Ministry of Livestock and Fisheries

Dalberg

Sector Analysis: Price, Cost, Revenue, Profitability and Human capital chains in Tanzania's Dairy Sector

REPORT

21 OCTOBER 2019

STUDY BACKGROUND

SECTION ONE

Ministry of Livestock and Fisheries

This work seeks to understand beneficiation across the dairy value chain and identify opportunities to strengthen the sector

Context

- Dairy is a key sector in Tanzania, contributing thirty percent of domestic production in the livestock sector and about 1.2% of national GDP
- The Government of Tanzania has prioritized the dairy sector as a driver of industrialization, food and nutrition security, and incomes
- While Tanzania has a competitive advantage of a large livestock sector, opportunities within the dairy sector are is still under-utilized
- Productivity remains the biggest challenge in the sector limiting potential growth, particularly for smallholders

Objectives

This work is an exploratory study that sets out to:

- **Map out the beneficiation** for both unprocessed and processed milk commodities – identifying costs, revenues and margins along the value chain
- **Understand beneficiation drivers** to identify potential levers to enhance profitability of the value chain (e.g., analysing potential improvements in production techniques, the role of improved capacity utilization at processing sites, etc.)
- **Identify human capital capacity gaps** across the value chain

In turn, this work seeks to inform interventions from the Ministry of Livestock and Fisheries, the Tanzanian Dairy Board, and other relevant actors

Source: Tanzania Dairy Board, State of Dairy Industry of Tanzania 2018/19, 2019

Over 80 stakeholders were interviewed to develop insights on beneficiation in the dairy sector, opportunities for growth, and the human capacity gap

Process overview

1. Aligned with the SteerCo on the objectives and methodology of study
2. Conducted desk research based on available information and publications
3. Performed field work and interviews
4. Aligned on findings and insights from field work and data analysis

Interviewees

Input providers
- 7 input providers

Producers
- 6 producer collectives
- 3 Large farmers
- 50+ small farmers

Traders
- 4 Traders

MCCs
- 6 MCCs

Processors (7)
- Tanga Fresh
- Azam Dairy
- Milkcom
- Galaxy
- ASAS
- Sebadon milk
- Mufindi milk group

Retailers
- Various retail shops
- 4 Dairy specific retailers

Sector actors
- International Livestock Research Institute
- East Africa Dairy Development project
- SAGCOT
- TAMPA
- SUA
- Sao Hill
- 2 Extension officers

EXECUTIVE SUMMARY

SECTION ONE

Ministry of Livestock and Fisheries

The value chain faces pressures at both ends; producer productivity and consumption are insufficient, pressuring processors and enabling informality

National milk **consumption is insufficient** when compared to neighbors and WHO guidelines

Farmer productivity is low; as such, low volume of output leads to impaired livelihoods even with a higher farm gate price

Weak consumption plus insufficient raw milk input supply leads to **poor processor utilization**, driving down profitability

Inefficiencies across the value chain drive up viable prices for unprocessed milk and eventually processed milk, incl. high costs of packaging and transport, and poor infrastructure

In turn, **the informal economy thrives** – driven by:

- A **price premium** in the informal trade – while at low production volumes many farmers can sell all of their output through this market
- **Market access** – were working through traders can be easier than accessing formal markets
- **Liquidity** – with the informal trade offering immediate payment vs. 7-15+ days for formal trade

Source: Dalberg analysis, 2019

Strong demand should be viable, but to strengthen the sector and drive processor utilization interventions are needed to unlock demand potential

2.7 billion liters

Current consumption with per capita value of 49L

Potential for additional 25 liter/capita consumption to match regional average

4.2 Billion L
Consumption

- To maximize utilization of existing processing capacity, a **4.4x** increase in the demand for processed milk would be required
- With only **2.7%** of raw milk being processed, sufficient demand could be created through the substitution of raw milk for processed milk alone
- Significant extra demand should be possible in Tanzania – consumption is below WHO recommended volumes of **200 liters** per capita and regional average of **74 liters per capita**
- Even if domestic demand was saturated, improved efficiency could **unlock export markets**, incl. DRC, Malawi, and Mozambique, to further grow processor utilization
- Driving sufficient demand in Tanzania will **require intervention to** address today's low levels of consumption and prevalence of unprocessed milk sales however

Source: Tanzania Dairy Board, State of Dairy Industry of Tanzania 2018/19, 2019; Dalberg analysis, 2019

Improving productivity for farmers, will lead to lower overall costs per liter and higher farmer incomes

Tsh 2,000

Additional beneficiation of a price floor that increases price by Tsh 200 for a farmer with 2 cows producing 5 liters each

Vs.

Tsh 8,410

Additional beneficiation of doubling the productivity of the same farmers existing 2 cows from 5 to 10 liters/day

- Although a price floor for milk may appear appealing, output rather than yield is the greater sensitivity driver of farmer livelihoods
- While most traditional breeds produce less than 2L/ day, productivity for improved breeds ranges from 18 to 45L/ day which lowers per liter production costs
- Feeding improvements can lead to an additional 6 to 8 L/ day but most farmers keep cows in open-range systems that are unconducive for optimal feeding
- Although absolute costs increase, improved productivity also drives down costs per liter of milk produced – reflecting a stronger margin (and a good business case). On average, farmers with high yields spend c. Tsh 200,000 more per cow to get an additional 5L/day, leading to lower overall costs particularly since fixed costs like labor, building related costs, vaccines, and calf milk stay stagnant and other costs experience economies of scale (e.g., purchase of feed in bulk)
- Targeted interventions are required to drive farmer productivity – tailored to distinct farmer archetypes (e.g., mixed vs. dedicated dairy farmers) to focus effort relative to reward

Source: Nicostratus Magori, Effect of Feeding Practice on Performance of Dairy Cattle; ILRI, Tanzania smallholder dairy value chain development, 2014. Dalberg interview and analysis, 2019

Even though processors cost base is heavily variable, improving utilization can uplift profitability, which in turn can improve producer beneficiation

Tsh 29/liter

Improved beneficiation resulting from a 10% increase in processor capacity utilization

If passed on in full, this will yield…

+10% uplift

In producer beneficiation per liter of milk

- Processors are currently running at very low levels of utilization – often as low as 30% (vs. 70% best practice utilization levels for manufacturing assets)
- Low levels of utilization driven by a combination of market uncertainty (given low demand) combined with difficulty sourcing sufficient quantity of inputs
- Improved utilization has been modelled to produce sufficient additional profit that, if passed on in full, could materially uplift farmer beneficiation by 10%+
- The case of Tanga Fresh (part co-op owned processor) proves that improved utilization can directly improve farmer beneficiation – where high seasonal production can yield higher prices for farmers
- This benefit should accrue naturally as demand and profitability are resolved, but some interventions may be required to ensure this is distributed across the value chain (not just retained by processors)

Source: Tanzania Dairy Board, State of Dairy Industry of Tanzania 2018/19, 2019; Dalberg analysis, 2019

Stronger ancillary service markets have the potential to drive down variable costs, create employment, and reflect potential investment opportunities

