

# **Women and the Sustainable Development of Market-Oriented Dairying: Evidence from the Highlands of East Africa**

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## ***Introduction***

Cattle play significant social and economic roles in the subsistence production systems of the East African highland – as a store of value, measure of wealth, and source of cash flow, fuel, food, draught power and manure. However, the productivity of indigenous breeds is relatively low, with milk offtake rarely exceeding 300kg for a lactation period of about 7 months. Currently indigenous cattle constitute some 77% of cattle in Kenya, but are more than 98% of the total Ethiopian cattle population. Low productivity is due to relatively late ages at maturity, low genetic potential, heavy parasite burden, seasonal variation in feed and little policy emphasis on livestock development. In recent years, however, policy environments for dairy production have improved, including liberalisation of dairy markets. Encouraging intensified dairying is one strategy of the Ethiopian and Kenyan governments to address the low productivity problem of indigenous cattle and to enable resource-poor smallholder mixed crop-livestock farmers to raise incomes.

In periurban Addis Ababa, market-oriented smallholder dairying (MOSD) is based on the use of crossbred cows (CBC) that are fed crop-residues such as barley straw, and natural grass and hay, and locally-produced wheat bran and oilseed cake. While some CBC's are kept on mixed crop/livestock farms, many animals are kept in the urban centre, and are confined to backyard stalls. Milk is mainly marketed directly to consumers by the producers themselves.

In the Central province of Kenya, MOSD is based on the intensification of smallholder mixed farming systems through the close integration of CBC's into the mainly maize-based farms. Cows are fed planted fodder (Napier grass), maize stover, weeds and grass, and grain millings or compounded dairy feed. In many cases where landholdings are small, cattle are not allowed to graze at all, but are instead stall-fed. An important element of this system is the heavy use of the manure to fertilise food and cash crops, allowing sustained multiple cropping on the small landholdings (usually less than 2 acres).

MOSD increases dairy production and sales of dairy products – especially liquid milk, i.e. the milk is treated as a “cash crop” resulting to greater market orientation of smallholder farm households (Shapiro et al., 1998). Intensification of dairy production has been shown (Pankhurst 1996) to potentially raise milk production and income, especially where demand and infrastructure are favourable (Staal et al., 1997). Further, since milk consumption globally is seen to grow with income levels, it thus has the potential to improve incomes of smallholder farm households in an economically sustainable manner. Because milk is sold daily throughout the year, more regular daily cash incomes enhance dairy households' ability to purchase needed food items during food shortage periods and hence smooth consumption throughout the year.

Under some circumstances in relatively extensive farming systems, the use of CBC as draft animals eliminates the need for draft oxen (and their replacements) required for only a few weeks in a year (Zerbini et al., 1996). Fewer but more efficient animals on the farm could reduce stocking rates and overgrazing, thus contributing to the establishment of a more productive and sustainable farming systems. In other circumstances in more intensive farming systems, where much of feed resources are imported from off-farm and animals are not grazed, MOSD leads to higher stocking rates, yielding more manure and so more rapid cycling of nutrients, again contributing to more productive and sustainable systems.

Farmers in the highlands of East Africa have a comparative advantage in dairying intensification because of the relatively low animal disease incidence and conducive climate for cattle rearing. As a result, the region

has the largest number of both indigenous and CBC cattle in the continent, good traditional animal husbandry skills, and high demand for animal products.

### ***The Problem***

As indicated, intensified dairying has been shown to potentially raise milk production and household incomes. However, the consequences on different household members – particularly women - are not well understood. In particular, the implications on women’s labour contribution to the dairy activity, women’s dairy income share and control, and female dairy operators’ access to productive inputs have not been well established. In both the Kenya and Ethiopia cases, intensive dairying means greater reliance on cut-and-carry of fodder to stall-fed animals, thus requiring a greater labour input per milk unit produced. Understanding women’s dairying responsibilities, access to resources and control of proceeds (products and income) from intensified dairying enterprise is crucial in the sustainable development of MOSD and dairying technologies.

This paper therefore seeks to identify the consequences of MOSD on East African (Kenya and Ethiopia) women’s wellbeing. We focus on their labour contribution, control of benefits, and access to productive resources and then discuss the implications of these to the sustainable development of MOSD.

