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SMALLHOLDER DAIRY PROJECT

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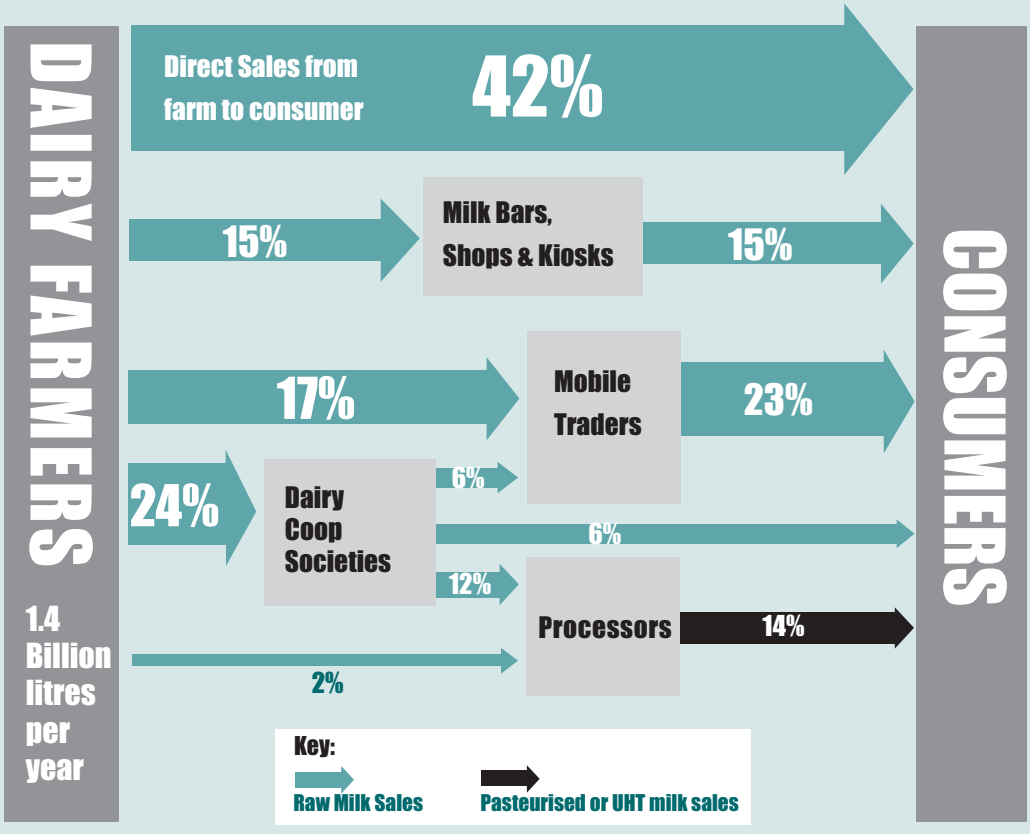
SDP Policy Brief 4

Public Health Issues in Kenyan Milk Markets

Key points

- Milk is passed from producer to consumer in raw or processed form. In Kenya, as in most developing countries, the raw milk channel is dominant, representing 86 percent of marketed milk.
- Concern has been expressed over the public health implications of raw milk trading. Most raw milk traders operate outside the existing regulatory environment and are not licensed by the Kenya Dairy Board (KDB).
- However, licensed traders show no significant difference in milk quality from the majority of smaller, unlicensed traders.
- Training of raw milk traders can lead to clear improvements in quality. Such training would be most effective within a licensing system that allowed for monitoring and accreditation.
- The current universal consumer practice of boiling purchased milk means that health risks from all marketing channels are in fact low.

FIGURE 1. How milk gets to consumers from farmers. Percentage of raw and processed milk going through the different market channels



Note:
1.4 Billion litres of milk marketed annually represents 55% of on-farm production. The remaining 45% is either fed to calves or consumed on farm

Box 1.

Potential health hazards from milk consumption

Adulteration by addition of water or other substances to milk may introduce chemical and microbial health hazards as well as reducing milk quality.

Bacterial counts in milk increase if milk is not chilled or if hygiene is lacking. Total bacterial counts reflect temperature and time since milking; coliform counts reflect levels of hygiene, as they are mainly fecal in origin. Both are measured in colony-forming units per millilitre (cfu/ml). All bacteria that cause illnesses are destroyed by boiling milk or by pasteurization (a form of heat treatment of specific temperature and duration).

Zoonoses are diseases (often bacterial) that can be passed from animals to humans and include brucellosis, E. coli 0157:H7, and bovine tuberculosis.

