

**MSSD DISCUSSION PAPER NO. 9**

**SMALLHOLDER DAIRYING UNDER TRANSACTIONS COSTS  
IN EAST AFRICA**

**by**

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**December 1996**

An earlier version of this paper was presented at the "Symposium on Markets in Sub-Saharan Africa" Stanford University, California, March 29-31, 1996. A subsequent draft has benefitted tremendously from the insightful comments of Marcel Fafchamps, Barbara Grosh, Bruce Johnston and William Steel. Remaining errors are the responsibility of the authors.

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## ABSTRACT

It is argued that dairying is vital to future viability of many small farms in East Africa and that high transactions costs for dairy production and marketing limit participation by asset- and information-poor smallholders. Case studies from Kenya and Ethiopia illustrate the role of dairy cooperatives in reducing transactions costs. Analysis of the determinants of producer prices received by a sample of dairy producers near Addis Ababa suggests that different levels of access to infrastructure, assets, and information explain why different households contemporaneously accept widely different producer prices for fluid milk.

## I. INTRODUCTION

As in the rest of the developing world, increased domestic dairy production by smallholders has the potential in much of Africa to generate income and employment on a wide scale, and thus to improve the welfare of populations on an economically sustainable basis (Walshe *et al.*, 1991, Winrock International, 1992). In peri-urban areas around the world where cattle are present, dairy typically has been part of the adjustment of production patterns when smallholder farmers have been faced with shrinking arable land, higher population density, and rising wage rates. Under such conditions, dairy farming may be one of the few agricultural activities that can provide enough income to maintain the economic viability of smallholder farming.

In Sub-Saharan Africa, smallholder agriculture still accounts for the majority of livelihoods, yet has been subjected in recent years to increasing strains as a viable source of income generation. Nevertheless, it is striking that smallholder peri-urban dairy development has not been widespread in Sub-Saharan Africa outside of the East African highlands, particularly given the importance of livestock in African farming systems.

This paper will attempt to apply insights from the New Institutional Economics to investigate a key issue of public policy for African countries, which are searching for ways to promote the inclusion of large numbers of smallholder farmers in the benefits offered by structural adjustment policies, even as they bear the costs of adjustment out of previously subsidized activities that are no long viable at the farm level. The paper will first argue that in peri-urban areas of Africa (150 km or less from the capital city) where cattle already are kept, dairy offers high potential as a smallholder diversification activity. In such areas, dairy is technically feasible, yet typically not widespread, and recent and on-going structural changes are improving its profitability.

Second, the paper hypothesizes that growth in smallholder dairying is limited by especially high transactions costs for both production and marketing of dairy products by smallholder farmers in Africa. Understanding the nature of these constraints and how they can be alleviated is central to using dairy development as a tool to improve rural livelihoods in peri-urban areas. In African economies that are only partly commercialized, smallholder farmers are likely to face higher transactions costs than larger producers. These may result from inadequate access to market information, for example, needed to enter into new activities that structural change has rendered profitable on paper. Transactions costs thus help explain why aggregate agricultural supply response to relative price changes is often quite slow in Africa (de Janvry and Sadoulet, 1992; Delgado, 1995).

Third, the paper hypothesizes that differential levels of transactions costs across producers in what appears on the surface to be a single "market" (i.e fluid milk in Addis Ababa at time  $t$ ) explains why producers habitually accept widely

different prices for a seemingly homogenous good in the same location and time period. A variety of market outlets for milk exist, different producers supply different outlets, and some producers supply several different ones simultaneously at different prices.

Fourth, the paper argues that producer-level institutions such as cooperatives and contracts with buyers play a central role in reducing transactions costs where market dairy activity is observed. Indigenous institutions and organizations<sup>1</sup> typically have evolved to reduce the costs of transactions among agents in the dairy marketing chain. It is vital to better document the nature of these institutions and organizations, and to study if alternatives need to be encouraged to promote dairy development.

These assertions will be investigated in case studies for Kenya and Ethiopia, where smallholder dairy is much more prevalent than in the rest of Africa. The highland climate in Kenya and Ethiopia is relatively favorable to grade dairy cattle crossed with indigenous stock. This in part explains the development of dairy in general and smallholder dairying in particular in those zones. However, the role of institutional and other policy factors in supporting smallholder livestock development in Kenya has been key, and the role of economic liberalization is currently affecting that development in both Kenya and Ethiopia.

## **II. A NEW ERA FOR DAIRY IN AFRICA?**

Dairy production added roughly \$2 billion to Africa's GDP at the end of the 1980's, and probably more at today's much higher world prices (Walshe *et al.*, 1991). More than 7 million metric tons of milk were produced annually in the late 1980's (Table 1) in Sub-Saharan Africa alone, excluding South Africa. Per capita consumption of dairy products has been estimated at 27 kg per year (Table 1).

The well-known bias in trade and macroeconomic policies against agriculture in Africa in the second half of the 1970's and the first half of the

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<sup>1</sup> For our purposes, institutions are defined as the rules and expectations governing exchanges, and organizations are defined as formal or informal groupings of economic agents.

Table 1: Selected Characteristics of the Dairy Sector in Sub-Saharan Africa.

Region	Milking Cows (000)	Total Cow's Milk Production (000 MT)	Production per capita (kg all dairy products <sup>a</sup> )		Imports per capita <sup>b</sup> (kg)	
	1988	1988	1970	1987	1970	1987
Eastern	14,468	4,959	59.1	53.8	1.2	2.3
Kenya	2,255	1,015		50.3		0.2
Ethiopia	3,875	815		21.9		1.7
Tanzania	2,800	378		20.5		0.9
Uganda	1,080	448		22.4		1.0
Western	4,496	1,071	14.3	8.1	3.7	5.1
Nigeria	1,220	360		3.5		1.9
Southern <sup>c</sup>	1,669	720	20.0	13.0	5.0	6.2
Zimbabwe	143	225		24.9		0.5
Central	669	311	7.1	4.8	2.0	4.4
Angola	295	148		16.1		14.9
Total	21,302	7,061	27.0	22.2	2.8	4.3

<sup>a</sup>Includes cow, sheep, and goat milk.

<sup>b</sup>Based on liquid milk equivalents.

<sup>c</sup>Excludes South Africa.

Sources: Walshe, et al. (1991) and ILCA (1993), various tables, using FAO data.

1980's was continued for livestock products well into the 1990's, particularly in West Africa (Williams, 1993). This occurred despite meaningful policy reforms in the second half of the 1980's affecting agricultural incentives as a whole. This differential effect for livestock products was due in no small part to the availability of heavily subsidized low grade frozen meat, milk powder and butter oil from developed countries. Besides the usual impediments to internal agricultural trade in sub-Saharan Africa (such as official and unofficial taxation), small-scale peri-urban dairy producers also have had to contend with poor infrastructure for handling perishable produce, and parastatal milk collection systems which passed on much of their excessive costs to producers, or used their market power to squeeze producer profits (Staal and Shapiro, 1994).