### ***Sources of Data***

Data were gathered in Holeta, Ethiopia (some 40 kms outside of Addis Ababa) dairy research project involving the Ethiopian Agricultural Research Organisation (EARO), the International Livestock Research Institute (ILRI), and the Ethiopian Health and Nutrition Research Institute (EHNRI). One of its goals is to develop technologies that enable resource-poor mixed crop-livestock farmers to participate in MOSD. Data from 120 farm households were collected beginning in 1996 from both households with introduced crossbred cows (CBC) and households with locally bred cows (LBC), with gender disaggregation where appropriate. With the CBC’s were also introduced complementary dairy technologies. Those farmers with introduced CBC are encouraged to plant fodders such as oats, vetch, and Napier grass, and were trained in improved hygiene and restricted grazing. Veterinary and breeding services were also provided.

The data from Kiambu, Kenya (centred some 25kms from Nairobi) was gathered in 1996 as part of a collaborative dairy research project between the Kenya Agricultural Research Institute (KARI), the Kenya Ministry of Agriculture and ILRI. Some 365 households of all types were randomly interviewed during a characterisation survey, out of which 260 were found to be dairy farmers and owned CBCs. Unlike those in Ethiopia, these dairy farms were not project-established. From the identified dairy farms, a sub-set of 27 households was selected to conduct a more detailed interview on gender-differentiated roles and resources related to the dairy activity.

From the same KARI/MoA/ILRI collaborative project, data from eight districts in Kenya covering Central, Eastern and Rift Valley provinces is also used mainly for comparison purposes. These derive from a larger characterisation undertaken in early 1998. The eight districts selected represent a wide range of levels of dairy productivity potential and market access within the Nairobi milkshed.

### ***Labour Contribution of Women to Dairy Operations***

Results from the survey carried out in Kiambu (Kenya) indicate that 70.4% of dairy operators are women and 29.6% are men, underlining the traditionally important role of women in milk production in Kenya. In the male-headed households (MHH), 66.7% of the total of 365 sampled, 61.1% of the dairy operators are women and 38.9% are men. In the female-headed households (FHH) (33.3% of the sample), 88.9% of the dairy operators are women and 11.1% are men. In the larger dairy characterisation survey in Kenya (1998), adult females are more involved in such dairy activity tasks as collecting and processing feed, milking, and marketing of milk in comparison to adult males, children and hired labour as shown in Table 1. However, marginally more men are reported involved in the spraying and dipping task than women are.

Table 1. Percent female and male activity in the dairy enterprise tasks, Kiambu, Kenya

Activity	Percent affirmative responses	
	Adult Males	Adult Females
Grazing and collecting feed	4	16
Processing feed and feeding	4	15

Planting, weeding and manuring	3	13
Milking	5	21
Marketing milk	5	17
Spraying/Dipping	9	7
Cleaning shed	5	11
Obtaining AI/Vet services	7	9
Fetching water for animals	5	21

Source: Unpublished data, MoA/KARI/ILRI Smallholder Dairy Project, 1998

The above numbers suggest that women are the dominant dairy operators in the intensive, mostly stall-feeding MOSD system of Kenya. These results compare to those reported by Mullins et al. (1995), who found that women supplied 48% of the labour input in dairy farms Coastal Province of Kenya. This corresponds both to women's traditional role as the agriculturalists in Kenyan farming communities, and as the milkers in its pastoral communities. Mullins et al. also reported that although women's overall work load increased with under MOSD, women consistently stated that they were nevertheless better off due to income increases and stability.

In contrast, as evident from Table 2, intensified dairying apparently does not significantly increase women's dairy-related labour in Ethiopia, as a result of which their labour supply to other activities is not likely to change. The monitoring survey in Holeta showed that women's labour contribution to dairy was only 5.5% in the CBC households, compared to 5% in those with indigenous cattle, a difference which may not be significant. While the household's children provide most of the labour in the LBC households, hired men and children provide much of the additional labour required for intensified dairying.

Table 2. Average Weekly Percentage Family and Non-family Labour Contribution to the dairy enterprise in Holeta, Ethiopia.

