Milk Handling in the Supply Chains: The Case Of Smallholder Retail Outlets In Nakuru, Kenya

Authors:

[1]Birachi E.Abucheli[1], Owuor George[2]., and Hanf. C.H[1].

1. Dept. of Agricultural Economics and Agribusiness, University of Kiel, Germany.

E-mail: eabirachi@hotmail.com

2. ***Presenting and correspondence Author*** , Dept. of Agricultural Economics and Agribusiness, Egerton University, Kenya., ***E-mail: gowuor2001@yahoo.com***

Contributed ***Poster*** prepared for presentation at the International Association of Agricultural Economists Conference, Gold Coast, Australia, August 12-18, 2006

Abstract

This paper characterises smallholder milk outlets in Nakuru district one of the major milk producing Districts in Kenya, and also analyses factors that influence their current operating and handling capacities. Data comes from four divisions of the district. A sample of 137 smallholder milk retail outlets was made using systematic random sampling methodology. Both descriptive and ordinary regression methods were used in the analysis. A characterisation of the retail outlets is brought out and the factors that affect their current operating capacities presented. Results show that a unit change in education, experience and selling prices leads to 0.29, 0.18 and 0.23 significant changes in milk handling capacities by the retail outlets respectively. These imply that there is an efficiency gain from education and better prices through higher consumer incomes in the industry. Enhancement of milk retailers' value addition through provision of physical facilities such as cooling equipment and stability in prices should be encouraged through policy intervention to promote informal sector investments in the sub-sector.

Key words: Milk supply chain, smallholder retail outlets, Kenya

1.0 Introduction

The milk supply chain includes activities and processes from production, processing, trading and consumption. The milk supply chain can be categorized into the cold chain and the warm chain. Milk delivered to the main processing firms constitute the 'cold chain' while milk delivered and used in raw form can be said to constitute the 'warm

chain'. The supply chains consist of a number of partners and therefore the management of relations in the chains is of paramount importance.

The Kenyan dairy industry is characterized by smallholder production, constituting up to 80% of the total milk produced and marketed in the country. Most of the milk (84%) is cow milk; the rest comes from sheep, goats and camels (Ngigi, et al 2000). The total number of livestock in Kenya is estimated at 10 million heads. There are over 3.2 million dairy cows (pure/cross-bred) in the country (Onyango et al, 2003). Dairy cattle contribute 60% of the total milk in the country while indigenous animals contribute the remaining 40%. The main breeds are the Friesians, Ayshire, Guernsey, Jerseys and the cross-breeds.

The Kenyan dairy industry has undergone tremendous changes since the colonial period (Ngigi, 2003). The pre-liberalization period was characterized by increased participation of smallholder producers due to reduced costs of transacting and improved services. It was also characterized by heavy government controls and protectionism. It was also characterised by a single processor sanctioned by the government, which was however not able to efficiently utilize its capacity, to control costs and to effectively market its products on behalf of farmers. Furthermore the regulatory mechanism through the Kenya Dairy Board (KDB) was found to be inadequate.

Reforms in the dairy industry started in 1987 when the government started divesting away from breeding services, clinical services, sale of feeds, dip management and finally marketing of milk in 1992 ((Ngigi, 2003). In this period, the number of private firms and individuals operating in the industry at the various stages of the supply chain increased.

The typical milk supply chain in Kenya can be said to constitute feed and chemical suppliers, the milk producers, milk bulking and other agents (e.g. Cooperatives), processors, distributors (retail outlets) and finally the consumers.

Participants in the milk industry can be categorized as formal and informal chain participants. Those handling non processed milk products are categorized as informal participants (Ngigi 2003, Onyango et al 2003). They include hawkers (Itinerant traders), brokers (commission based), and self help groups. The formal chain participants are the milk processors, cooperatives including retail outlets among others that handle processed milk products.

A major feature in the current market is the emergence of the informal milk outlets and distribution in the urban areas. Sale of unprocessed milk in urban areas is illegal but is allowed in the rural areas. However Ngigi (2003) notes that unprocessed milk has always been sold in urban areas even before liberalization. Informal milk sales account for up to 80% of the milk supplied and consumed in the urban and peri-urban areas.

A configuration of the supply chains shows that 42% of the milk is often sold directly to customers by the milk farmers. On the other hand 32% of the milk is sold informal market participants who also buy 6% from cooperatives to bring the total milk handled by them to 38%. 24% of the milk is sold through cooperatives and of this milk, 12% is delivered to processors and 6% sold directly to consumers. Only 14% of the farmers' milk is handled by the processing firms (Staal 2004b). Milk can be collected by brokers (for a commission), cooperatives, self-help groups, or processors. Some 332 dairy cooperatives are registered in Kenya and handle up to 24% of the total milk marketed by smallholder farmers (Staal 2004a).