Antimicrobial residues are drug residues (antibiotic or antibacterial) in milk, perhaps resulting from recommencing milking too soon after drug treatment of a cow, though it is possible that some operators introduce them deliberately to prolong the shelf-life of milk. They can contribute to the development of bacterial resistance. They cannot be eliminated by boiling or by pasteurization and may be a risk to health.

Box 2.

Data sources and methods

Seasonal survey data were collected from 249 informal milk agents (including cooperatives, hawkers, milk bars, shops/kiosks) and 219 households purchasing raw (unpasteurized) milk in rural areas (Kiambu and Nakuru Districts) and urban areas (Nairobi city and Nakuru town) during 1999 and 2000.[3] Raw milk samples were laboratory tested to assess levels of bacteria, adulteration, brucellosis, and antimicrobial residues. Assessment of bacterial quality was based on the milk hygiene standards of the Kenya Bureau of Standards (KEBS).[4] In addition, the risks to zoonotic bovine tuberculosis (TB) were investigated in Narok District, including analysis of samples from 159 suspect TB patients. The bacterial milk quality indicators were combined with market factors to identify characteristic clusters of traders and trade-offs between quality and profit efficiency in milk marketing. Finally, a pilot study to test the potential gains from training of mobile milk traders in hygienic handling and testing of milk was carried out in Nakuru, Thika, and Murang'a.

Introduction: small milk traders and public health

Current milk flow channels in Kenya clearly show that informal milk markets dominate, with approximately 86 percent of milk sold raw or unpasteurized (figure 1). This dominance is mainly due to consumer preference for raw milk and the relatively high cost of pasteurized milk.[1] The milk is either sold directly to consumers by farmers, or passed to consumers through cooperatives, retail outlets (including shops and kiosks), or small-scale traders (including hawkers and milk bars). Small-scale traders create valuable employment and generate respectable incomes for themselves,[2] while acting as a cost-effective link between dairy producers and their consumers.

However, there has been growing concern about the public health risks from informally marketed milk (box 1). This brief presents the results of a survey (box 2) and an analysis of the major risks identified in relation to market factors. Additionally, the brief shows evidence of improvements that can be made through training of small milk traders in hygienic handling.

Survey results: potential hazards present in marketed milk

The survey made the following findings (summarized in table 1):

Adulteration with added water varied widely with site, season, and location but showed no particular trend by type of milk market agent or scale of business. Cases of adulteration were generally most numerous during the dry season, when higher milk prices act as an incentive to add volume to milk.

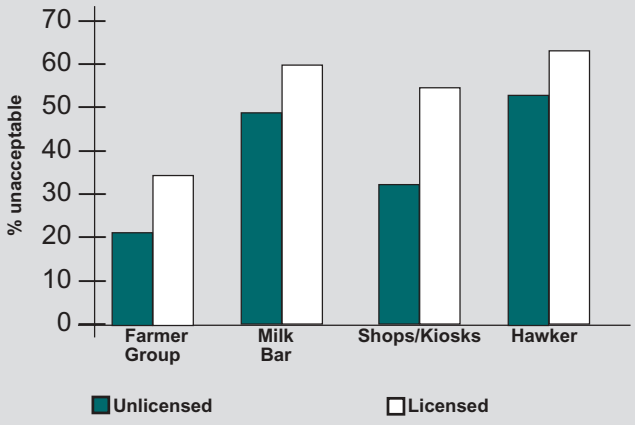
Bacterial quality of milk was often quite low in reference to the set standards, which most agents are unable to meet mainly due to common use of poor handling containers and the general lack of a cold chain. Variable prevalence levels of brucellosis were found. However, virtually all consumers boiled purchased milk before consumption, so risks of infection from bacterial health hazards were therefore determined to be low. No zoonotic TB was found.

Antimicrobial residues were found in several samples. They cannot be eliminated by any form of heat treatment, even from pasteurized milk. Policy makers are currently generally unaware of this high level of drug residues in milk, and the potential consequences of allergies and drug resistance.

Table 1. Proportions of unacceptable milk samples from raw milk traders

Proportion unacceptable[5]	Average (%)	Min - Max (%)
Adulteration with added water	10	0 - 22
Hygiene as determined by coliform counts	52	29 - 70
Prevalence of brucellosis antibodies	5	0 - 34
Antimicrobial agents present	6	0 - 12

Figure 2. Comparison of quality of milk samples between licensed and unlicensed traders based on KEBS hygiene standards for coliform counts (50,000 cfu/ml)



Comparison of quality of milk sold by licensed and unlicensed milk traders

The survey found little difference in milk quality (based on coliform counts) between licensed and unlicensed traders (figure 2), with or without fixed premises. This somewhat invalidates the current unwillingness to license small traders who have no fixed premises. On the other hand, licensing would facilitate systematic testing of traded raw milk, and present an opportunity to engage with traders to offer training towards increasing raw milk quality.