The economic and political environment for growth in many countries of sub-Saharan Africa has changed dramatically since the mid-1980s. Modifications to domestic and external policies are likely to have improved the incentives for domestic agricultural production in general, and dairy production in particular. Structural adjustment programs have wrought changes in agricultural sector, trade, and exchange-rate policies. These economic changes have improved the financial profitability of the peri-urban dairy production systems in some countries, such as Kenya (Staal, 1995; Staal and Shapiro, 1994; Williams, 1993), although this remains to be established in others. Domestic resource cost (DRC) analysis in Kenya, for example, shows that Kenya holds a strong comparative advantage in dairying with respect to world markets (Staal 1995).

Countries of the North have become more sensitive to the impact of their surplus management policies on the poorer countries of the South. International trade liberalization, such as reform of the European Union's Common Agricultural Policy (CAP) and the GATT agreement, changes in US dairy policy, and the reduction of subsidies on dairy exports from Western Europe, are all expected to reduce world milk surpluses. Further, these reductions have not been offset by a flood of exports once expected from the liberalization of the former CIS and Eastern European economies. Policies in Europe and the U.S. were largely responsible for the world price of skim-milk powder falling to \$600/metric ton in 1985, rising to \$2,000 in early 1989, and falling to \$1,300 in 1990 (Nell, 1992). Currently, the price is well above \$2,000 and projections are that world market prices for dairy products will not decline substantially in the near future (FAO, 1994). To the extent that exchange rate reform and trade liberalization allow higher international prices to be expressed domestically, incentives for domestic dairy production are likely to be improving.

Further improvements in incentives for domestic dairy production are also likely in coming years due to rapidly growing and increasingly urban populations. In sub-Saharan Africa, per capita dairy product demand grew about 2 percent per annum over the 1960's and 1970's, then stagnated during the 1980's (Walshe *et al.*, 1991, Winrock International, 1992; Rosegrant, Agacaoili-Sombilla, and Perez 1995). Dairy imports in Sub-Saharan Africa grew from 2.3 kg/capita in 1970 to 4.3



kg./capita in 1987. Higher world market prices and domestic policy reform may enable local dairy producers to lessen the gap between domestic production and consumption.

Dairy production by smallholders in several peri-urban areas of Africa does appear to be growing in response to changes in the economic environment, although response rates appear to vary across regions and types of producers (Brokken and Seyoum, 1992; Shapiro *et al.*, 1995). Smallholders, however, may be having greater difficulty than larger commercial farmers in profiting from the new opportunities. Smallholder dairy production and marketing in Africa appear to have been limited by transactions costs and the inadequacy of the institutions and organizations governing exchanges of raw milk and home-produced dairy products to deal with them.

### **III. TRANSACTIONS COSTS AND SMALLHOLDER RESPONSIVENESS TO THE CHANGING ECONOMIC ENVIRONMENT FOR DAIRY**

The notion that the costs of arranging exchange may reduce or even prevent exchanges from occurring, and may give rise to institutions and organizations to offset their negative impacts, is now widely accepted (Williamson, 1985; Bardhan, 1989; De Janvry, Fafchamps and Sadoulet, 1991; Hoff, Braverman and Stiglitz, 1995; Jaffee, 1995). Transactions costs include, *inter alia*, the costs of searching for a partner with whom to exchange, screening potential trading partners to ascertain their trustworthiness, bargaining with potential trading partners (and, in some cases, officials who can hold up trade) to reach an agreement, transferring the product (this typically involves transportation, processing, packaging, and securing title, if necessary), monitoring the agreement to see that its conditions are fulfilled, and enforcing (or seeking damages for any violation of) the exchange agreement.

#### **A. *Milk as a Commodity Subject to High Transactions Costs***

The nature of milk and its derivatives in part explains the transactions costs associated with exchanges of dairy products. First, raw milk is highly perishable, and thus requires rapid transportation to consumption centers or for processing into less perishable forms. This may limit marketing options for small and remote dairy producers, and implies greater losses due to spoilage than for commodities such as grains. Because milk production typically is a year-round activity, dairy producers often must be concerned with maintaining outlets for their production. The search for stable market outlets by producers is complicated by what is often significant seasonal variation in milk production and dairy product consumption (Jaffee, 1995; Debrah and Anteneh, 1991).

In addition, raw milk is a “bulky” commodity. Raw milk is typically more than 85 percent water, implying relatively high transportation costs per unit, and limiting

the quantities that can be marketed by individual households or groups of them without vehicular transport. In part due to high perishability, but also due to natural variation, milk composition and quality is variable and often not easily ascertained. This implies costs for monitoring milk quality and potential losses by traders, processors, and consumers when milk is spoiled or adulterated. The lack of easily measurable quality standards may also allow agents purchasing raw milk from producers to reject milk without just cause when they have contracted to purchase more milk than can be profitably sold<sup>2</sup>.

Finally, raw milk can be transformed into numerous products, such as butter and cheese, and often this is performed by producer households themselves. Such processing increases the value per kilogram of finished product and lengthens the time before spoilage. This reduces transport and storage costs, even if the returns per kilogram of fresh milk input are lower. On the other hand, price differentials for quality tend to be higher for processed products. Butter and cheese production is in fact typically a reflection of the lack of availability of marketing outlets for raw milk, and a reflection of the high transactions costs of milk marketing.

#### *B. Difficulties in Observation*

Perhaps the limited empirical evidence on the nature and importance of transactions costs for East African dairying is due to a number of conceptual and measurement difficulties. First, when transactions costs are high enough to prevent exchanges from occurring, by definition the costs cannot be observed because no transaction exists. A related issue is that the nature of transactions costs for “observed” transactions is likely to be different than that for “prohibitive” transactions costs. If policy interventions are to be designed to promote entry by producers into certain activities that are not currently undertaken (by lowering the associated transactions costs), observed transactions costs may not provide much of a guide. In addition, observed transactions costs may not provide a full measure of the opportunities for dairy development under alternative institutional or organizational structures. For example, if producers limit milk production in response to market outlet risk, thereby limiting their exposure to such risk, the nature of observed transactions costs due to market outlet risk may be small, but the behavioral implications of market outlet risk for overall production may, in fact, be large.

Costs associated with organizing and enforcing institutions of exchange are inherently difficult to document. Even transactions costs that are, in principle, observable may often be designated as “overhead” in firms maintaining records of such costs. Finally, accurate assessment of observable transactions costs and their behavioral implications implies a significant commitment of resources for data

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<sup>2</sup> There is anecdotal evidence that the parastatal Kenya Cooperative Creameries (KCC), a designated buyer of last resort that has generally lost money in recent years, engages in such practices.

collection. This is due to the need to examine all agents (not just producers) in what are often diverse marketing channels, simultaneously and for a period of time sufficient to capture inter-seasonal variation in costs and marketing decisions. To date, few if any studies have provided detailed empirical evidence on the nature and implications of transactions costs, even for producer households.