Informal channels pay on time and at a higher price; but as farmers increase their production levels, the informal distributors can absorb only limited quantities. Thus for the long term development of the dairy industry, the formal market has an important role to play (Ngigi, 2003 , and Staal 2004b, Launonen et al, 1985).

Of the total milk produced in Kenya in the year 2000, 63% was marketed; about 30% was consumed at home, 7% fed to calves. Though production is currently higher than demand, the increasing population coupled with an improvement in the economic condition may put pressure on the supplies in a few years time (Omore, et al 1999). About 80% of processed products are sold in Nairobi and Mombasa and other urban areas. Milk shows high income elasticity, which provides potential for the growth of the industry especially with improving economic conditions and incomes (Karanja, 2003, Onyango et al, 2003).

The types and numbers of licensed milk traders in Kenya as of 1999 are given as 1552 (KDB 1999). However, most producers and informal outlets are not registered hence their numbers cannot be accurately ascertained. In addition there are supermarkets, whose role is increasingly becoming significant in handling milk in the formal supply chains.

Karanja (2003) observes that whereas consumer prices have increased for the last 15 years, producer prices have been decreasing resulting in welfare losses. He also identifies the cost of packaging material, together with cooling and pasteurizing as constituting the largest portion of the cost. However, transportation costs have been found to be quite minimal relative to the consumer prices.

The relations between smallholder retail outlets and the market have been studied from policy perspective. An analysis of the milk supply chain especially for the small-scale outlets is necessary to enhance their role in income generation and employment for Kenya. As a step in this direction it is necessary to identify the characteristics of those participating in the milk retail outlets. It is also necessary to identify what factors influence their operating levels and their effect on the handling levels. This will help in addressing efficiency issues in the dairy enterprises.

2. Research methods

Data was collected from the four divisions of Nakuru district consisting of Nakuru Municipality, Rongai, Molo and Bahati divisions between April and August 2005. A total sample of 137 outlets was surveyed using systematic random sampling. Most of the retail outlets are located in market centres, urban centres and along major roads. Data was analyzed using ordinary least squares regression method. The main relation investigated was as follows:

Handling capacity (C) = (enterprise experience, level of education, milk selling price, milk purchase price, gender, distance from milk supplier, distance to consumer, average stocking time).

Handling capacity was measured by the quantity of milk currently handled in litres per day. Enterprise experience was captured by the number of years in the same business and the level of education by the number of schooling years of the operator. Milk prices are the prices paid for the milk and received by the outlets per litre of milk. Gender was captured by dummy variables, 1 for males and 2 for females. Distances were measured by

the number of kilometres from the outlet to the buyer while average stocking time measured the average time it takes to normally exhaust the stocks of the milk and milk products in hours.

3. Results

3.1 Characteristics of milk retail outlets

The main retail outlets identified were kiosks, milk bars and milk dairies and mobile traders that constituted 42%, 50% and 8% of the retail outlets respectively. Over 40% of the kiosks had an average business experience of at least one year and 4 months. On the other hand, milk bars and dairies had an average experience of about 3 years with at least 63% of them reporting an experience of at least one year. Mobile traders had the highest experience in business of about 3 years and 8 months with at least 80 % reporting an experience of at least one year.

Regarding educational levels, kiosks owners and mobile traders had more or less the same educational levels of about 8 years while dairy owners had a higher educational level of about 10-11years or more. Noteworthy is that all mobile traders report at least having attended formal education compared to 98% for dairies and kiosks respectively.

Kiosk owners had the lowest handling capacity followed by mobile traders. Dairy units had more than 3 times handling capacity compared to the kiosks. There was almost no difference between the dairy units and the mobile traders regarding potential operating capacity. However, the current handling capacities appear generally modest with dairy units generally operating at higher capacities than mobile traders. The capacity utilizations are 65% for kiosks, 70% for dairies and 58% for mobile traders.

The prices fetched by the outlets also differ significantly between kiosks and mobile units on the one hand and milk dairies on the other such that the dairies tend to fetch higher prices for their milk than kiosks and mobile units by almost 30%. While dairy units generally pay more for their milk supplies compared to the others, mobile traders pay a slightly higher price for their supplies than kiosks.

Regarding the products handled or traded in, kiosks were found to handle more pasteurized milk than dairy units by almost 75% although the absolute quantities are relatively low averaging slightly more than 2 litres. This may be explained by the fact that kiosks generally sell other products besides milk and processed milk is usually only one of such products. Mobile traders do not handle any pasteurized milk. Kiosks and mobile traders did not also trade in yoghurt while some dairy units handle some yoghurt business (about 9%). However, all outlets handle fresh farm milk, constituting 89% of kiosks, 97% of dairy units and 100% of the mobile traders. Mala (fermented milk) is scantily handled by kiosks and milk bars with mobile units having none at all.