Packaging production

Transport / logistics

Primary input services

Dairy industry certification

- **89%** of processor costs per liter are variable costs, and thus not impacted by improved utilization – e.g., raw milk prices, transport, packaging, taxes and levies
- Several of these reflect potential ancillary service markets that if better developed could **drive down costs** – e.g., localizing packaging production to reduce transport costs, or further optimizing logistics costs
- Additionally, these ancillary service markets reflect **sources of employment** that will grow as the dairy value chain matures – e.g., input services
- Many of these reflect potential investment opportunities, that would need to be further scoped and promoted based on their viability

Source: Tanzania Dairy Board, State of Dairy Industry of Tanzania 2018/19, 2019; Dalberg analysis, 2019

A three-pronged recommendation, covering both policy and programmatic interventions, can drive sector growth and improve beneficiation

Improve producer productivity – although relative profit margins (as a % of cost) may remain stable, this will yield more total profit for the farmer

Invest to address value chain inefficiencies – incentivizing processors to invest back into the value chain, while promoting ancillary service investments

Stimulate demand – provide greater certainty to processors and producers that expanding utilization will deliver sufficient demand in the formal milk trade

OVERVIEW OF THE DAIRY VALUE CHAIN

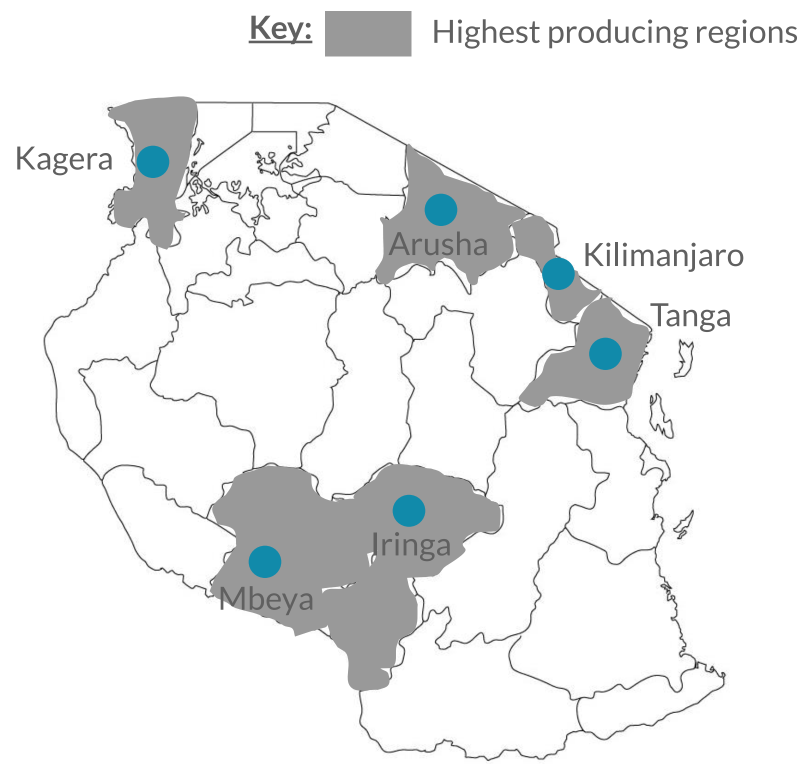
SECTION ONE

Tanzania's dairy sector comprises primarily of small-scale producers producing low volumes of milk for domestic consumption

OVERVIEW OF THE DAIRY SECTOR IN TANZANIA

- The livestock sector contributes 7.6% to GDP – 30% of the livestock sector GDP comes from the dairy value chain
- Currently Tanzania produces over 2.7 billion liters of milk
- Since 2008, dairy production has grown on an average of 5.3% per annum
- The value chain is dominated by small-scale producers primarily producing milk for domestic consumption
- 90% of the milk produced is consumed at the farm level while 10% goes through collection centers
- There are 221 milk collection centers distributed across the country of which 173 have a cooling capacity and 64 are non operational
- Only 2.7% of milk produced is processed
- There are 99 milk processing units handling 862,100 liters daily, ranging from micro-processing units to large processors such as Tanga Fresh which handles 45,000 liters daily
- In addition to local production, Tanzania imports about 24 million liters of liquid milk equivalent, 2016
- Local demand for unprocessed milk is low, with milk consumption per capita estimated at 49 liters, while FAO recommends per capita consumption of 200 liters

DAIRY PRODUCING REGIONS

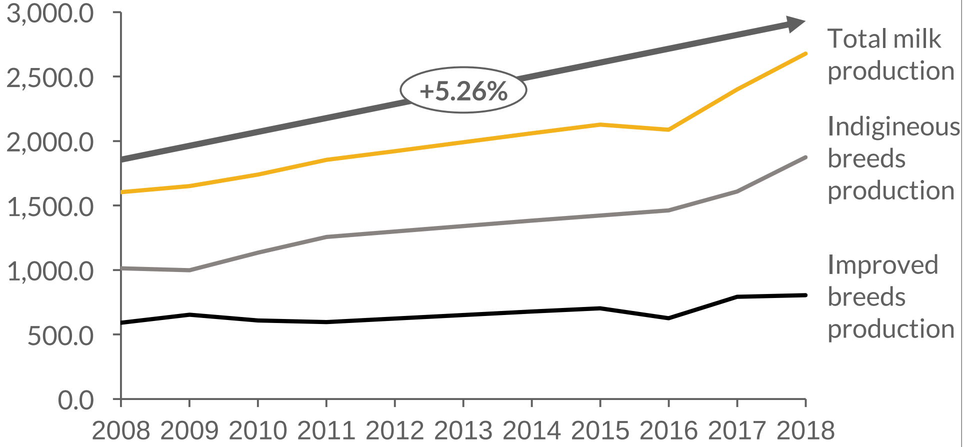


Dairy cattle are concentrated around the highlands of Kilimanjaro, Arusha, Mbeya, Iringa as well as Tanga and Kagera

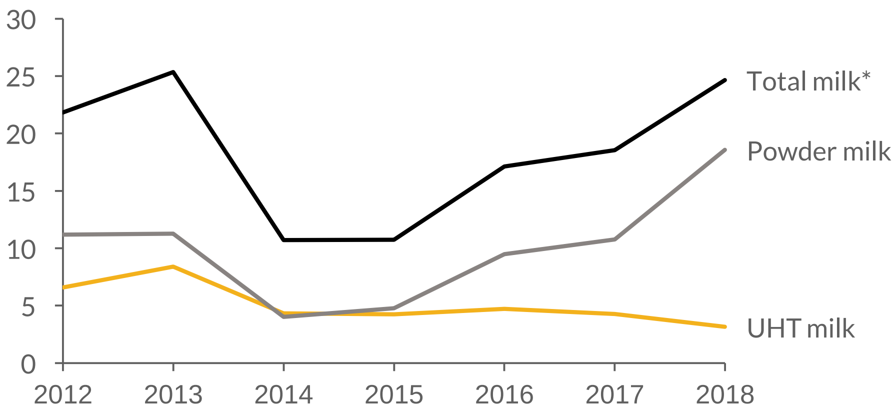
Sources: TechnoServe SAGCOT Investment Partnership Program, Market Assessment of Dairy Industry in Tanzania, FAO 2019

Tanzania's dairy sector has experienced steady growth over the past decade, with the indigenous breeds contributing 70% of the total production