The few extant studies dealing empirically with transactions costs have instead attempted to infer the magnitude of transactions costs, based on the observed behavior of participating and non-participating agents in the marketing channels (Goetz, 1992). When detailed data on transactions costs themselves are not available, a reasonable first step is to look for evidence of lack of commercialization, as evidence of "prohibitive" transactions costs. Tell-tale signs are an activity involving significant numbers of producers and for which imports of the product are sold, but for which a low percentage of domestic production is commercialized.<sup>3</sup> For dairying in Africa, the evidence of behavioral implications of transactions costs is clear. Only a small portion of African dairy production is marketed. In Ethiopia, which has significant per capita milk production, only 5 percent of estimated national production was commercialized in the early 1990's (Staal, 1995). In Kenya, the African country with the largest number of smallholder dairy producers selling milk off-farm, estimates of commercialization in 1990 range from 43-48 percent (Table 2 and Jaffee, 1995). Visits to Central Province in Kenya by the authors in early 1996 confirmed that even when producers can sell "morning milk"<sup>4</sup>, the "evening milk"

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<sup>3</sup> This is consistent with the conceptual framework in de Janvry, Fafchamps and Sadoulet (1991), in that the existence of transactions costs stemming from imperfect factor markets makes the production item (milk) non-tradable. Producers are then less responsive to external markets through production of the item. Instead adjustment to relative price changes occurs either in the labor market or linked product markets, such as food.

<sup>4</sup> Many smallholder dairy producers in Kenya milk twice a day. "Morning milk" is from the morning milking, "evening milk" is from the evening milking.



Table 2: Evolution of Selected Characteristics of the Dairy Industry in Kenya, 1979-1990.

	Smallholders and Pastoralists	Medium-scale Farmers	Large-scale Farmers	Total or Average
<hr/>				
Total production (millions of liters)				
1979	769	193	196	1,158
1990 (est)	-----1,577-----		253	1830
Percentage consumed at home or fed to calves				
1979	57	33	8	44
1990 (est)	----- 66 -----		8	57
Percentage sold to KCC (Dairy Parastatal)				
1979	11	25	81	20
1990 (est)	-----25-----		81	33

Sources and caveats: Data for 1979 are from Jaffee (1995) and are from Kenya's Integrated Rural Surveys 1976-1979. Estimates for 1990 are heuristic, and are based on estimates in Republic of Kenya (1993) and anecdotal accounts.

often must be consumed at home or sold at a lower price. Estimates for several other countries in West and Central Africa range from 25 to 40 percent of milk sold off the farm (Metzger et al., 1995).

It seems likely that smallholder farmers consume a higher percentage of their milk production than do larger farmers. This is borne out by the sketchy evidence available for Kenya (Table 2). These stylized facts are consistent with the view that smallholders face higher transactions costs in milk marketing than do larger farmers, but further study would be needed to better document this conclusion.

The magnitude and impacts of transactions costs can also be inferred from the milk marketing behavior of producers of various sizes in differing locations. Debrah and Anteneh (1991) show that larger dairy producers tend to sell relatively more to institutional clients--hotels, restaurants, government--than do small producers (Table 3). Similar results can be observed in coastal Kenya (Staal and Mullins, forthcoming). Selling directly to institutional clients may allow larger producers reduce other transactions costs such as searching, monitoring, bargaining, etc. Debrah and Anteneh (1991) also suggest that--other things equal--proximity to collection point (within 3 km) is more important than proximity to final market in explaining participation in dairy markets (Table 4).

Larger producers are by definition "collection points" of a sort, and thus may benefit from milk collection costs lower than those for smallholders. Furthermore, the way that transactions costs affect institutional and organizational structures, although little explored empirically for dairying in Africa, can be partially examined through observed marketing arrangements. For example, the issue of proximity to collection point in explaining participation in dairy cooperatives comes up time and again in East Africa.<sup>5</sup> In sum, there is evidence from a number of countries that suggests that both smallholder and large-scale dairy producers face transactions costs, but they are of different levels, and they influence production and marketing behavior in a manner detrimental to efficiency and equity.

### *C. Approach to the Case Studies*

In the remainder of this paper, we further document the importance of transactions costs in smallholder dairying in East Africa using data from recent

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<sup>5</sup> Most recently in a reconnaissance mission by the authors in March 1996 to Uganda.

Table 3: Distribution of 1985 Wet Season Milk Sales for Dairy Producers<sup>a</sup> in the Addis Ababa Milkshed.

Market Outlet	Large Producers	Small Producers
	( percent of total sales)	
Individual consumers	26	91
Hotels and restaurants	39	0
Government institutions	35	9

<sup>a</sup> Averages from 16 large and 16 small producers.

Source: Debrah and Anteneh (1991).

Table 4: Average Daily Sales of Dairy Products per Dairy Cow by Smallholder Farmers in the Addis Ababa Milkshed, July 1986.

Producer Distance from Collection Center (km)	Producers (N=16) 0-20 km from Addis Ababa		Producers (N=16) 20-85 km from Addis Ababa	
	Milk	All Dairy	Milk	All Dairy
(liters sold per cow, liquid milk equivalents <sup>a</sup> )				
0 - 3 km	0.74	2.06	1.78	1.78
3 -10 km	0.12	1.81	0.05	1.09

<sup>a</sup> Other dairy products sold include butter and cheese; calculations assumes that 1 kg butter requires 24 liters of fresh milk and that cheese output is a by-product of butter-making.

Source: Calculated from Debrah and Anteneh (1991).



surveys of dairy cooperatives in Central Province, Kenya, and of dairy producers in the Addis Ababa, Ethiopia milkshed.<sup>6</sup> In the absence of direct estimates of the transactions costs incurred by economic agents in the dairy marketing chain, we discuss the indirect evidence of the nature and behavioral implications of transactions costs for milk-producing households. Our guiding hypothesis is that the influence of transactions costs can be explored through differences in observed marketing costs, marketing channels used, costs of inputs (including the capital necessary for entry into dairying), and prices received for milk and dairy products. The role of organizations in reducing transactions costs is explored through differences in the prevalence of dairy cooperatives, and resultant differences in dairy marketing patterns, in Kenya and Ethiopia.

To the extent possible, we explore the additional hypothesis that smallholder producers face higher transactions costs in dairy production and marketing than do larger producers. The existence of this phenomenon raises the questions as to how both sectors can co-exist over time in the same market, the extent to which policy interventions have created the dualism, and whether the dualism is desirable.

#### **IV. TRANSACTIONS COSTS IN DAIRY MARKETING IN KENYA**

In Kenya, 93 percent of urban milk supply in 1992 was handled by dairy cooperatives (FAO, 1993). Developed mainly since independence and with substantial state support, dairy cooperatives play a critical role in enabling the participation of smallholder producers in the formal urban milk market. In principle, dairy cooperatives serve to reduce transactions costs facing individual producers through pooling risk, lowering unit collection costs, making inputs available, and enhancing bargaining power. For processors, cooperatives may lower raw milk acquisition (search) costs and make milk supplies more reliable. Raw milk from cooperative members is transported (usually by the farmer or a farm household member) to nearby collection points. Milk is then delivered by the cooperatives to private buyers or collection centers or plants belonging to the Kenya Cooperative Creameries (KCC). Although registered as a private limited company, the KCC is effectively a parastatal (Grosh, 1991; Jaffee, 1995). Prices paid to cooperatives by the KCC are set by the government, are subject to major political considerations, and are uniform throughout the large highland collection area that extends for more than 300 kilometers from Nairobi, the main center of urban milk demand (Leonard, 1991).

