DAIRY IN ETHIOPIA

APPLICATION OF THE SUPPLY CHAIN ANALYSIS FOR NUTRITION (SCAN) TOOL

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ABOUT GAIN

The Global Alliance for Improved Nutrition (GAIN) is a Swiss-based foundation launched at the UN in 2002 to tackle the human suffering caused by malnutrition. Working with governments, businesses and civil society, we aim to transform food systems so that they deliver more nutritious food for all people, especially the most vulnerable.

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SUMMARY

In Ethiopia, per capita annual consumption of dairy is just 11% of World Health Organization recommended levels. Low incomes are a key constraint to dairy consumption, as many consumers cannot afford to buy dairy in recommended quantities. Key sector constraints are centred around rural scarcity, high prices, and quality concerns. To support the improvement of the dairy sector in Ethiopia, this briefing paper presents a supply chain analysis of dairy in Ethiopia, with a focus on the barriers and possible mechanisms for scaling.

The results suggest that the potential of dairy products to improve nutrition is high, especially for drinking milk and yoghurt products, and should be explored through traditional and informal channels. Collaborative efforts to support smallholder farmers are needed to improve milk supply and quality. Concerns about low disposable incomes should be addressed through single-serve product variations to promote affordability. Operational constraints in the traditional and informal sectors should be addressed through sustainable mechanisms, such as improved access to refrigeration systems (e.g., mobile coolers).

KEY MESSAGES

- In Ethiopia, approximately 4.4 billion litres of fresh milk were produced in 2018, with 3.08 billion litres (70%) for human consumption; of this, 57% was consumed by rural households and 43% processed and distributed through supply chains.
- Dairy consumption has historically been low due to lack of affordability and availability.
- Quality issues centre around a lack of hygiene and issues of contamination during milk production and handling, adulteration/pooling of milk due to the fragmented supply chain, and issues with packaging materials, such as labels.
- Targeting low-income dairy consumers will require taking the product to them and tailoring strategies to their lifestyles through smaller packaging and pasteurised products as well as leveraging traditional and informal channels' proximity to them.

BACKGROUND AND OBJECTIVE

In Ethiopia, micronutrient deficiencies are common, leading to poor growth and development among young children and malnutrition among other vulnerable populations, such as pregnant and lactating

women: 37% of children under 5 are stunted and 21% of them are underweight (1). This is largely due to inadequate diets: only 11% of Ethiopian children aged 6-23 months were fed a diet that met minimum standards for diversity and meal frequency (1). In particular, animal-source foods such as dairy are rarely consumed – even though these are dense sources of multiple micronutrients. For example, dairy products are excellent sources of calcium, vitamin A, and vitamin B12, as well as good sources of zinc (2). However, per capita annual consumption of dairy in Ethiopia is just 11% of World Health Organization (WHO) recommended levels (22 litres versus 205 litres) (3). Increasing dairy consumption represents an opportunity to address nutritional deficiencies in the population, but there are barriers. While three-quarters of households live in rural areas where 'own-production for own consumption' is prevalent (3), for most low-income households, dairy products are unaffordable due to limited disposable incomes.

To support the strengthening of the dairy sector in Ethiopia, this briefing paper presents a supply chain analysis of dairy in Ethiopia, with a focus on the barriers and possible mechanisms for scaling. The analysis applies the Supply Chain Analysis for Nutrition (SCAN) tool, developed by the Global Alliance for Improved Nutrition (GAIN) for analysing specific supply chain weaknesses or bottlenecks and suggesting potential mechanisms to improve nutrition along the supply chain (4). Using the SCAN tool, this analysis builds upon a market assessment completed by Euromonitor International, which was based on secondary research, sales channel visits, trade interviews, and a survey of 279 consumers (3).

FINDINGS

CHARACTERISTICS OF THE FOOD ENVIRONMENT

The top product categories of dairy analysed are drinking milk, powdered milk, infant milk formula,[1] yoghurt, cheese, and butter. The key characteristics of dairy within the food environment (i.e., accessibility, desirability, and quality) are outcomes of the supply chain, in interaction with the broader food system in Ethiopia. These shape consumers' decisions around food acquisition, with implications for their nutrition.