Milk production in Tanzania, million liters



Milk importation – Liquid Milk Equivalent, million liters

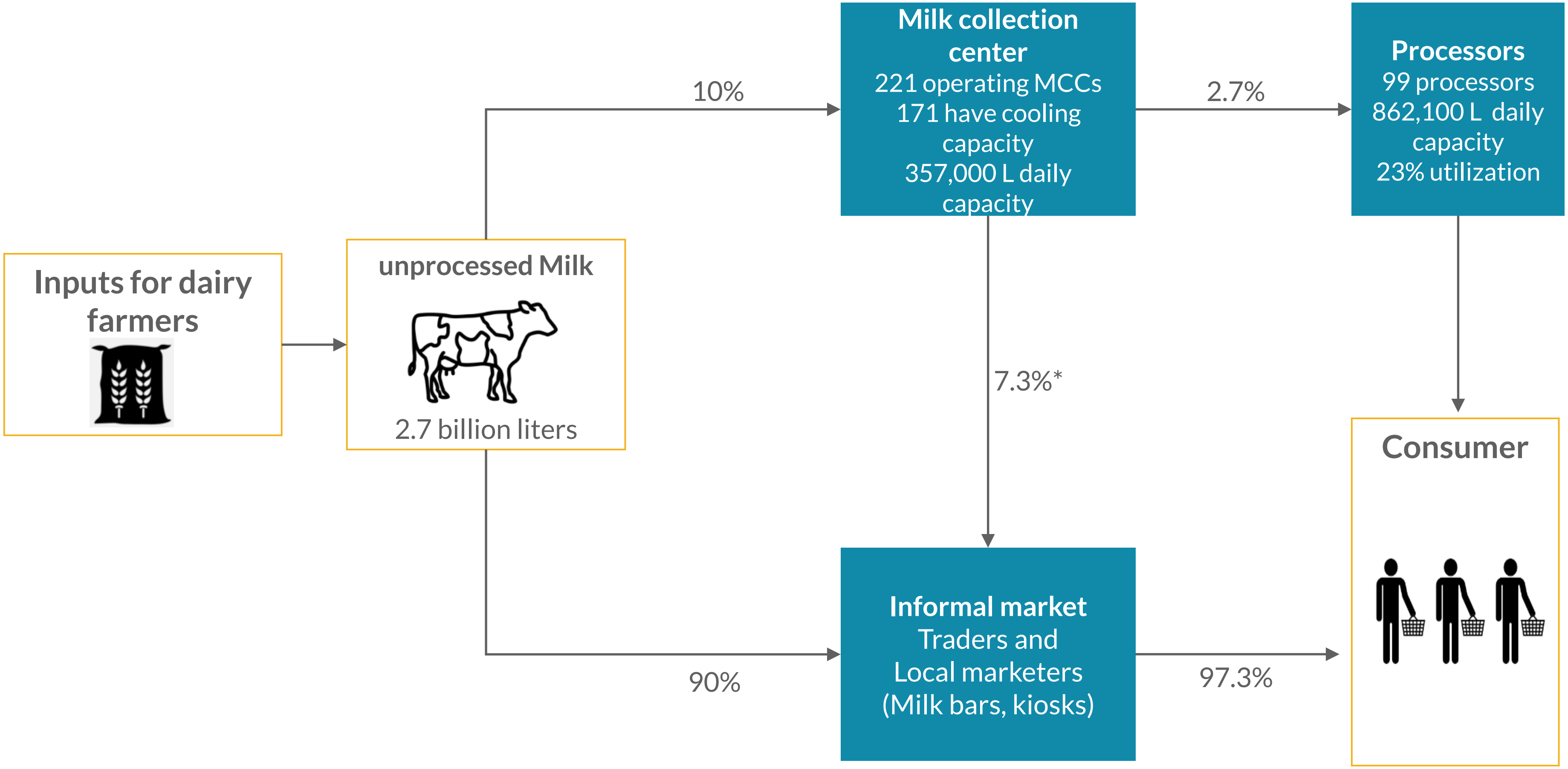


* Includes other milk product categories including cheese, butter, ghee, etc

- Milk production has been increasing in the country over the last decade primarily due to increased cattle population. Production from improved breeds has also increased over recent years
- Indigenous breeds produce approximately 70% of the milk with the remaining 30% coming from improved breeds (including cross-breeds). The majority of indigenous breed farmers practice open-range farming while improved breeds farmers practice semi-intensive to zero-grazing farming
- The primary drivers of milk consumption include income, geography and awareness
  - **Income.** Processed milk if often consumed by more affluent households (middle-to-upper income) while the relatively cheaper unprocessed milk is common among low income households *(observational)*
  - **Geography**. Most peri-urban and urban milk customers consume processed milk while rural milk customers consume unprocessed milk. There is also a thriving unprocessed milk market in urban areas e.g. Ubungo Maziwa
  - **Awareness**. Health campaigns have increased milk consumption primarily with children
- Milk imports are relatively small compared to production but cover a significant proportion of the market for processed milk products. Powdered milk particularly is very popular with the current import tariff charged on weight limited due to producing 8 times its weight in milk. Applying the tariff on milk equivalent can increase annual revenues by **Tsh 32 billion**

Sources: FAOSTAT, 2019, Tanzania Dairy Board, State of Dairy Industry of Tanzania 2018/19, 2019

The dairy value chain is semi-structured; majority of milk sold in Tanzania is marketed informally in villages, with few aggregators and processors



% Percentages indicate estimated volume through each channel

*MCCs also act as traders selling consumers

Sources: Tanzania Dairy Board, State of Dairy Industry of Tanzania 2018/19, 2019 , Dalberg Analysis, 2019