The KCC is mandated to act as “buyer of last resort”, so as to provide a guaranteed market outlet for smallholder producers. Until 1992, the KCC had a monopoly on fluid milk sales in urban areas. Although no detailed study of the issue

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<sup>6</sup> The Addis Ababa case study draws heavily on the data and insights in Staal (1995).

exists, the provision of stable prices and market outlets by the KCC most likely reduced price and market outlet risk for smallholder dairy producers. The resulting lower search costs, and lower risk to smallholders who invested in specialized dairy production probably contributed to the success of smallholder dairying in Kenya, although withdrawal of KCC's monopsony on milk procurement is a key element of future progress (Jaffee, 1995).

In recent years however, KCC's financial performance has been severely compromised by pan-seasonal and pan-territorial pricing policies adopted for political reasons (Grosh, 1991 and personal communication). In Kenya as in most of Africa, rainfall and pasture are seasonal. Milk production in the dry season is consequently dependent on purchased feeds, which raises costs. Pan-territorial procurement pricing appears to treat producers in different parts of the country equally; pan-seasonal pricing appears to treat those organized for industrial milk production with concentrate feeding equally per liter of milk output with smallholders using cut forages. In fact, it meant that KCC was forced to pay relatively high procurement prices when milk is abundant in the rainy season, leading to a glut of processed milk products in cold storage, and to be faced with a shortage of willing suppliers in the dry season, when retail milk prices are higher (Ibid.).

The squeeze on KCC's balance sheet has resulted in a number of dramatic changes affecting the nature and magnitude of transactions costs for smallholder dairy producers in Kenya. In the late 1980s and early 1990s, the milk prices paid by the KCC to cooperatives and subsequently to producers did not keep pace with increases in input prices. This was also due to inefficiency in the KCC's collection and processing operations, in addition to political considerations regarding prices of milk to consumers. Most importantly, payments by the KCC to cooperatives for milk supplied were delayed, sometimes for months. In return, cooperatives were forced to delay payments to producers, who were subsequently faced with higher risks and irregular cash flow. Producers began to shift more sales to the informal raw milk market, in spite of higher variation in both the availability of a market outlet and prices, incurring the search costs required to locate new buyers. Supplies to the KCC fell and, coupled with poor rainfall, in 1991 produced dramatic shortages of processed dairy products in urban areas. Encouraged by donors, in 1992 the Kenyan government liberalized the dairy industry, revoking the KCC's monopoly on urban milk sales (Staal and Shapiro, 1994).

Although the liberalization applied only to sales of processed milk in urban areas, with raw milk sales still officially illegal, it was interpreted differently by milk producers, processors, and traders. By many, liberalization was taken to mean that all manner of milk market transactions were permitted. As a consequence, the period since 1992 has seen the rapid development of a variety of milk market innovations, mainly in raw milk markets. These include "self-help groups" which collect and market raw milk. These are not registered as cooperatives and so unconstrained by restrictive cooperative laws. Emerging private market intermediaries now fulfill the same role. Further, dairy cooperatives themselves,

once an integral part of the formal KCC milk collection system, are marketing a greater proportion of their milk raw to urban markets.

The growth in raw milk marketing by cooperatives can be seen as a response to the continued uncertainty of milk payments by the KCC. Producers regularly report that their primary complaint is not the price paid, but the delays in payment. To avoid the payment delays that characterize the present KCC collection system, producers and cooperatives must incur the costs of searching for alternative market outlets, and the related costs of screening, bargaining, and monitoring contractual agreements with individuals and firms that are new to them. Some, such as self-help groups, may require collective effort to establish themselves. In this new environment, the search for outlets providing reliable payment has implied considerable uncertainty to many producers and cooperatives. Anecdotal evidence suggests that a number of cooperatives are uncertain about the quantity of milk they will be able to market on a given day, which illustrates that smaller marketing units introduce a different set of complications compared to the omnipresent parastatal. Cooperative members say that they often must market milk on public transportation (which they describe as unreliable for their purposes), and lack the savings or credit to buy cooling or transportation equipment. Further study of the magnitude of these transactions costs, and of appropriate policy responses to this environment of greater uncertainty, thus appears merited.

A survey of private dairy cooperatives in three districts of Central Province provides additional evidence on the impacts of transactions costs in dairy marketing. Transportation costs, and the related issues of time required to transport milk to cooling centers and resultant milk quality, imply that the ability of private cooperatives to market milk outside of KCC channels is limited by access to the Nairobi market. A survey of 30 dairy cooperatives carried out in early 1996 (Owango et al, 1996) assessed changes in cooperative operations since 1990.<sup>7</sup> Kiambu district borders Nairobi, with its center only some 25 kms from the city. Thika and Muranga districts are further afield, centered 50 and 80 kms away, respectively. Data were collected on amounts of milk marketed to the KCC and other outlets by sample cooperative members in each district, and prices paid to cooperative members for milk. Alternative market outlets that have grown in importance in the three districts include direct sales to individuals, sales to market intermediaries, and to private dairy processors making mainly non-liquid milk products. Of these, sales to individuals are the most important.<sup>8</sup> Kiambu, the closest district to Nairobi, exhibited a dramatic decline in the share of output going

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<sup>7</sup> This was a joint study by the Kenya Agricultural Research Institute (KARI), and the International Livestock Research Institute (ILRI), and is the source of data for this section.

<sup>8</sup> Sales to individuals constituted on average 45 percent of Kiambu cooperative milk sales in 1995, and 27 percent in Muranga.



to the KCC, whereas in Muranga, the most distant, KCC's share of sales declined only marginally. Thus proximity to Nairobi may be an important determinant in the decision to sell to KCC, as would be expected in the case of parastatal procurement where prices are not fully set by market forces.

Transactions costs are likely to rise more quickly with distance from the urban market than do straight-forward transport costs, due to risks associated with limited information about distant marketing outlets, and the increased costs of screening, bargaining with, and monitoring distant trading partners. The approximate costs per liter of transporting milk by self-help groups in Thika were calculated by the authors to be KSH 0.03 per liter per kilometer. Thus, milk transported a distance of 80 kilometers would incur transport costs of KSH 2.4 per liter, or more than 20 percent of the KCC price. Muranga cooperatives continue to sell most of their milk to the KCC at KSH 11 per liter, whereas raw milk sales in Nairobi and other urban areas in the districts obtain a minimum of KSH 15 per liter. Transportation and search costs that rise rapidly with distance most likely explain much of this choice of market outlet. These transactions costs are related to the high perishability of raw milk, which reduces time available for marketing, and raises risks of spoilage with distance. In the case of the more distant Muranga cooperatives, the transactions costs necessary to obtain higher prices in urban markets appear to be greater than the losses imposed by the uncertainty and delay of KCC payments.