Accessibility: Dairy product categories include fresh (or 'raw'), pasteurised, and long-life drinking milk; powdered milk; infant milk formula; flavoured and plain yoghurt; hard and soft cheese (especially cottage cheese); and various types of butter. Low incomes are a key constraint to dairy consumption, and most consumers cannot afford to buy dairy in recommended quantities. For example, current pricing of powdered milk makes it prohibitive for many consumers, and infant milk formula costs more than some households' weekly grocery spend (3). Yoghurt products are relatively inexpensive given stiff brand competition and become more affordable when produced in single-serving cups. Rising rural-urban migration (due to industrial expansion in Addis Ababa and other urban and peri-urban areas) is increasing disposable incomes and driving an increase in food accessibility and affordability. However, scarcity remains a key limitation in rural areas: 20% of rural consumers cited lack of product availability as a reason for not consuming dairy products (3). Accessibility of most dairy products is not an issue in modern retail outlets, but traditional retail is unable to stock some products due to supply and capacity limitations, except for fresh and pasteurised drinking milk, yoghurt, soft cheese, and

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[1] Exclusive breastfeeding until age 6 months and continued breastfeeding beyond that are recommended by the WHO for optimal child nutrition and growth.

unsalted butter. Informal retail struggles with supply and capacity limitations for all dairy product types except for fresh drinking milk, plain (unflavoured) milk, soft cheese, and unsalted butter (3).

Desirability: Milk is the most widely consumed product given its low price, with preference for the cheaper priced fresh milk. Following milk, yoghurt is the second-most-popular dairy product. Considering motivations, 72% of consumers see the health and nutritional value as one of dairy's key benefits, while the convenience of packaged milk is also seen as an important benefit (75% of consumers) (3). Product development, including processing of probiotic yoghurt, and the availability of different flavours have improved the popularity of yoghurt. Soft cheese, including cottage cheese, is also popular with consumers. People do not consume dairy products either because they do not like dairy products (64%), they are too expensive (23%), or there is a lack of product availability (5%) (3). In addition, 75% of Christians completely abstain from dairy during fasting periods (which encompass nearly half of calendar days), while others might consume yoghurt (3); unlike Orthodox Christian fasting, Muslim religious fasting does not impact consumption.

Quality: Inefficient quality control systems allow substandard dairy products to reach markets. For example, there is lack of hygiene and issues of contamination during milk production, as well as adulteration or pooling of milk due to the fragmented supply chain and issues with packaging materials (such as labels and expiry dates). These all affect the quality of dairy products on the market (3). Safety concerns seem to be particularly present in rural areas, with 9% of consumers citing them as a reason for not consuming dairy products (3). Safety concerns are centred around the widespread consumption of raw milk; consumption of pasteurised milk could be promoted to reduce safety concerns (3).