Training pilot study

The pilot study to test potential gains from training and certification showed that significant gains in milk quality can be achieved (figure 3). After hygiene training and the introduction of newly developed cans of appropriate size and shape (figure 4), there was a marked decline in the proportion of unacceptable milk samples. In addition there was clear consumer demand for milk purchased from the trained traders using more appealing containers.

Figure 3. Comparison of quality of milk samples from untrained and trained traders according to national (KEBS) hygiene standards for coliform counts (50,000 cfu/ml)

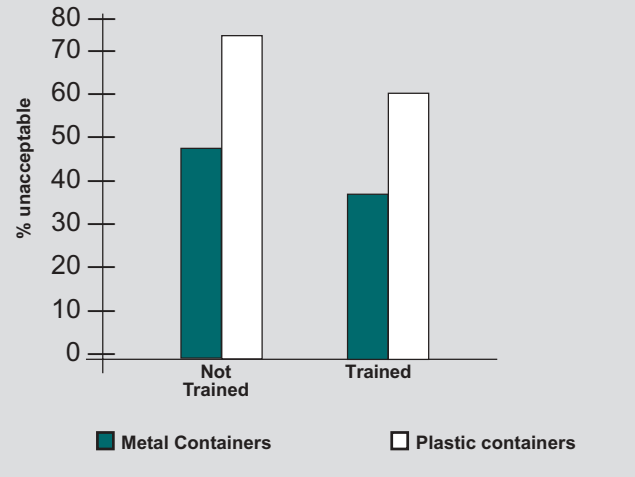


Figure 4. Milk cans developed in collaboration with small traders in Nakuru

Conclusions

The following conclusions can be drawn from this study of the health implications of raw milk trading:

- Boiling raw milk, as with pasteurization, destroys all harmful bacteria that may be present. A greater health risk may be presented by antimicrobial residues, which can occur in both raw and pasteurized milk.
- Current licensing of traders, in itself, makes little difference to quality of milk.
- However, licensing in conjunction with training and accreditation can lead to significant gains in milk quality.

Policy implications

The following factors need to be considered when devising policies related to milk quality:

- Dairy marketing policies in developing countries have often relied on standards derived from industrialized countries where large-scale production systems, cold-chain pathways, and milk pasteurization are key features. However, some of these standards may be inappropriate in developing countries, owing to climate, poor infrastructure, and large distances.
- In Kenya, as in most developing countries, consumers prefer unpasteurized milk and are often not willing to pay the extra costs associated with packaging and processing.[6]
- The almost universal practice of boiling milk destroys harmful disease pathogens and largely eliminates public health risks.

Considering such factors, the following policy directions might be appropriate:

- A review of current dairy industry policies and legislation is needed, with a view to creating greater consistency between related policies, and between policy and legislation in the industry. Current dairy policy recognizes the sale of raw milk; regulations, however, often discourage it.[7]
- Both formal and informal channels play important roles in meeting consumer needs; therefore realistic standards for both pathways need to be considered.
- Any rational development of raw milk markets will involve licensing of raw milk traders, to allow for monitoring of milk quality, along with a recognized system of training and accreditation. Milk cess revenue from such traders, along with fees for licensing and training, could finance such a system.
- Antibiotic use at farm level may need further investigation and intervention.
- Consultative bodies such as the Dairy Public Health Committee, set up by stakeholders and convened by the KDB, provides an ideal mechanism for dialogue and a platform to agree on practical and detailed recommendations to address public health concerns, while maximizing efficiency in milk markets.

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[1] See brief 1, 'The Demand for Dairy Products in Kenya'.

[2] See brief 2, 'Employment Generation in the Kenya Dairy Industry'.

[3] Omore, A., Arimi, S., Kangethe, E., McDermott, J., Staal, S.J., Ouma, E., Odhiambo, P., Mwangi, A., Aboge, G., Koroti, E., and Koech, R. 2002. 'Assessing and Managing Milk-Borne Health Risks for the Benefit of Consumers in Kenya.' SDP Collaborative Research Report.

[4] The KEBS standard for coliform counts in 'good milk' is a maximum of 50,000 cfu/ml. This applies to bacterial counts for raw milk destined for processing, and not for direct sale to consumers. Pasteurization KEBS standard for processed milk is a maximum of 10 cfu/ml.

[5] According to national (KEBS) standards for major milk-borne hazards.

[6] See brief 1, 'The Demand for Dairy Products in Kenya'.

[7] See brief 6, 'The Policy Environment of Kenya's Dairy Sector'.

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