These same factors can be seen at work in a comparison of changes in real milk prices paid to producers by the cooperatives surveyed during 1990-1995.<sup>9</sup> Real prices rose most significantly in the two districts (Kiambu and Thika) closest to Nairobi. These price increases are primarily due to increased sales by Kiambu and Thika cooperatives to alternative raw milk outlets. Thus, some cooperatives appear able to at least partly offset the increased transactions costs implied by new marketing opportunities with higher prices for their product.

Both price and market outlet changes observed among peri-urban Kenyan dairy cooperatives indicate the important role of transactions costs in determining marketing behavior. Importantly, these changes began with a policy reform, that of liberalization of the dairy market. Although many of the impacts were unintended, this liberalization permitted market actors to avoid uncertainty due to the KCC. As a result, cooperatives began to explore alternative market outlets, but only in the regions where transportation and other transactions costs permitted. Further market reform that formalizes and finalizes the still-tentative reform of dairy marketing channels is likely to create more reliable demand by non-KCC processors, and therefore larger milk collection areas.

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<sup>9</sup> Prices to producers are set based on prices received, cooperative costs, and a capital levy. Nominal prices were deflated using average annual CPI changes reported by the Kenya Central Bureau of Statistics.

## V. PERI-URBAN AND URBAN DAIRYING IN THE ADDIS ABABA MILKSHED

Dairying in the Addis Ababa milkshed in Ethiopia offers an additional opportunity to examine the potential effects of transactions costs on the structure of dairy production and marketing. Most milk and dairy product marketing in Ethiopia occurs through the informal sector, and so is subject to market forces. Few large farms or collective marketing organizations exist, so production and marketing costs reflect the dispersed and small-scale nature of dairy sector organization. Dairy producers in the Addis Ababa area can be classified into two types: urban producers operating "backyard" dairy units, and peri-urban producers operating in a mixed crop-livestock system.

Peri-urban producers in the Addis Ababa milkshed are generally based within households whose primary economic activities are agricultural. The use of animal traction and accompanying traditions of animal husbandry allows improved dairy animals to be incorporated into existing agricultural practices. Major crops in the area include wheat, barley, lentils, and oats. In some areas of lower elevation, the traditional Ethiopian grain *teff* (*Eragrostis tef*) can be found. A minority of producers live in or near small towns and also pursue wage labor. Even those producers in small population centers generally have access to agricultural land. In addition to land allocated to households, communal grazing land is available to some producers.

Urban producers are defined as those who live in the greater Addis Ababa area and have no access to agricultural land. They use zero grazing or semi-zero grazing practices, depending on the level of street-side grazing employed. They tend to rely more heavily on the income from their dairy activities than do peri-urban producers. Milk is produced in "backyard" operations, utilizing space available in residential compounds. Compounds are not generally designed or enlarged specifically to accommodate dairy production. Cattle sheds typically are simple structures of corrugated metal sheeting or mud and wattle and floored with blocks of stone. Aside from milk sheds, fixed inputs are minimal, including a few buckets and milk cans, a water barrel, and brooms. Larger urban producers may possess a water pump and a sprayer for application of pesticides.

### A. *The Survey*

A survey of dairy operations was carried out in two rounds during 1992 and 1993; producers were asked to describe the activities of their dairy farms within the previous 12 months. Nine survey sites were selected, five within the city limits of Addis Ababa. The other four were within 60 km. of the city. Regional clusters were averaged and subjective reliability indicators were computed based on enumerator measurements and recall items; the 231 respondents were then ranked for "reliability" and the bottom third of the "reliability" distribution were eliminated (see Staal, 1995). Besides the geographic division between peri-urban and urban, which attempted to incorporate the main dairy systems known to operate in the milkshed,

the distribution of herd sizes in tropical livestock units (TLU=450 kg live weight) showed two distinct modes in terms of herd size, in both the urban and peri-urban samples. The two locational samples were then statistically clustered into "small" and "large" *ex post*.<sup>10</sup> Sample characteristics are shown in Table 5.

The analysis that follows is based on responses from 77 small urban producers, 44 small peri-urban producers, nine large urban producers and six large peri-urban producers. Although the large producer samples are small, with only 131 large urban producers and 46 large peri-urban producers reported operating in the Addis Ababa area, the samples represent 7 percent and 13 percent, respectively, of the total populations.

Large producers in both urban and peri-urban locations tend to have about 7 times as many dairy cows as small producers. Large-peri urban producers also have sizable herds of non-dairy cattle. Both large and small producers use crossbred dairy cattle, and large producers, not surprisingly, use considerably more hired labor, especially in urban areas.

Table 5: Sample Characteristics (Means) for Dairy Producers Surveyed in the Addis Ababa Milkshed, 1992-1993.

Farm Characteristic	Peri-urban		Urban	
	Large	Small	Large	Small
Number of operations surveyed	6	44	9	77
Persons in household	11.2	8.2	9.1	8.0
Land operated (ha)	11.3	3.7	-	-
Hours of hired labor used/month	710	244	616	75
Crossbred or purebred dairy cattle (head)	15.4	2.5	14.3	2.3
Local cows (head)	2.1	0.5	0.0	0.0
Total herd (head)	17.5	3.0	14.3	2.3

Source: Producer survey carried out by Steven Staal and reported in Staal (1995).

<sup>10</sup> The clusters were based on the minimized sum of squared distances between the cluster means.

The largest amount of marketed milk is produced by small producers - 73 percent of milk marketed. Although 6,813 small producers with crossbred dairy cattle were identified in 1993 by the Addis Ababa Dairy Producers' Association, only 177 large producers existed.<sup>11</sup>

#### *B. Dairy Marketing*

The sources of average dairy and dairy-related revenues and costs differ between small and large producers, and between urban and peri-urban producers of the same size (Table 6). There is considerable variation in the importance of marketing outlets depending on scale of production and location. The remarkable feature of the urban liquid milk supply, however, is the fact that 88 percent of all milk is supplied as raw milk through the informal market. The parastatal collection system, the Dairy Development Enterprise (DDE), handles only 12 percent of urban milk supply, despite decades of government and donor efforts to expand its presence.<sup>12</sup>

Besides sales to the DDE, which only occur in peri-urban areas, important market outlets include direct sales to individual customers, sales to hotels, restaurants, retailers, and traders. The lowest average prices are paid by the Dairy Development Enterprise (DDE), the dairy parastatal, followed by sales to restaurants and hotels. Individuals pay the highest average prices for raw milk.