ASPECTS OF THE SUPPLY CHAIN

In Ethiopia, approximately 4.4 billion litres of fresh milk were produced in 2018, 3.08 billion litres (70%) of which were for human consumption; of that, 57% was consumed by rural milk-producing households directly and 43% was processed and sold via supply chains (6). The remaining 1.32 billion litres were wasted (20%) or consumed by calves (10%) (6). The dairy supply chain in Ethiopia is traditional and fragmented (Figure 1). Products, processes, people, and policies are four aspects that affect the transactions happening within the supply chain and the surrounding business and social environment.
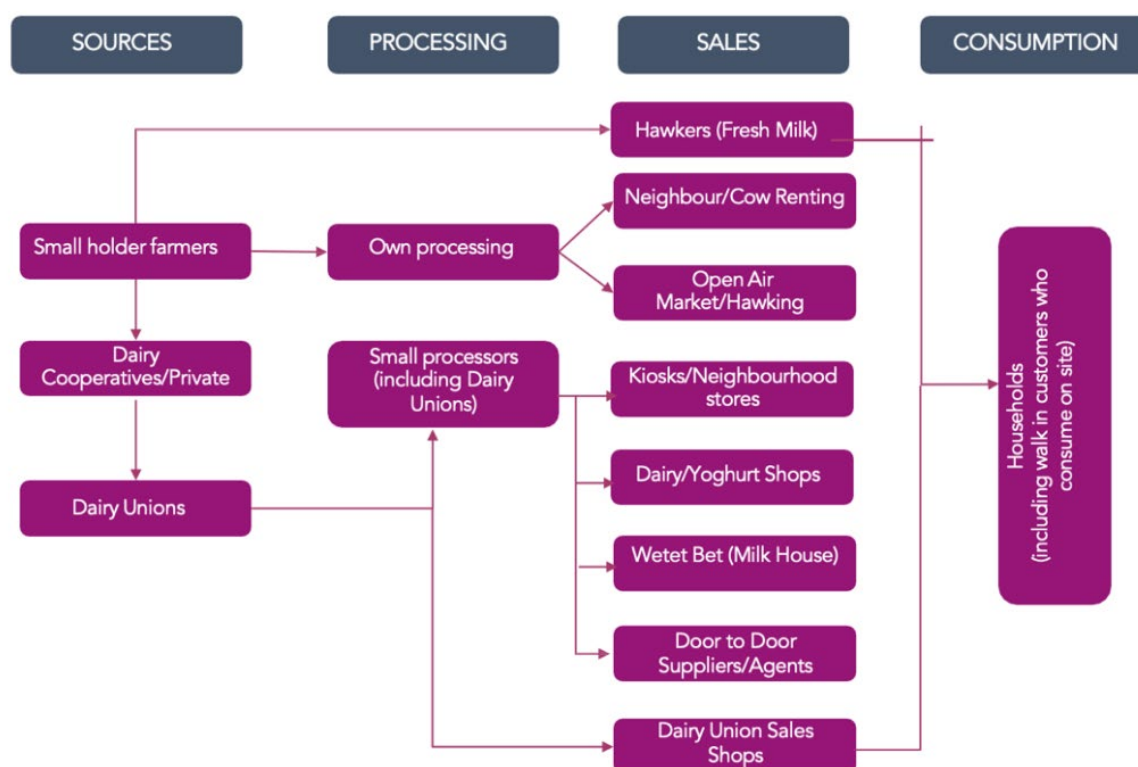
Figure 1: Overview of the dairy value chain in Ethiopia (3).

PRODUCTS. Pre-farm and On-farm: Cows comprise 91.3% of the milking animal herd (5). Milk produced from animals besides cows is largely un-marketed. **Post farm:** Drinking milk is the largest dairy product category consumed in Ethiopia, accounting for 63% of total dairy market value in 2018, mainly driven by high consumption of raw or fresh milk (largely in rural areas), followed by pasteurised milk (3). Yoghurt constitutes 29% of the market amid an increasing number of processors, implying increased supply, and growing consumption of flavoured yoghurt (3). Cheese and butter account for a small share, but the processing of these products with longer shelf lives has helped reduced milk wastage. Powdered milk and infant milk formula cumulatively account for 1% of the market value (3). They are the two most expensive products and are consumed mainly by middle- and high-income consumers in urban areas.

PROCESSES. Pre-farm and On-farm: Challenges with migrating to urban and peri-urban cities with cattle have rendered some rural and pastoral migrant households unable to continue with production of dairy. **Post-farm:** Significant volumes of milk produced are lost due to a lack of refrigeration facilities or cooling centres and the fragmented nature of milk sources (i.e., many farmers in remote villages that milk collectors cannot reach). To salvage their milk, rural households convert it to more shelf-stable products, such as cheese and butter, for their own use, sale in surrounding rural markets, or barter to neighbours.

PEOPLE. Pre-farm and On-farm: Most milk production comes from smallholder farmers in rural areas who pool their milk through dairy cooperatives organised under dairy unions (5). **Post farm:** There are approximately 32 industrial dairy processors in the country, mostly located in Addis Ababa and peri-urban areas (6). Product supply is limited, with most processors operating below 40% of capacity.