Group	Family Labour (%)			Hired Labour (%)	
	Men	Women	Children	Men	Children
CBC	20	5	46	10	19
LBC	14.7	5.5	76.8	1.5	1.5

Source: Holeta Survey Results, 1996/97

Differences in the traditional roles of women in agriculture and cattle keeping mainly explain the variation in women's labour contribution to MOSD in Kenya and Ethiopia. As is suggested in Table 2, women are not generally responsible for cattle keeping in Ethiopia. Differences in the type of dairy technology employed also explain some of the differences. The stall-feeding dairying technique practised in Kenya is labour intensive, requiring animal feed and water to be carried to the cow. In Ethiopia, on the other hand, MOSD technology includes open grazing, with herding tasks traditionally designated to children (the Holeta site does not include urban stall-feeding farms). The results indicate that adoption of MOSD does not necessarily raise the labour burden to women in the household, depending on traditional roles in cattle keeping and on the specific MOSD technology employed.

### ***Dairy Income and Control***

Earlier studies (Pankhurst, 1996; Walshe et al., 1991; Sanders et al., 1996; Shapiro et al., 1998, Baltenweck et al., 1998) of income impacts of MOSD indicate that cash incomes increase as a consequence of higher milk production and increased market-orientation. The Holeta data indicate that men and women in households with introduced CBC had 14 and 4 times higher dairy incomes than men and women in households with LBC, respectively. Thus, although both women and men benefit from MOSD in Holeta, men's cash incomes rise significantly more as a result, compared to those of women.

In Kenya, results from the dairy characterisation survey indicate no significant differences in the net cash flows from the dairy enterprise per household per annum by household headed type i.e. FHH and MHH. This implies that dairy production has the same opportunities for both household types. This appears to be a significant result, in that it indicates quite strongly (with a sample of over 1,300 households) that the income-generating potential of MOSD is equally available to women, in spite of their apparent restricted

access to many resources (discussed below). At least in this cultural setting where women are the agriculturalists, MOSD technology offers them important opportunities.

The important question to be answered is whether the introduction of intensified dairying causes women to lose control over the income generated. Income growth from intensified dairying is expected to improve households' purchasing power, as well as change expenditure patterns. Such changes are governed by household needs, intrahousehold resource allocation, and gender division of labour and responsibilities. It is therefore important to examine whether intra-household changes in income control exist, and if it does whether it adversely affects women's responsibilities – particularly food expenditures.

In traditional dairy production practices in Ethiopia, women via the processing and sale of butter and cheese earn 69% of the dairy income. Whalen (1983) notes that Ethiopian women maintain control of this money and spends it to purchase household items. Men and women use the incomes they control to meet different objectives. For example women, by virtue of being responsible for food preparation, spend more money in food purchases than men (Quisumbing et al. 1995). The data from Holeta show that women in households with CBC spend only 4% more on food compared to women in LBC (while their incomes were 4 times higher, as above). On the other hand, men in households with MOSD technologies spend 28% more on food than men in households with traditional dairy production practices. Thus women's incomes increase under MOSD in Holeta, and while they do not appear to spend more on food for the household as a result, men do. The higher expenditure by men on food may reflect their greater effective control over the dairy income in this setting – women's control over that income is apparently low.

The detailed survey in Kiambu, Kenya showed women solely control the dairy income in 50 % of interviewed MOSD households, with husbands and wives jointly controlling income in another 25 % of the cases. In male-headed households, wives control dairy income in 41%, husbands in 23%, and both husband and wives in 35 % of the cases. In FHH, dairy income is controlled by either the wife or the children. Even in the MHHs, therefore, women have at least some control of the dairy income in 76% of households, and sole control in 41%. These results confirm earlier studies (Mullins et al, 1996; Maarse 1995 ) that indicate that women do indeed gain an important, if not majority, share of the income generated from intensified dairying.

The apparent differences in this regard can again be attributed to differences in traditional gender roles towards cattle keeping in Ethiopia and Kenya. In central Kenya, where women do traditionally have a role in milking of cattle, intensification has led to higher incomes not only for their households, but for their own uses. It may be important to note that, at least in this case, the common scenario of commercialisation leading to more male control of activities and incomes is not apparently occurring.

