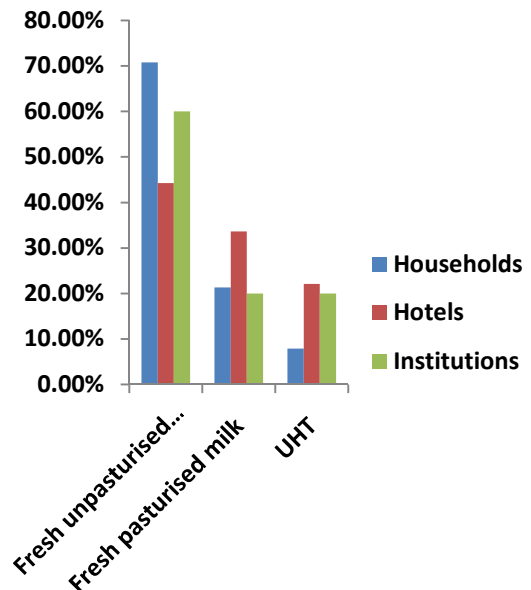

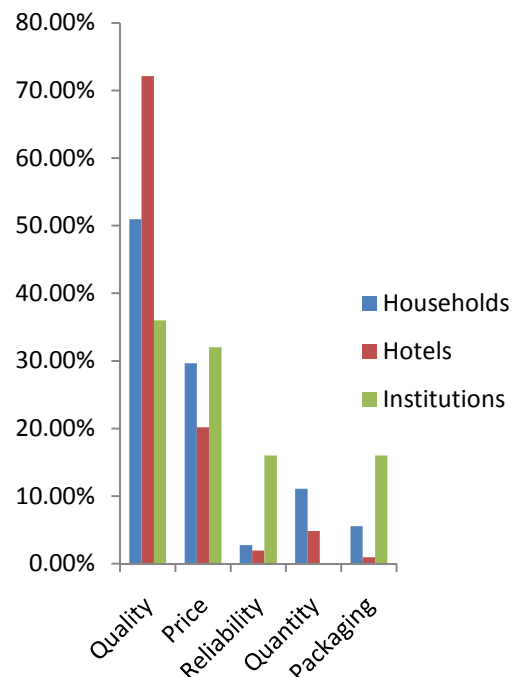**Fig. 2a. Preferences for milk products among consumers (P<0.05)**

Fig. 2b. Preferred attribute for milk supplier

low milk supply, farmer apathy, delayed or defaulted payments, mismanagement, low technical, financial and business skills, competition from other buyers and high operational costs. Similar results have been reported in Kenya by Limo *et al.* (2011) and Ortmann and King (2007) on South African Cooperatives. To be efficient and remain relevant and competitive in this post liberalization era, cooperatives indeed must upgrade from horizontal to vertical coordination through embracing modern functions. Bijman (2007) suggests that such modern functions include quality guarantees, enhancing logistics, information exchange, process and product innovation. To what extent milk cooperatives in Kenya are prepared to play this new role in the value chain is a subject of further research.

Making choices on markets

This study identified four main milk markets/ buyers which included households, hotels, institutions and cooperatives. Using the USAID end market analysis tool kit (2008), from the variables indicated in Table 5, though households and hotels offer good prices, these markets are unsustainable, scattered and unable to absorb increased volumes in an upgrading strategy designed to increase milk production since the study revealed that the mean volume bought by households, hotels and institutions were 1 litre, 5 litres and 23 litres respectively. We argue that cooperatives, though unpopular and comparatively buy milk at lower price in the region are the better option.

Table 3. Status of dairy cooperatives in the study area

	Busia	Bungoma		Kakamega		Vihiga	
Parameter	Nambale	Kitinda	Naitiri	Butere	Kwitsero	Hamisi	Overall
Registered suppliers	210	9000	1300	305	270	31	11116
Active suppliers	101	50	300	215	200	9	875
Capacity of cooler(l)	2500	10000	5000	1000	2500	2500	23500
Quantity received /day (lit)	350	250	800	400	250	20	2070
Buying Price KES /lit	55	40	30	46	45	45	43.50
Mode of payment	Fortnight	Cash	Monthly	Weekly	monthly	weekly	
Quality test used	Alcohol	Alcohol	Lactometer	Lactometer	Alcohol	Lactometer	
Problem with milk	Adulteration	Clotting	Chemicals	Clotting	Clotting	Clotting	
Main constraint faced	Lack collection centres	Low milk supply	Low management skills	Low financial capital	Low financial capital	Mismanagem ent	

Source: Compiled from field data

SWOT of milk market

The results of the SWOT analysis of the milk market are shown in Table 4. The findings of this study show that the main strengths of the Western Kenya milk market is the availability of coolers which at the moment are not being fully utilized by local farmers to take advantage of prevailing opportunities of high milk prices, unmet demand and growing population. The biggest weakness was found to be inadequate milk supply. With a population of 4.3 million people (GOK, 2009), using FAO recommendations for milk consumption of 0.25 litres/person per day, the demand for milk in the region is about 392 million litres per annum against a production of 215 million litres/annum. Therefore the region's milk deficit is about 177 million litres per annum. From this study, 53% of milk comes from outside, which translates to 94 million litres. The low quality milk is another weakness and in addition to idle capacity, if not urgently addressed could not only expose the market to threat of competition from milk that comes from outside the region but also lead to total collapse of key market institutions such as farmer cooperatives.

Table 4. SWOT of milk market in Western Kenya

Strengths	Opportunities
Good accessibility	High milk price
Milk coolers available	Growing demand
	Urbanization
Weaknesses	Threats
Inadequate milk supply	Competition from outside suppliers
Low milk quality	Safety concerns due to milk contamination
Underutilized milk coolers	
Un organized milk market	
Absence of milk processing plant in the region	

Source: Compiled from field data

Table 5. Prioritization and ranking of milk markets

Parameter	Households	Hotels	Institutions	Cooperative
Quality	1	2	3	4
Quantity	1	2	3	4
Price	4	4	3	1
Reliability	2	2	3	4
Packaging	1	1	3	1
Availability of organized structure	1	1	3	4
Total weights	10	12	18	18
Rank	3	2	1	1
Advantages	Good price	Good price	Contractual	Huge capacity, contractual
Disadvantages	Unreliable, very low volumes	Volumes limited	Few and scattered	Low buying price, mismanagement

Legend Weights: 1= very low, 2= low, 3= average, 4= good

Conclusion and Recommendation

The findings of this study show that the milk market in Western Kenya offers the highest raw milk price/litre in the country at K shs 60. The market is growing and has a demand of 392 million litres/year while the deficit is 177 milion litres/year. Farmers and traveling traders supply about 58% of total milk traded, with 70% of the milk passing through the informal channel. Problems associated with milk suppliers as perceived by consumers included adulteration with water (65.5%), addition of chemicals (18%) and physical dirt (13.5%). There was a significant correlation between channel and milk contamination ($p<0.05$. The main milk markets and buyers included households, hotels, institutions and cooperatives. Consumers preferred quality (56%), price (27%), quantity (9%), packaging (5%) and reliability (3%) as attributes influencing choice of milk supplier. Based on these findings, marketing strategy in the region should prioritize

quality and pricing. Though households, hotels and institutions offered good prices, they were unsustainable, scattered and unable to absorb increased volumes in an upgrading strategy designed to increase milk production. It is recommended that cooperatives, though comparatively buy milk at lower price, are the better option. However, the multiple challenges facing dairy cooperatives must first be addressed to prepare them for leadership in the milk value chain.

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