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However, the entrance of new processors (both single and joint ventures) for dairy products, especially drinking milk and yoghurt (e.g., 7D Food Factory, Misale Dairy, Choye Plc.), has improved availability in urban areas. Ethiopia's urbanisation rate is 4.6%, higher than the global average of 1.9%, yielding a growing urban population with increased demand for food, including dairy products (3).

KEY BARRIERS

Multifaceted constraints hinder the growth of Ethiopia's dairy industry. Local cow breeds, which dominate the dairy herd, have low yields of around 1.5 litres (3). Milk production from smallholder farmers is fragmented in nature, which affects efficiency of milk pooling. The low quality and unsteady milk supply results in a supply deficit, with dairy processors operating below capacity. Limited processing capacity affects re-stocking of and supply to retail channels. Dipping demand during fasting seasons dampens production and overall market activity. General scarcity of foreign currency to facilitate imports, especially of powdered dairy products, affects stock flow. Depreciation of the Ethiopian Birr also makes imported dairy products more expensive. Difficulties, including limited transportation for milk collectors and agents and lack of cold storage centres, lead to high wastage (20%); finally, poor monitoring of quality control standards hinders market growth (3). The structural challenges in the dairy supply chain in Ethiopia can be separated into four categories: production, processing, sales ,and consumption (Figure 2).

Milk Production

- Dominance of local breed cows with low milk yield
- Low supply of fodder which is also expensive
- Dry season negatively impacts grazing, needing fodder
- Fragmented production, dominated by subsistent dairy farming and therefore a small herd size per farmer
- Lack of chilling facilities on farm/nearby
- Lack of hygiene and issues of contamination
- Dispersed location of dairy farmers hinders efficient provision of health services to cattle

Milk Processing

- Inconsistent supply and low quality of raw milk
- Adulteration of raw milk (on-farm and during pooling)
- Inadequate refrigeration (small processors) and chilled transport
- Lack of packaging material
- Equipment breakdown (lack of replacement parts)
- Regulatory clampdown/shutdown (failure to meet product standards)
- Lack of economies of scale – below capacity operations

Milk Sales

- Lack of refrigeration especially in traditional and informal channels limits volumes
- Logistical problems limits capacity for bulk trading
- Fluctuating supply/stock levels due to processors' limited capacity
- Scarcity of foreign currency
- Issues with packaging materials (labels, expiry date, bursts)

Milk Consumption

- Low consumption rates and low awareness of nutritional value of dairy
- Low disposable incomes / high prices of dairy
- Lack of refrigeration
- Poor monitoring of product standards (safety concerns)
- Lack of access to dairy products (rural areas)
- Limited marketing

Figure 2: Structural challenges in the dairy supply chain in Ethiopia (3).

RECOMMENDATIONS AND OPPORTUNITIES

Collaborative efforts to support smallholder farmers are needed to improve milk supply and quality in Ethiopia. Operational constraints in the traditional/informal sector should be addressed with sustainable mechanisms. Recommendations for tackling the production, processing, sales, and consumption constraints mentioned in the previous section are as follows.

Recommendations for milk production
1. Support production of fodder crops from by-products and crop residues (e.g., maize stalks).
2. Foster economies of scale in milk collection by supporting the establishment of dairy cooperatives in remote rural areas where they are lacking.
3. Partner with private companies and government to make veterinary services more accessible to farmers through a model that links farmers to health services.
4. Train farmers on hygienic product handling, from milking to pooling, and provide suitable equipment for milking and transportation (e.g., stainless steel buckets and cans).
5. Provide milk testing equipment to dairy co-operatives and unions to address issues of contamination at the point of milk pooling/collection.
6. Support the establishment of cooling centres/hubs in key dairy producing areas.

Recommendations for milk processing
1. Encourage processors to produce milk and yoghurt in single-serve sizes to improve affordability.
2. Facilitate contractual milk supply agreements between dairy unions and processors.
3. Improve technological and operational capacity of processors by providing access to training on more efficient processing technologies and equipment.
4. Foster collaboration between processors (through government and industry associations) to avoid new investments in overcapacity, harness synergies, and fully utilise existing capacity.
5. Support small processors to obtain financing to access chilled transport facilities to increase collected and processed volumes.
6. Facilitate processors' access to eco-friendly dairy packaging materials to reduce the use of single-use plastic.
7. Train small processors on the implementation of efficient internal quality control systems to check the quality of products before release to the market.