Ministry of Livestock and Fisheries

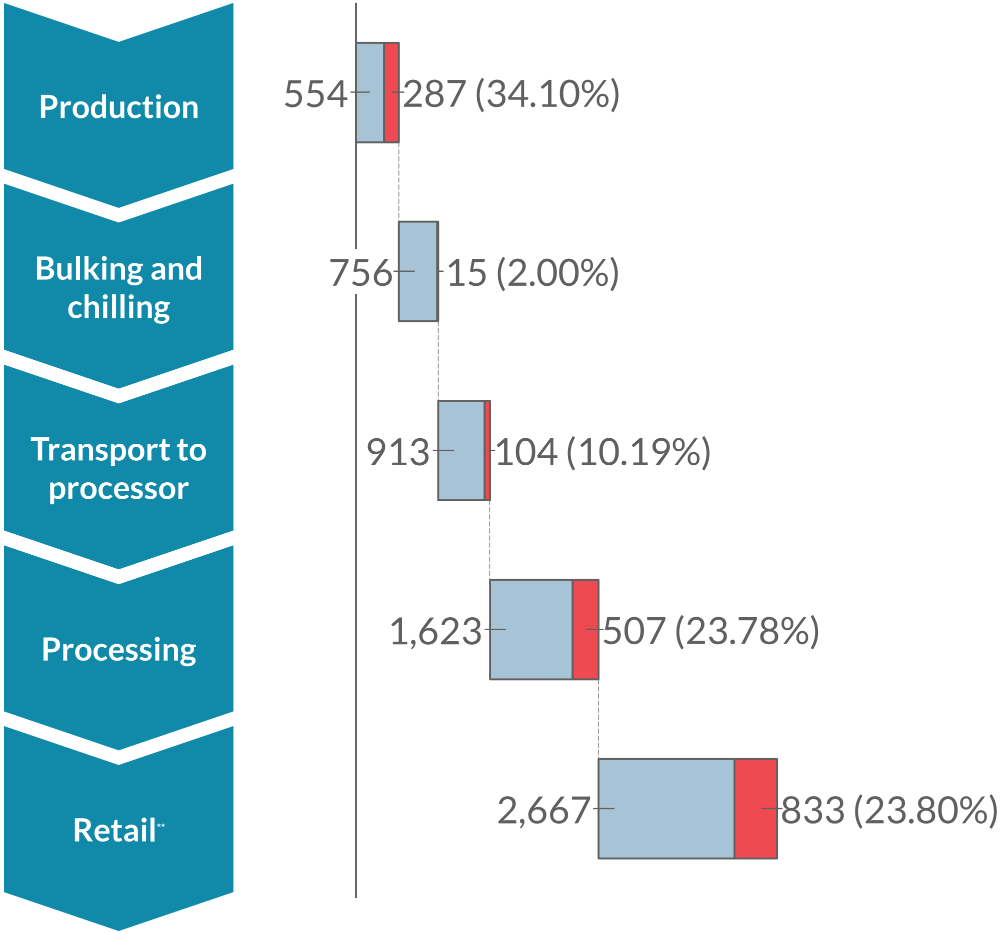
Dalberg

BENEFICIATION IN THE VALUE CHAIN

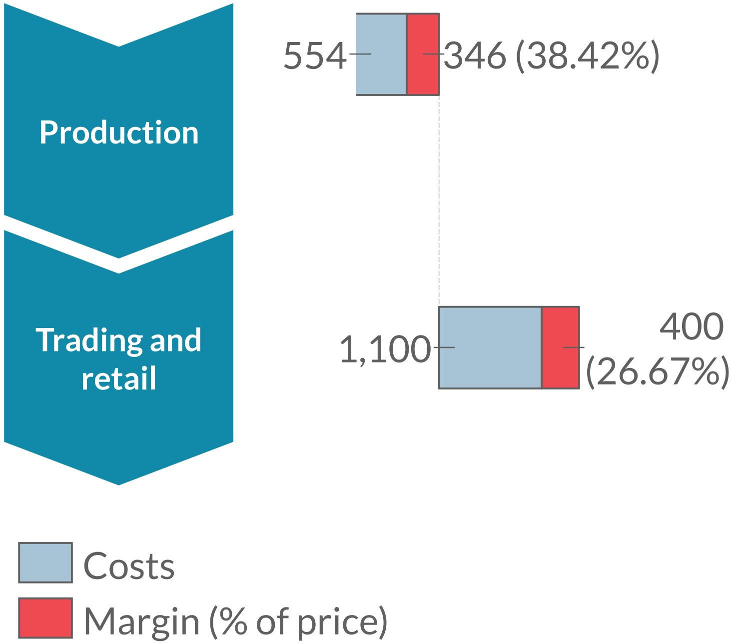
SECTION TWO

Share of absolute margin is higher further down the value chain, although in the fresh value chain producers and processors accrue higher margins

Beneficiation for processed milk



Beneficiation for unprocessed milk*



All costs are cumulative e.g. the bulking and chilling cost of Tsh 756/L is inclusive of the production cost of Tsh 554/L

*Despite higher margins the raw milk market is usually constrained with limited ability to make sales at scale for most farmers. *Our sample size for retailers operating in unprocessed milk is relatively small and current margins and costs would very based on trader, location, and sales channel**Retailer costs and margins are dependent on the number of actors (wholesalers and retailers) to final retailer and pricing strategies

Ministry of Livestock and Fisheries

Dalberg

National consumption for milk is low relative to neighbors and WHO guidelines, while informal sales capturing a significant share of demand

Input providers | Production | Collection centers | Transport / Traders | Processing | **Market demand**

Overall demand:

- Unlike neighboring East African, Tanzania does not have a milk-drinking culture – current consumption is 49 liters per capita (vs. 53 liters in Uganda and 120 liters in Kenya, vs. WHO guidelines of 200 liters)
- Processors have been taking steps to drive demand including promoting school milk-drinking programs, but utilization is still low. Changes in the seasonal supply of milk drives variation in demand for milk

Product preferences:

- The dairy market is dominated by sales into the informal market with over 90% of milk avoiding milk collection centers and going straight to consumers
- Income is a key determinant of milk preference where raw milk is preferred in rural areas (predominantly low income) while processed milk is preferred in urban areas (predominantly middle-to-upper income)
- Pack size was identified as a challenge especially when targeting lower-income communities. The most common pack sizes are 200ml, 500ml, and 1,000ml

Price data:

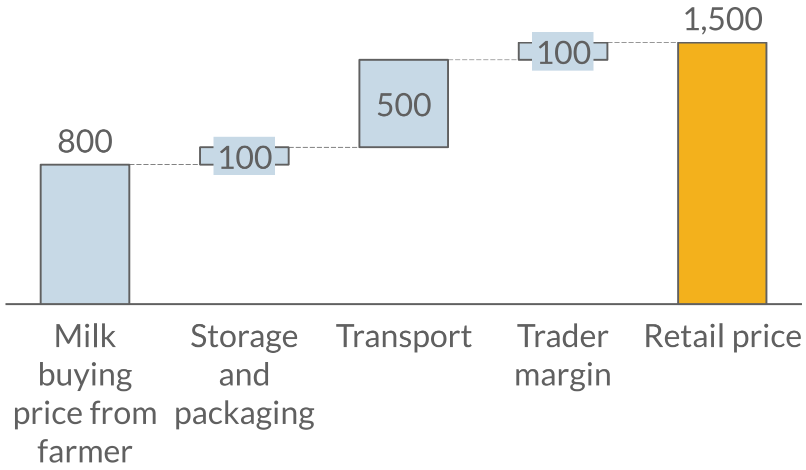
- Observed raw milk prices in the informal market range from Tshs 1,000 to Tshs 2,000 per liter while local processed milk prices range from Tshs 3,000 to Tshs 5,000

Low demand is a significant binding constraint across the value chain – uncertainty about demand for additional product disincentives processors from improving utilization