Large peri-urban farmers receive 44 percent of their dairy revenue from milk sales to the DDE. The DDE operates a system of milk collection and cooling centers (typically at 5-kilometer intervals) along the major roads radiating from the capital. Farmers transport their morning milk to the collection centers spaced along the road, where milk is weighed and tested for adulteration. Records of milk supplied are kept, and payment is made monthly. In addition to its role as a buyer of last resort, the DDE plays a role in provision of dairy inputs, especially feed. Large peri-urban producers reported a desire to sell milk to the DDE, despite its lower price, because in the past this helped ensure access to concentrated feeds at subsidized prices. Larger producers professed a belief that diverting sales to other outlets would undermine their

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<sup>11</sup> The association was formed by the large producers, and is thought to include all of them.

<sup>12</sup> The DDE operates a collection system in the peri-urban area along major roads leading out of the capital. The milk is processed as sold primarily as packaged, pasteurized milk in the urban area. The operations of the DDE are heavily subsidized.

Table 6: Income from Various Market Outlets Received by Large and Small Peri-urban and Urban Dairy Producers in the Addis Ababa Milkshed, 1992-1993.

Market outlet, revenues or costs	Peri-urban		Urban	
	Large	Small	Large	Small
	( percent of total income)			
Own consumption of milk (%)	9.1	12.3	3.3	8.5
Milk sales to dairy parastatal	43.8	17.6	0	0
Milk sales to individuals	12.3	15.7	29.5	42.7
Milk sales to hotels, restaurants	11.6	35.0	65.9	36.9
Cheese and butter sales to private institutions and individuals	3.6	15.8	0	1.0
Income from cattle sales (culling, etc.)	19.6	3.7	1.4	10.8
	(EB/MT)			
Total revenue	1,174	1,126	1,145	1,188
Total costs	955	968	610	1,069
Net returns	219	158	535	119

Source: Staal (1995), Appendices C, D and unpublished data.



access to feeds available only through linked-transaction arrangements with the DDE.

Feed subsidies through the DDE are being discontinued as part of overall parastatal reform. Further, sales at low prices to the DDE suggests supply in excess of demand in alternative (informal) markets. This “surplus” exists in spite of the fact that many peri-urban producers selling to the DDE are located within 20 kms of the center of Addis Ababa. In Kenya this proximity to the urban center would be considered ideal for marketing directly to urban consumers.

Unlike in Kenya, for a variety of historical and policy reasons, dairy cooperatives are essentially non-existent in Ethiopia.<sup>13</sup> In the absence of alternatives to the DDE for collective marketing, dairy marketing behavior close to urban areas is strongly affected by individual transactions costs faced by individual producers. Partly as a consequence of this, 68 percent of urban milk supply was estimated to come from producers operating inside the urban area, and in close proximity to consumers (Staal 1995). Small peri-urban producers sell only about 20 percent of their milk production to the DDE. They are able to obtain higher prices for their remaining milk through sales to individuals and businesses in small population centers.<sup>14</sup> Hotels and restaurants in peri-urban areas constitute points of small but steady demand. Small peri-urban producers rely more than any other group on home processing of milk, primarily into butter, which is then sold to traders. This allows excess production to be conserved and transported, avoiding some transactions costs due to spoilage or forced consumption, and improves upon the low returns available through sales of small quantities to the DDE collection centers.

Direct sales by producers to individual and institutional consumers, bypassing the dairy parastatal and private middlemen, constitute the bulk of milk sales in the Addis Ababa milkshed, comprising 70 percent of total milk marketed. Post-farm processing activities play a relatively small role overall.

As a result of this, direct sales normally involve an informal contractual arrangement, whereby a producer agrees to supply a certain quantity of milk daily to the consumer. The price is then agreed on a Ethiopian Birr/liter /month basis for milk supplied daily, and payment is made monthly. The milk is either delivered by the producer or collected by the consumer. Anecdotal evidence suggests that these

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<sup>13</sup> See Staal 1995 for a description of the evolution of the dairy industry in Ethiopia.

<sup>14</sup> Sales to individuals also allow the opportunity for adulteration of the milk with water, which is more difficult in the case of DDE sales, which are tested. The resultant uncertainty about milk quality may result in additional transactions costs for consumers, and therefore affect overall demand for fluid milk.

contracts are inflexible; consumers report that they cannot easily buy more or less milk if their needs change. However, the contracting system appears to be adapted to the seasonality of production and consumption<sup>15</sup>.

The higher prices obtained from sales to individuals attract most small urban production, and much of large urban production. Small producers supply quantities most appropriate for individual direct sales, their most important outlet. Large urban producers' main outlet, however, is through sales to hotels and restaurants, which constitute stable demand for their greater output. In sum, both producers and consumers of dairy products in the Addis Ababa area appear to be put a premium on contracting with only a small number of clients\suppliers, suggesting that transactions costs are especially high in open milk markets.

### *C. Milk Prices Received*

The average milk prices received reported by peri-urban and urban dairy producers during the survey period averaged EB/liter 1.03 for individual sales in the peri-urban area and EB/liter 1.64 in the urban area. The DDE paid 1.00 EB/liter, a price that is set administratively. Prices received for raw milk sales by different producer groups are shown in Table 7. There is a notable difference between small and large producers in prices received for hotel and restaurant sales, in both urban and rural areas. The price that hotels and restaurants paid to small urban producers is significantly less ( $p < 0.01$ ) than the price paid to large producers. This price is also less than the price available from sales to individuals by either group.<sup>16</sup> This price discount affecting sales by small urban producers can be perceived as the cost to them of not being able to supply a larger quantity of milk (which may be only 5-10 liters/day) on a more reliable basis to businesses that require a reliable supply. This "cost"

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<sup>15</sup> In Ethiopia, dairy products are not consumed by Coptic Christians--roughly half the population--during the lenten fasting season. This has a major impact on market outlets for dairy products and on dairy prices in the period before Easter.

<sup>16</sup> Given the lack of a significant difference between prices received by large and small producers for sales to urban individuals, and also relative to prices paid by institutions to large urban producers, the range 1.60-1.65 EB/liter can be considered a competitive retail price in urban areas.

Table 7: Average Raw Milk Prices Received, by Market Outlet and Producer Type and Location (EB/liter).

Producer Type	Individuals	Hotels and Restaurants	Other outlets <sup>a</sup>	DDE <sup>b</sup>
Large Peri-urban	0.95 (n=3)	2.00 (n=1)	NA	1.00
Large Urban	1.63 (n=5)	1.60 (n=3)**	1.54(n=3)	NA
Small Peri-urban	1.05 (n=14)	1.30 (n=3)	1.22 (n=5)	1.00
Small Urban	1.65 (n=49)	1.35 (n=10)**	1.21 (n=6)	NA

\*\* Significantly different from each other (small and large urban) at ( $p<0.01$ )

<sup>a</sup> Other outlets include retailers, traders, etc.

<sup>b</sup> DDE prices were administratively set at 1 EB/liter.

averages EB 0.25 per liter in the urban area, some 15 percent of the mean price of sales to individuals. This price difference can also be taken as a direct estimate of the cost that the small producer is willing to accept to sell milk to a presumably more reliable contract buyer. In this case, hotels and restaurants may be acting as "market outlets of last resort". Thus this price difference provides an estimate of transactions costs particular to small producers due to the absence of alternatives to the DDE collection system. Notably, no price difference is evident for individual sales that are composed of smaller transactions (often 1-2 liters).