Recommendations for dairy sales
1. Facilitate credit sales agreements between traditional and informal channels and small processors to address issues of low stock levels due to inadequate capital.
2. Support access to cheap refrigeration systems (e.g., mobile coolers) for informal channels to increase trading capacity.
3. Improve operations of informal channels by providing access to simple logistics solutions (e.g., bicycles with attached storage units) to increase capacity for bulk purchase and trading.
4. Support the establishment of a technology-based stock management system that links traditional channels to small processors in their vicinity to ensure timely restocking.
5. Encourage traditional retail shops to invest in simple branding solutions, such as printed stickers, to improve product visibility and attract consumers.

Recommendations for dairy consumption
1. Increase consumers' awareness of the nutritional value of dairy through community outreach programmes in high-density suburbs of Addis Ababa and peri-urban areas.
2. Support the establishment of SMEs and dairy co-operative processors in key rural areas, to supply processed dairy products like yoghurt to surrounding areas.
3. Collaborate with grassroots-level stakeholders (e.g., community leaders) to educate rural households on hygienic milk handling processes and the value of processed dairy products like yoghurt for older (non-breastfeeding) children.
4. Partner with local processors to produce shelf-stable powdered milk in cheaper packaging material than tins (e.g., cardboard boxes and aluminium foil sachets) and in small quantities (e.g., 15 g) to promote access for low-income consumers.

Additionally, dairy consumption has historically been low due to lack of affordability and availability. Targeting low-income consumers requires taking the product to them and tailoring strategies to their lifestyles; examples for doing so are shown in Figure 3.
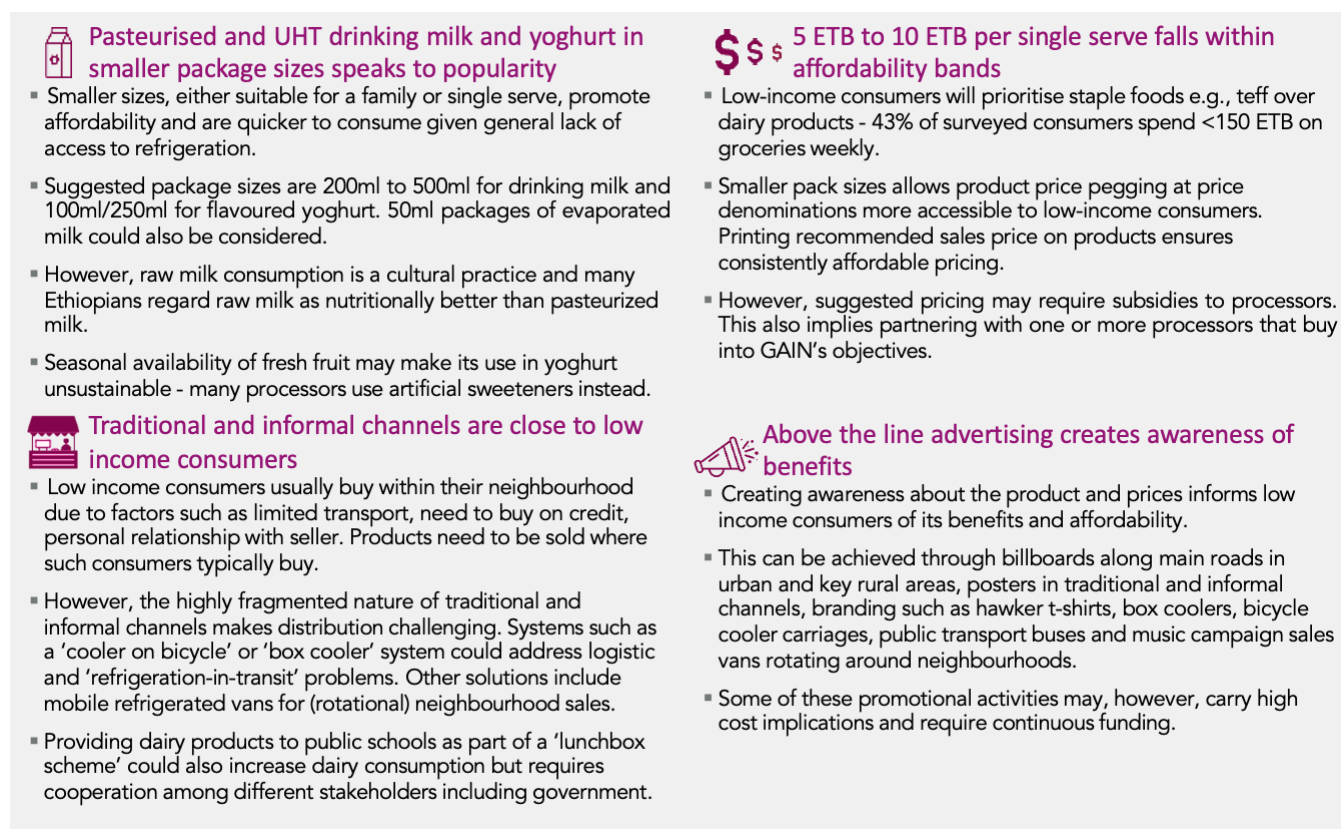
Pasteurised and UHT drinking milk and yoghurt in smaller package sizes speaks to popularity