### ***Access To Resources***

Female dairy operators in Kiambu stated that they would have been more productive, if they had access to financial resources to purchase more feed and feed supplements and also more land to grow forage. This section focuses on women's access to productive inputs and highlights resources essential for improvement of dairy production, not available in sufficient quantities and quality in the East Africa Highlands.

The main sources of funds to start stall-fed dairying in Kiambu were through savings and sales of assets in 54.2% and 25.0% respectively, in all the sample farm households. Farmers in Holeta-Ethiopia, were given pregnant high milk yielding heifers at a subsidised price to be repaid over a specified period of time. Farmers in both Kiambu and Holeta do not utilise formal loans because of high interest rates, unavailability and required collateral. Another reason for not taking loans from formal institutions is because of the uncertainty of raising money from dairying with CBC in sufficient quantities to repay the loans. Risks associated in dairying with CBC are animal diseases, unstable dairy product prices and payments, scarcity and costs of feed, etc. The risks of loan defaults include forced sale of land and other valuable asset. Women dairy operators thus do not have the cash to invest in productivity-increasing dairying technologies. Also, female dairy operators typically lack secure title to property that eliminates them from obtaining credit from formal financial institutions, even if it is available. Since women are the main dairy operators in Kenya, their inability to obtain necessary cash and credit may be a constraint expanding MOSD production.

The detailed survey in Kiambu found that the average farm size of FHH is 1.86 acres compared to MHH who have 2.26 acres of land. The larger survey over 8 districts found, however, no significant difference between the land size per household by gender of the household head, with mean size of 6.2 and 6.7 acres

for male and female headed households respectively, though the standard deviations are greater than the means. This is far much higher than what is reported in Kiambu, where there are higher intensification levels.

An important factor that enhances women's dairy productivity is the extent to which they have access to education and training (Overholt et al., 1985). Studies (Lloyds and Niemi 1979; Cloud, 1985) show positive effects of education and training on agricultural productivity. Yet in Kiambu- Kenya, where women are the main dairy operators, 26% had no formal education, 57.8% had primary education and only 15.7% had secondary school education. In comparison, 75% and 25% of the male dairy operators in the same area had primary and secondary schools education respectively. This is also true for the dairy characterisation survey results where 23 % of the female-headed households do not have formal education in comparison to 8 % of the male headed households.

### ***Conclusions***

Traditional gender differences in household and farm roles largely explain the variations observed in impact of smallholder dairy production on women's labour input and control of resulting income. In Kiambu, Kenya, it was reported that MOSD both increased women's labour input, which was in turn compensated through women's control of most of the income from dairying. In Holeta, Ethiopia, in contrast, women's labour input did not apparently increase when MOSD was introduced, and their income from dairy activities similarly remained small, although in percentage terms it increased. Some of these differences can also be attributed to the different technologies employed in the two locations under study, with the stall-feeding Kenyan system requiring a larger labour input.

Evidence from Kenya also shows that access to resources may be a constraint to women's participation in smallholder dairying, even in this setting where women are the main dairy operators and control most of the income from dairy sales. Women will benefit more from MOSD, if they have more access to land for fodder production, credit to purchase needed veterinary services and supplements, and advice of the extension agents on the management skills required for profitable operations of the dairy enterprises. In spite of the fact that women have resource constraints, dairying with CBC is still profitable. Comparisons of income from dairying between MHH and FHH show no significant differences.

The high demand of women's time for MOSD in Kenya may have negative effects on their other responsibilities – crop production, childcare, household chores and other non-farm activities etc. This hypothesis requires further examination.

The hypothesis that market-orientation of smallholders will result in women losing control over income to men is not supported by data from MOSD in the East African Highlands. This is in contradiction to findings from other smallholder commercialisation processes (von Bruan and Kennedy, 1994).

Clearly, the development of smallholder dairying offers opportunities to improve the livelihoods and welfare of smallholder households and the women among them. Although constraints remain, there does not appear to be the threat to women of losing livelihoods to men through commercialisation, in those cases where women's role is traditionally linked to agriculture and milking. In areas where women's roles are primarily in the household, more change may be necessary before women can capture a greater share of the opportunities offered by MOSD.

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