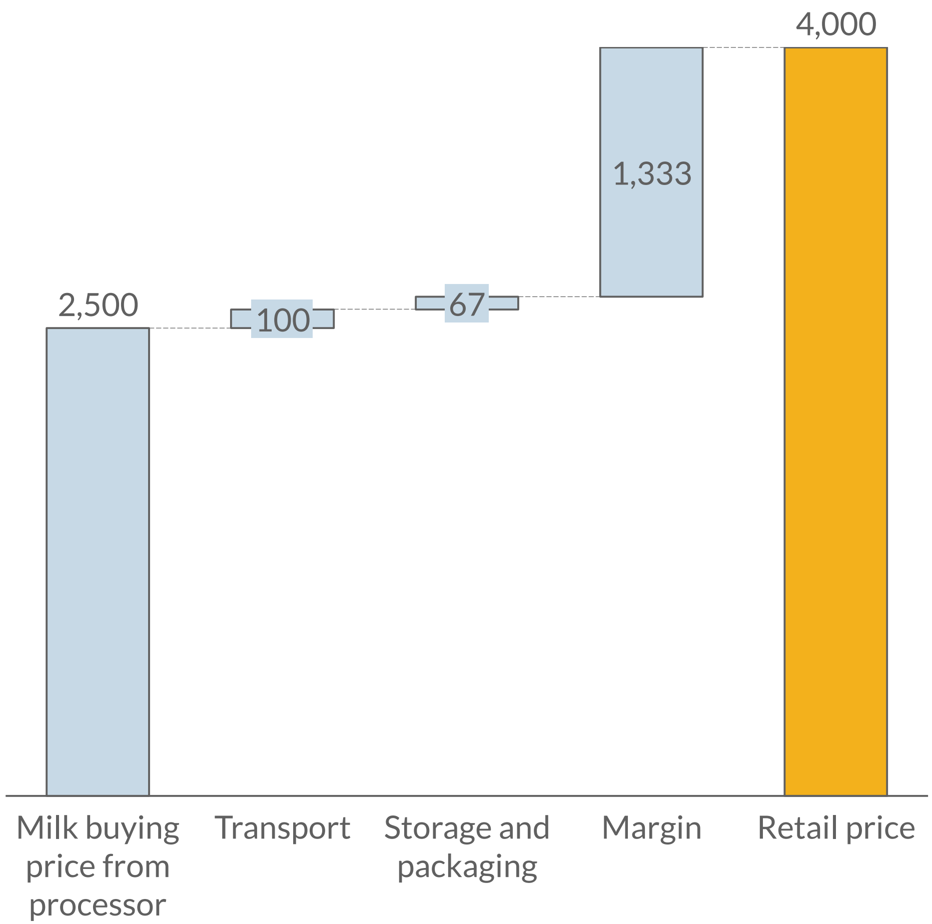
Sources: Tanzania Dairy Board, State of Dairy Industry of Tanzania 2018/19, 2019. Dalberg Analysis, 2019

Despite lower prices unprocessed milk retailers have higher margins due to limited transport and storage costs

Unprocessed milk (Tsh per liter)



Processed milk (non-UHT) (Tsh per liter)



Sources: Dalberg interviews and analysis, 2019

Low utilization of processes is eroding margins and at times leading to losses, driven by both low demand and difficulty accessing raw milk inputs

Input providers → Production → Collection centers → Transport / Traders → **Processing** → Market demand

Capacity utilization:

- Underutilization drives lower profitability, with several producers noting they are not breaking even under current low levels of utilization. For instance, with some of processors, process at low utilization rates (less than 10%) production costs can go as high as Tshs 1,869/ L, while average utilization (c.35%) costs are lower at Tshs 1,327/ L, with costs lowest at 100% utilization Tshs 1,227 leading to highest margins
- Under better utilization, processors have been able to produce greater beneficiation which is shared across the value chain to secure supply – e.g., Tanga Fresh have passed on an additional TShs 22/liter to farmers with higher utilization
- Low demand for processed milk products, has made processors wary of increasing utilization

Cost structure:

- Insufficient access to quality raw milk inputs limits full utilization by processors – with this, processors are investing in MCCs and backwards integration across the value chain to assure security of supply (although often do not make standalone profits out of these parts of the operation)
- The 18% VAT on UHT also hinders competitiveness and profitability (particularly given the high costs associated with transporting products to market (major city) and retailers. The government can explore VAT exemptions on inputs

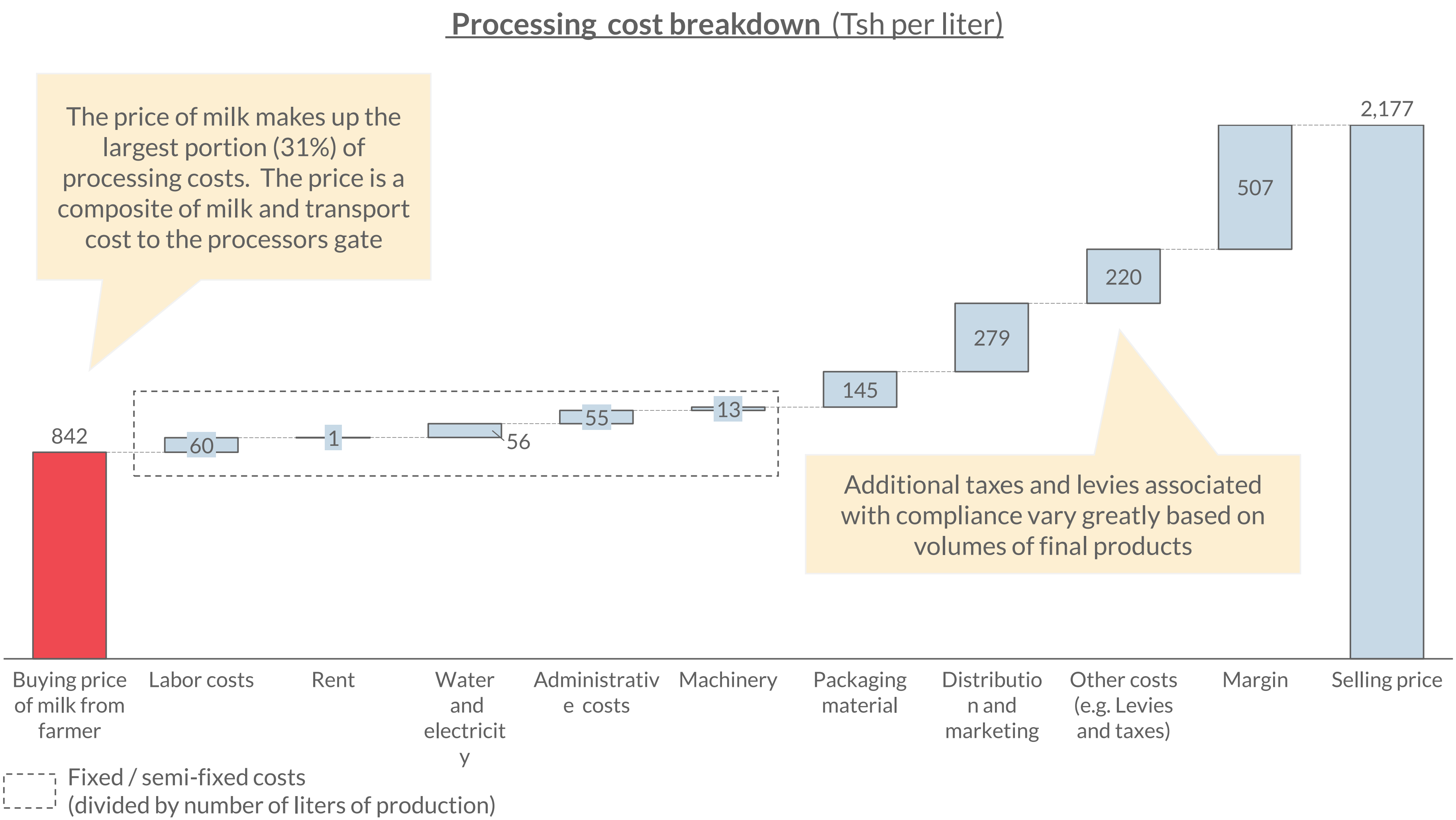
Competition:

- Formal processors having a challenge competing with informal processors with lower compliance costs e.g. VAT, although smaller processors also have disadvantages from lacking economies of scale
- The increase in number of processors has also led to fragmentation of a small market amongst multiple processors which has led to losses for processors who previously had higher utilization e.g. Azam

Current prices for raw milk inputs are largely unavoidable given the tight margins of processors – improving utilization through both higher farmer yields, and marketing could deliver greater beneficiation

Sources: Tanzania Dairy Board, State of Dairy Industry of Tanzania 2018/19, 2019. Dalberg Interview and Analysis, 2019

Processing: Margins are low, driven by low utilization (affecting the 11% fixed costs), and high variable costs (incl. raw milk, packaging and levies)



Sources: TAMPA, A baseline study on the implementation of the vat rate of zero percent in the dairy sector in Tanzania, 2015; Dalberg estimate, No data on selling price of processors

Preliminary cost data: Thin processor margins are often driven by variable cost components (particularly levies, taxes and transport)

Input providers → Production → Collection centers → Transport / Traders → **Processing** → Market demand

Demographic category	Min	Max	Average
Processing capacity	72000	120,000	96,000
Capacity utilization	8%	37%	23%
Volume of milk sold - daily	4,000	44,400	25,200
Price of milk average	2,038	2,222	2,177
Total revenue	4.8 B	32 B	

Cost category	Min	Max	Average
Cost of raw milk at farm	730	860	795
Labor costs	20.27	99.21	59.74
Rent	-	2.25	1.13
Water and electricity	39.68	72.07	55.88
Administrative costs	24.46	84.83	54.65
Packaging material	140.00	149	144.50
Distribution and marketing	187.00	370.38	279
Machinery	9.95	16.31	13.13
Other costs (e.g. Levies and taxes)	70.50	370.39	220.45
Total cost	1,222	2,024	1,623.5
Margin			507

Source: Dalberg Interview and Analysis, 2019

Ministry of Livestock and Fisheries

Prevalence of the informal market has necessitated the role of traders as they provide linkage services between scattered dairy farmers and the market

Input providers → Production → Collection centers → **Transport / Traders** → Processing → Market demand

Trading models:

- Traders thrive in areas with poor infrastructure and scattered farmers, offering linkage to markets
- Traders supply both the informal market and the formal market i.e. processors
- The informal market dominates, with the trading model differing depending on where milk is sold
  - For milk sold in cities, there is often a chain of multiple traders / transporters before milk is sold in cities, with most milk passing through MCCs for testing and chilling (to preserve cold chain)
  - Locally sold milk can and often does skip the MCC and goes directly to market
- Traders can play a role in the formal market – with one example identified where milk processors are working with traders to formalize them and use them to access farms to provide services and inputs

Cost profile:

- Gross margins are relatively thin at ~7% of the selling price; with this, trading is a volume business
- Raw milk is mostly transported in motorcycles carrying up to 120 liters in 20-liter drums
- Transport is the primary cost drivers for traders
- Though the majority of traders run informal businesses, in some cases traders are formalized including at Ubungo, Dar es Salaam where they pay municipal fees of up to Tshs 20 per liter
- Quality is a risk for traders, as buyers can return to claim a replacement – MCC testing mitigates this risk

Business outlook:

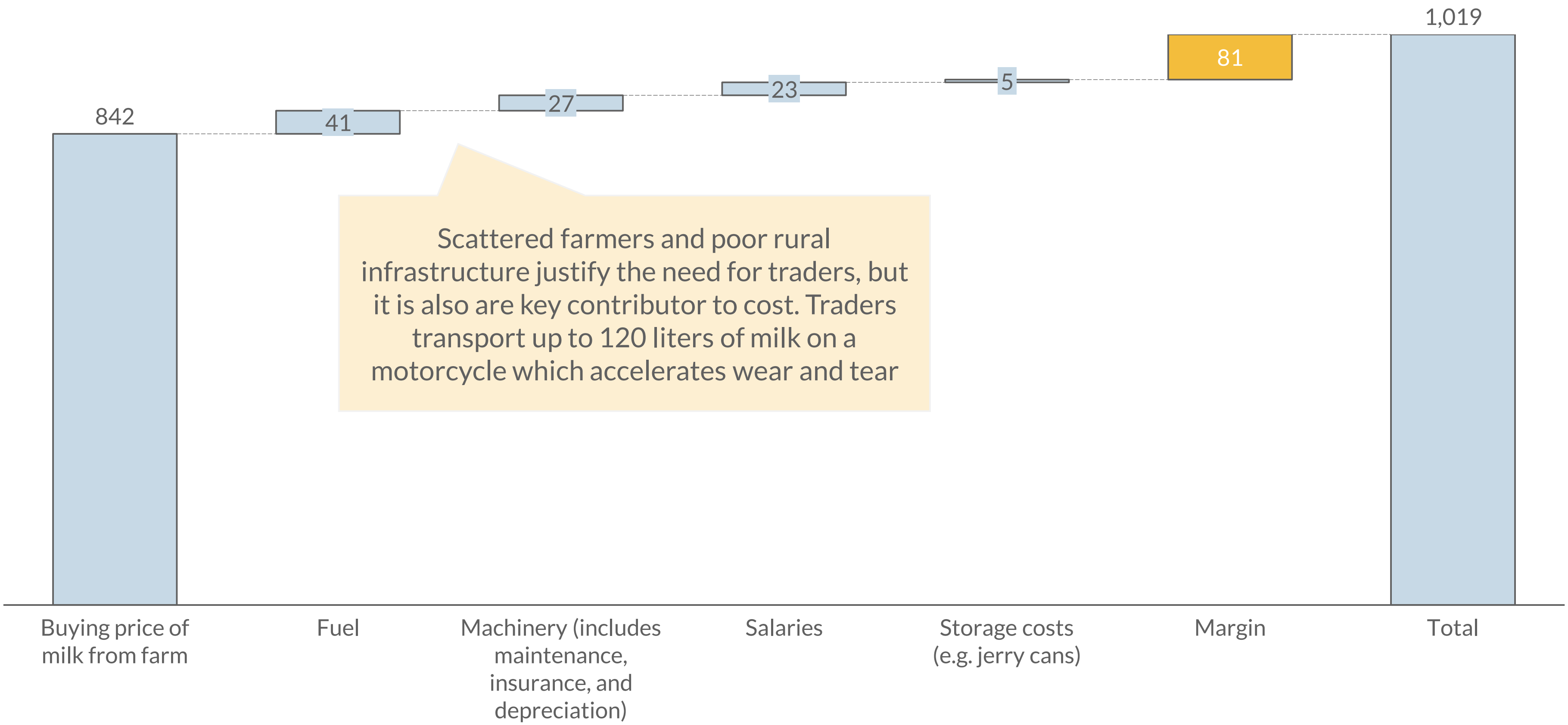
- Traders note they typically sell all milk they stock early in the day and are optimistic around demand

Trading is a low-margin business that serves formal and informal markets – as long as raw milk demand exists, and quality challenges prevent entry into the formal value chain, there is an opportunity for traders

Sources: Tanzania Dairy Board, State of Dairy Industry of Tanzania 2018/19, 2019. Dalberg Interview and Analysis, 2019