- Smaller sizes, either suitable for a family or single serve, promote affordability and are quicker to consume given general lack of access to refrigeration.

- Suggested package sizes are 200ml to 500ml for drinking milk and 100ml/250ml for flavoured yoghurt. 50ml packages of evaporated milk could also be considered.

- However, raw milk consumption is a cultural practice and many Ethiopians regard raw milk as nutritionally better than pasteurized milk.

- Seasonal availability of fresh fruit may make its use in yoghurt unsustainable - many processors use artificial sweeteners instead.

Traditional and informal channels are close to low income consumers

- Low income consumers usually buy within their neighbourhood due to factors such as limited transport, need to buy on credit, personal relationship with seller. Products need to be sold where such consumers typically buy.

- However, the highly fragmented nature of traditional and informal channels makes distribution challenging. Systems such as a 'cooler on bicycle' or 'box cooler' system could address logistic and 'refrigeration-in-transit' problems. Other solutions include mobile refrigerated vans for (rotational) neighbourhood sales.

- Providing dairy products to public schools as part of a 'lunchbox scheme' could also increase dairy consumption but requires cooperation among different stakeholders including government.

5 ETB to 10 ETB per single serve falls within affordability bands

- Low-income consumers will prioritise staple foods e.g., teff over dairy products - 43% of surveyed consumers spend <150 ETB on groceries weekly.

- Smaller pack sizes allows product price pegging at price denominations more accessible to low-income consumers. Printing recommended sales price on products ensures consistently affordable pricing.

- However, suggested pricing may require subsidies to processors. This also implies partnering with one or more processors that buy into GAIN's objectives.

Above the line advertising creates awareness of benefits

- Creating awareness about the product and prices informs low income consumers of its benefits and affordability.

- This can be achieved through billboards along main roads in urban and key rural areas, posters in traditional and informal channels, branding such as hawker t-shirts, box coolers, bicycle cooler carriages, public transport buses and music campaign sales vans rotating around neighbourhoods.

- Some of these promotional activities may, however, carry high cost implications and require continuous funding.

Figure 3: Recommendations for targeting low-income dairy consumers in Ethiopia (3).

CONCLUSIONS

While increased consumption of dairy could have significant benefits for nutrition in Ethiopia, there are various challenges with developing the sector. Low incomes are a key constraint on dairy consumption, as most consumers cannot afford to buy dairy in recommended quantities. Rural scarcity, high prices, and quality concerns are also issues, and modern retail is the only channel without reported availability issues. However, there are also opportunities for development and growth. Collaborative efforts to support smallholder farmers are needed to improve milk supply and quality. Operational constraints in the traditional sector need to be addressed through sustainable mechanisms, such as greater promotion of single-serve packaging to promote affordability and improved access to refrigeration systems.

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