Factors explaining why producers of an ostensibly homogenous product would repeatedly accept substantially lower prices in the same location and season from one buyer compared to another can be investigated more formally with the data from the producer survey. The price reported by respondents as the typical price they accepted from a given outlet (institutional, retail, etc.) in a given season is regressed against several characteristics of the producers in question and several characteristics of their dairy marketing operations, exclusive of whom they were selling to. These producer and transaction characteristics are independent of the type of outlet selected by the producer. In a perfectly competitive market, all outlets would pay the same price for the same good. In the market studied, different producers faced different levels of transactions costs, depending on asset and information levels, season and location. They responded to these differential transactions costs by differential sales strategies.

The model regresses price accepted from a given outlet against farm characteristics such as dummy variables for season and location of farm, continuous variables for farm herd size, annual rental value of land operated by the producer, daily hours typically required for milk delivery from the farm, and transaction characteristics such as the typical cash cost of marketing milk to this outlet, average daily milk sales to outlets of this type, and a dummy variable whether this outlet is a regular customer of the farmer. Results for a variety of disaggregations are shown in Table 8.

The "daily cash cost of milk marketing" and "daily hours of milk delivery" variables tend to be collinear, which may account in part for the low significance observed. When "cash cost" is dropped for the peri-urban sample alone, where remoteness is more of an issue, the time required to market milk is significantly negatively associated with the price that farmers can get for their milk. This suggests that farmers located further away from Addis have significantly less attractive options for disposing of their milk.

Otherwise, almost all other coefficients are statistically significant at 10 percent or better, and of expected sign when the high cost of moving milk over

**Table 8: Determinants of Producer Prices of Fresh Milk in the Addis Ababa Milkshed, 1992-1993**  
(dependent variable: average milk price received in EB/liter per producer and type of outlet).

Variable	Pooled Across Locations				Pooled Across Season/Location		Pooled Across Seasons			
	Rainy Season		Dry Season		Coefficient	T-statistic	Urban		Periurban	
	Coefficient	T-statistic	Coefficient	T-statistic			Coefficient	T-statistic	Coefficient	T-statistic
Intercept	0.943	(16.2)	0.790	(10.1)	0.806	(16.1)	1.109	(26.1)	0.999	(6.7)
<i>Dummies on the Intercept</i>										
Urban producers	0.344	(8.5)	0.355	(6.3)	0.354	(10.5)	-	-	-	-
Rainy season sales	-	-	-	-	0.112	(4.2)	0.117	(3.8)	0.085	(1.8)
Non-contract sales	0.084	(1.8)	0.095	(1.6) <sup>1</sup>	.093	(2.5)	0.107	(2.8)	-0.091	(-0.7) <sup>1</sup>
<i>Continuous variables</i>										
Herd size	-0.012	(-4.4)	-0.007	(-2.1)	-0.009	(-4.3)	-0.000	(-0.1) <sup>1</sup>	-0.014	(-4.2)
Daily milk sales to that type of outlet (lt/day)	0.009	(3.8)	0.09	(3.2)	0.008	(4.8)	0.006	(2.9)	0.015	(1.6) <sup>1</sup>
Daily cash cost of marketing to that type of outlet (EB/day)	-0.009	(-0.2) <sup>1</sup>	0.107	(1.6) <sup>1</sup>	0.038	1.02 <sup>1</sup>	0.033	(0.9) <sup>1</sup>	-	Note <sup>2</sup>
Daily hours used in milk delivery	-0.013	(-0.5) <sup>1</sup>	-0.50	(-1.4) <sup>1</sup>	-0.030	(-1.3) <sup>1</sup>	-0.031	(-1.4) <sup>1</sup>	-0.304	(-2.25)
Rental value of land, including urban compounds (000 EB)	0.012	(5.2)	0.008	(2.8)	0.010	(5.5)	0.007	(3.7)	0.013	(3.7)
No. observations	102		96		198		142		56	
R <sup>2</sup>	0.65		0.50		0.58		0.39		0.44	

Notes: (1) Not significant at 10 percent.

(2) "Cash costs of milk marketing" and "Daily hours used in milk marketing" were collinear in the small periurban sample. "Cash cost" was therefore dropped in the periurban regression.



distances with poor infrastructure is considered. Urban producers typically received a significantly and substantially higher price, other things equal, confirming the results in Table 7. Despite the greater availability of milk in the rainy season, prices accepted were higher then. This seems to be due in part to greater difficulty in delivering milk from rural areas to the city during the rainy season, as evidenced by the stronger seasonal effect for the urban sample as compared to the peri-urban one.

Another clear trend in the results are that a pattern of selling a relatively larger amount of milk to the outlet in question tends to be positively associated with receiving a higher per liter price, *cet. par.* This reinforces the view that consumers are willing to pay more for adequate supplies from a given source. On the other hand, farmers received less per liter on regular sales to the same source, suggesting again that farmers were prepared to forego income for a regular outlet. Finally, once these other effects are netted out, farmers with a higher level of capital (proxied by the rental value of land and installations operated) per animal (accounted for by herd size) still tend to receive higher payments per liter. This is clear evidence that relative availability of assets (capital intensity) is associated, *cet. par.*, with being able to secure a higher price per liter for milk.

#### D. Revenues and Costs

The average revenue per metric ton of milk in the survey was remarkably similar across producer types. However the unit cost for large urban producers was remarkably lower than for other types of producers. Thus the unit profit for large urban producers was 4.5 times as high as for small urban producers and 2.5 times as high as for large peri-urban producers. When average production levels are taken into account, large urban producers made a profit in 1992-93 of more than US\$2,500, whereas small urban producers earned less US\$70 net from dairying. Large peri-urban producers earned US\$700, and small peri-urban producers netted about US\$110.<sup>17</sup>

The cost structures per ton of milk produced are shown in Table 9. Land costs are obviously different between peri-urban and urban producers. In fact, other evidence suggests that the land rents or opportunity costs incurred by peri-urban producers were considerably in excess of their social values, in view of policies that restrict access to land (Staal, 1995). Small peri-urban producers were able to substitute pasture and labor for feed purchases. Table 9 shows

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<sup>17</sup> Profit calculations include "normal" returns to land, labor and capital, based on current opportunity values estimated for each group of producers. Positive profits may thus be considered "above normal" profits.

Table 9: Cost Structures of Large and Small Producers in the Addis Ababa Milkshed, 1992-1993 (EB/MT Milk Produced).