Local market traders: Margins for traders and transporters selling into the local market are sufficient to cover operation cost primarily vehicle costs

Transport cost breakdown (Tshs per liter)



Anchoring on farmer price of Tsh 842/ liter for comparison
Sources: Dalberg interviews and analysis, 2019

Ministry of Livestock and Fisheries

Dalberg

Profits at the MCC value chain node are low, while the distance from MCCs to processors / buyers influences transport costs and prices paid for raw milk

Input providers → Production → **Collection centers** → Transport / Traders → Processing → Market demand

Ownership structure:

- There are 119 operating MCCs in the country with several MCC models including privately-owned, cooperative-owned and processor-owned. A further 74 MCCs exist but do not operate
    - All interviewed processors had made investments in MCCs. Investing in MCCs helps with quality control and ensuring supply of raw milk
    - Cooperative MCCs aggregate milk and seek markets for member and non-member farmers. Some have small-scale processors attached (e.g. fermenting unsold milk)
    - Some large traders dealing in the informal market, e.g. the Dar es Salaam market, operate MCCs

Cost structure:

- Margins from MCCs are incredibly low with high operating costs; MCCs operate to provide a route to market for farmers and security of supply for processors, rather than standalone profitable enterprises
- MCC distance from processing factories is a key cost driver, driving milk to the informal/formal market.
- Transport costs from MCCs to processors are high in rural areas such as the Tshs 87 per liter from farmers to MCC and Tshs 120 per liter from MCC to factory.

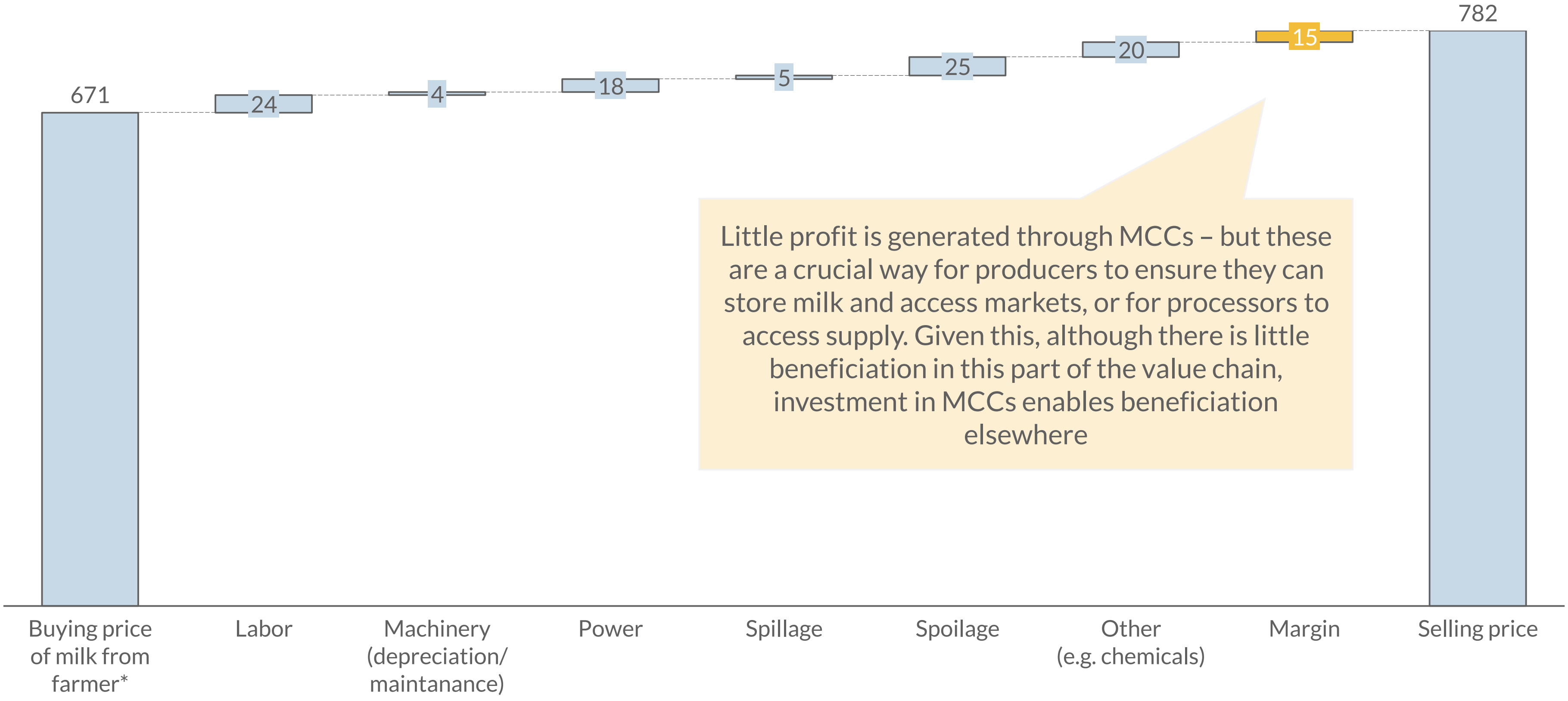
Despite low margins, MCCs make significant business sense given processor quality and quantity requirements and the size and distribution of dairy farmers in Tanzania

Sources: Tanzania Dairy Board, State of Dairy Industry of Tanzania 2018/19, 2019. Dalberg Interview and Analysis, 2019

Ministry of Livestock and Fisheries

Bulking and chilling: Margin are thin relative to costs driven by spoilage loses and labor and power costs

<u>**Bulking and chilling cost breakdown (Tsh per liter)**</u>



Little profit is generated through MCCs – but these are a crucial way for producers to ensure they can store milk and access markets, or for processors to access supply. Given this, although there is little beneficiation in this part of the value chain, investment in MCCs enables beneficiation elsewhere

* While the average producer price for a liter of raw milk to processors is Tsh 842/ liter, prices for sales through MCCs are lower at c. Tsh 671/liter to offset the additional costs of bulking and chilling , as well as transport
Sources: Dalberg Interviews and Analysis, 2019

Cost data: Survey data suggests MCCs produce little profit or are loss making, but are an essential node in the supply chain

Input providers → Production → **Collection centers** → Transport / Traders → Processing → Market demand

Cost category (Tshs/liter)	Min	Max	Average
Buying price of raw milk (from farmer or trader)	600.00	750.00	657.00
Labor	6.67	50.00	20.78
Machinery (depreciation/ maintenance)	-	6.94	3.31
Power/electricity	2.22	33.33	19.80
Spillage	-	15.00	7.50
Spoilage	2.82	41.67	17.65
Other (e.g. chemicals)	-	46.11	25.15
Total cost	664.72	840.18	737.60
Average selling price	650.00	800.00	747.00
Gross profit	(40.18)	79.26	9.40

Source: Dalberg Interview and Analysis, 2019

Ministry of Livestock and Fisheries

Cost data: Data suggests traders make narrow margins but play a critical role increase market access for farmers

Input providers → Production → **Collection centers** → Transport / Traders → Processing → Market demand