Over 98% of the kiosks are able to clear the milk stocks within four hours on average, dairy units within four and half hours for 95% of them and within 2 and half hours for the mobile traders. The average stock time may be related to the availability of storage facilities and the urgency to sell the milk before it goes bad.

3.2 Factors influencing milk handling capacity

Model results show that a unit change in education, experience and selling prices leads to 0.29, 0.18 and 0.23 significant changes in milk handling capacities by the retail outlets respectively Table 1.

Table 1 Factors Influencing Milk Retail Outlets' Milk Handling Capacity (Ordinary Least Squares)

Dependent Variable: Daily Handling capacity in litres

Variable	Coefficient
Intercept	
Experience in business (Years)	0.18***
Educational level (Years)	0.29***
Gender 1=male 2=female	-0.12
selling price (Ksh)	0.23***
Purchase price (Ksh)	0.04
distance from supplier (Km)	-0.01
distance to consumer (Km)	0.10
average stock time (Hours)	0.03
F-Value	5.05****
R^2	0.49
N	137

*** = Significant at 0.01 significance level

These imply that there is efficiency gain from education and better prices through higher consumer incomes in the industry.

The significance of education (as measured in years of formal schooling) reflects the role of education in better decision making, better market research skills and better utilization of available facilities for higher quality. The operators are likely to gain from a long term trade relations and better terms and knowledge of customers. This is confirmed by the dairy unit and mobile traders' highest experience in business compared to the

kiosk operators, and the overall significance of experience. Results on selling price reflects role of price on profitability through cost reduction. The more favourable the selling price the more the products are likely to be stocked by the operator. This can be explained by the fact that the differences in milk purchase prices by the outlets are insignificant while the selling prices are significantly different. The selling prices differed by as much as 30% among the outlets. Selling prices therefore play a bigger role in determining whether an outlet operates at a higher or lower capacity.

4. Conclusions and Recommendations

Three major types of milk retail outlets; kiosks, milk bars/dairy units and mobile traders were established to dominate the sub-sector. Milk bars/dairy units constituted over 50% of the outlets, kiosks about 42% and the remainder being the mobile traders.

The study also shows that most of the outlets are not operating near their full capacities (ranging between 50% and 75%). The major product is fresh or raw unprocessed milk. The outlets stock on average two milk products only, thus poorly diversified in the brands, a reflection high consumer preference for raw milk.

Model results on the other hand shows that there is an efficiency gain from education and better prices through higher consumer incomes in the industry. A unit change in education, experience and selling prices leads to 0.29, 0.18 and 0.23 significant changes in milk handling capacities by the retail outlets respectively. Enhancement of milk retailers' value addition through provision of physical facilities such as cooling equipment and stability in prices should be encouraged through policy intervention to

promote informal sector investments in the sub-sector. This is important for the growth of the smallholder enterprises in the milk industry.

Besides, a policy framework to encourage more investments through concessionary credit facilities and licensing is required to encourage value addition through acquisition of cooling facilities to help in higher handling capacities and a ability to add more product lines.

References

Karanja, A.M., 2003. The dairy industry in Kenya: The post liberalization agenda. Tegemeo Institute Working Papers.

Launonen, R., Karinpää, A., Marangu, L., and Minae, S., 1985. Rural dairy development in Meru. Report 8/1985.B. Institute of Development Studies, University of Helsinki. Finland

Ngigi, M., C. Delgado, S.J. Staal, and S. Mbogoh, 2000. Role of market outlet in determining terms for milk sales by smallholders in Kenya. Paper presented at the symposium on expanding market participation in the developing world, Annual meetings of the American Agricultural Economics Association, July 31 – August 3 2000, Tampa, Florida.

Omore, A., Muriuki, H., Kenyanjui, M., Owango, M., and Staal, S., 1999. The Kenyan Dairy Sub-sector: A rapid appraisal. Smallholder Ministry of Agriculture/Kenya Agricultural Research Institute/ International Livestock Research Institute.

Onyango, H.O, G.A. Kodhek, J. Omiti and J.K. Nyoro, 2003. Revitalizing agricultural productivity in Kenya, in restarting and sustaining economic growth and development in Africa. The case of Kenya. contemporary perspectives on developing societies, Ed Kimenyi, S.M, J.M. Mbaku and N. Mwaniki. Ashgate Publishing ltd.

Staal, S.J. 2004a. Competitiveness of the smallholder dairy enterprises in Kenya. The Smallholder Dairy Project, Nairobi.

Staal, S.J. 2004b. The demand for dairy products in Kenya. The Smallholder Dairy Project, Nairobi.