Cost Category	Peri-urban		Urban		Difference	
	Large (PL)	Small (PS)	Large (UL)	Small (US)	PL-PS	UL-US
Feed	439	321	317	561	118	-244
Land	209	328	24	92	-119	-68
Fixed inputs except animals	92	47	95	73	44	22
Family labor	13	55	14	74	-42	-60
Hired labor	67	92	52	84	-25	-33
Veterinarian/AI services	47	27	23	27	20	-4
Marketing	41	40	16	31	1	-15
Dairy animals	32	39	24	62	-6	-38
Utilities	13	18	45	64	-5	-19
Total	954	968	609	1,068	-14	-459

Source: Staal (1995), Appendix C.

the differences in cash values of inputs for large and small-scale producers. It is clear that the cost advantage of large urban farmers per ton of milk stems in large part from lower per unit feed costs, despite not having pasture land. The differences in feed costs per kg are largely due to a policy of cheap disposal of edible industrial by-products, which impacts primarily in the city, and primarily on larger producers. However, it should be noted that economies of scale were also evident in land use and labor use. The latter dwarfed economies of scale in marketing costs, veterinary costs, artificial insemination cost, utilities and unattributed economies of scale due to herd size.

Large farms required about 7 times more capital (based on amortized annual costs) per farm than small farms in peri-urban areas and 8 times more capital than small farms in urban areas. On a per cow basis, large farms are still 15 to 30 percent more capital intensive than small ones. On a per liter basis, large peri-urban farms are the most capital intensive and the small peri-urban farms the least capital intensive.

The large per farm capital cost differences illustrate the potential for credit market imperfections to limit entry into large-scale dairy production. Formal credit is only available to those with existing collateral, which is constrained because land is not privately owned. Formal credit applications also require submission of detailed investment plans that may be beyond the skills and resources of many dairy producers. Informal credit is available through rotating savings societies (*idder*), but the amounts available are small relative to capital needs for dairying. Credit availability, combined with the capital intensive nature of large-scale dairying, could partially explain the predominance of small-scale production.

## VI. CONCLUSIONS

The evidence available from Kenya and Ethiopia about the role of transactions costs in smallholder dairy marketing is largely indirect and anecdotal, rather than the result of detailed direct observation of transactions costs. Nevertheless, certain hypotheses are compelling. First, transactions costs in east African dairy are high, as evidenced by the low percentage of milk production that is commercialized in Kenya and Ethiopia, compared to that in developed countries.

Second, the size of the dairy operation, and its proximity to urban markets, influence the products and market channels used by producers to market dairy products. Transactions costs increase with distance, most likely faster than transportation costs alone, due to the increased costs of information and risk of dairy product spoilage before a buyer is found. The prices received by producers also decrease with distance and appear to vary considerably depending on the size of sales and the flexibility of contractual relationships between producer and consumer. Smaller producers in the Addis Ababa milkshed appear to receive lower prices than larger producers in some marketing channels. All producers appear to

be willing to accept lower prices in exchange for a reliable outlet. Further, small producers may incur greater transactions costs per unit of milk sold than large producers when both sell to the dairy parastatal that serves as a buyer of last resort.

Finally, empirical analysis on the Ethiopian data shows that even when other producer characteristics and transaction characteristics are accounted for, producers with a higher degree of capital intensity per cow tend to be able to secure higher prices per liter than those with a lower capital intensity. This is indicative of an underlying explanation of differential transactions costs faced by different producers: differential access to assets (and probably to differential information), which may translate into greater market clout.

The role of organizations of collective action (such as processing parastatals, cooperatives, “self-help” groups, etc.) in reducing transactions costs is a recurring theme in smallholder dairy development in East Africa. When effectively managed, such organizations reduce transactions costs for both the producers and the buyers of dairy products. This reduction in costs typically is due to economies of scale in collection and transport, and also because organizations reduce the need for information about widely dispersed and small-scale buyers and sellers.

Kenya’s experience with a parastatal processing company as a buyer of last resort seems to indicate that a full-fledged government intervention such as KCC can lower transactions costs during the start-up phase of smallholder dairy development. Over time, however, political pressures begin to affect the parastatal, particularly with regard to pricing policies. As a result, producers, cooperatives, and private processors began to face higher transactions costs than necessary to take advantage of market opportunities through the KCC. Attempts to circumvent this problem by private parties appear to have led to attempts by the parastatal to prevent competition from alternative institutional arrangements.

Comprehensive policy recommendations require a more detailed study of the structure and determinants of transactions costs and their impacts on the behavior of economic agents. However, the evidence already available suggests a number of policy implications. First, because of the potentially important role of collective organizations in lowering transactions costs in dairy marketing, government actions to provide an enabling environment of regulations, enforcement and infrastructure for well-managed cooperatives, self-help groups, and private enterprises would promote smallholder dairy development. In both Kenya and Ethiopia, a more supportive environment for collective action in the dairy sector would involve reduction in the bureaucratic obstacles to effective formation and management of cooperatives.

In both countries, government intervention in cooperative formation and decision-making appears to transcend that necessary to protect cooperative

members and their customers<sup>18</sup>. It appears that governments can productively intervene to support the flow of information (about market opportunities and prices, for example) to dairy marketing organizations, to provide resources for training in management and planning of their decision makers, and under appropriate circumstances, to support greater access to credit for capital expenditures identified by the organizations as priorities (vehicles and cooling equipment, for example).

Another action that appears necessary to support smallholder dairy development is greater transparency of dairy marketing policies, and greater consistency in their implementation. In Kenya, greater transparency is likely to be required with regard to fluid milk marketing by private processors in urban areas. The 1992 liberalization has yet to be finalized, perhaps discouraging investment and marketing activities by private dairy companies, including producer-based cooperatives. Ethiopia's policy concerning privatization of state dairy farms and the dairy parastatal has yet to be made definitive.

The implications for researchers are perhaps the most clearly defined. Despite agreement that transactions costs have potentially large impacts on market integration, and therefore development in general, few studies exist that document the level and determinants of transactions costs. The nature of transactions costs renders a full accounting of their nature and impacts difficult. Yet opportunities exist to better document transactions costs that are, in principle, observable. These observable transactions costs include: the opportunity costs of time spent by producers in marketing, direct transportation and processing costs; losses due to spoilage resulting from uncertain market outlets; and the degree to which market outlets used by producers change over time (resulting in additional search costs). Costs incurred by producers for transactions to obtain inputs, especially feed, credit, land, and labor, may have especially important impacts and also deserve detailed study.

Finally, a comprehensive study of transactions costs in dairy marketing would account for transactions between numerous agents in dairy marketing channels, including producer decisions to sell milk to more than one buyer, often under quite different contractual terms. Perhaps what is most needed is methodological development with regard to conceptualization of transactions costs and how to measure them. Research on household and sub-sector models that better integrate both existing transactions costs, but also the institutions and contracts that govern individual transactions, would be beneficial in a broader sense. Such models would

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<sup>18</sup> For example, in Kenya, all expenditures over KSH 5,000 (currently about \$100) must be approved by the District Cooperative Officer, and approval of the Ministry of Cooperative Development is required to appoint and dismiss key cooperative management positions. In Ethiopia, government agencies are reputed to have claimed ownership of dairy processing equipment purchased by groups of producers under dairy development projects.



not only provide improved policy insights for dairy development, but ultimately would promote the well-being of rural smallholders by improving their ability to respond to an ever-changing economic environment.

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