Cost category (Tshs/liter)	Min	Max	Average
Buying price of raw milk (from farmer)	550.00	600.00	850.00
Vehicle fuel	37.4	45.00	27.47
Salaries	22.5	24.00	15.50
Machinery (includes maintenance, insurance, and depreciation)	34.72	34.72	18.24
Storage costs (e.g. jerry cans)	4	5.56	3.19
Total cost	643.00	709.28	914.39
Average selling price	750.00	1,500.00	1,016.67
Gross profit	116.1	790.02	70.08

Source: Dalberg Interview and Analysis, 2019

Improved feeds and breeds, and capacity building on animal husbandry are critical to improving productivity

Input providers → **Production** → Collection centers → Transport / Traders → Processing → Market demand

Productivity:

- Production yields vary widely from 5 to 40+ liters / cow / day. This is driven by breeds and husbandry:
    - Zero grazing produced up to 5x yields for animals of the same breed in the same location
    - Lowest yields of 1.5-5l liters / cow / day were seen for traditional breeds with free-range rearing
- Despite the importance of improved feeds on yields, farmers are still using readily available non-nutritious feeds such as dry maize stems and banana leaves due to cost, accessibility, and knowledge
- Farmers acknowledge the need for animal replacement and the use of improved breeds, but costs are high. Artificial insemination can cost between Tshs 25,000 – 40,000 per animal with success rates often lower than 60%. Interest on loans to buy animals is also high and can reach 30%
- Many farmers are non-specialized with other crops or livestock providing additional income – as a result, farmers often have less dairy-specific knowledge, and may offset low margins with other outputs
- Farmers lack guidelines on proper husbandry and feed that has reduced their productivity

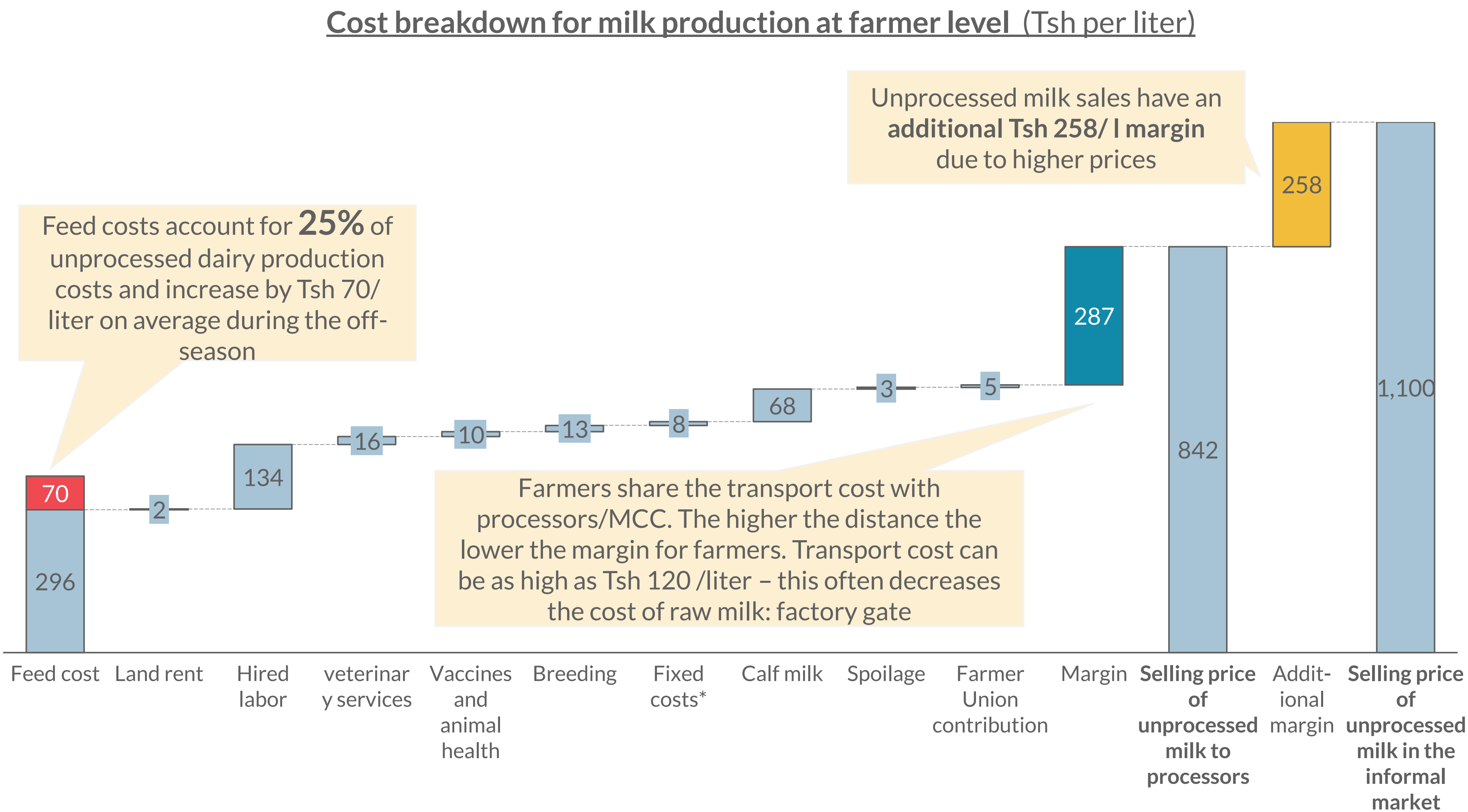
Sales:

- The desire to sell into the informal market is driven by (1) ease of market access / proximity of informal buyers (2) up-front payment / liquidity, (3) better prices in some cases, and (4) lower quality thresholds
- Many farmers engaged sell their "base supply" informally, and excess to processors. The exception is farmers with relatively higher yields 25+ L/ day/cow – in this context, the potentially lower margins of selling to processors is offset by the guaranteed offtake for all of their output

There are significant opportunities to improve productivity (quality and quantity), both to improve beneficiation and to create a context where the formal market is the most viable path for farmers to sell to

Sources: Dalberg Interviews and Analysis, 2019

Production: Under spending on feeds and animal health leads to low yields driving margins up



*Fixed cost is cost for land rent, building and Machinery depreciation

Sources: Dalberg, Value chain prioritization: AgriFin Accelerate Tanzania Assessment, 2015; Dalberg Analysis

Preliminary cost data: production costs vary, with feed being the greatest cost driver, followed by hired labour (where used)

Input providers → **Production** → Collection centers → Transport / Traders → Processing → Market demand

Demographic category	Min	Max	Average
Size of herd	2	378	50
Lactating animals	1	48	41
Employment data (full time/ part time)	-	13	2
Volume of milk produced - daily	7	250	50
Volume of milk sold - daily	2	217	41
Milking days per year	210	360	258
Price - high range	540	1,500	1500
Price - low range	540	1,200	1200
Price average	540	1,300	1300

Cost category	Min	Max	Average
Purchase of feeds	139	769	213
Roughage	16	218	116
Concentrates	17	27	69
Hired labor	-	317	113
Animal health	2	30	9
Veterinary services	37	19	14
Breeding	2	9	2
Building and machinery depreciation	6	42	26
Farmer Union contribution	-	-	10
Calf milk	-	95	68
Total production cost	**217**	**1,526**	**569**
Average milk yield per cow	**20**	**9**	**9**
Average profit	**353**	**526**	**287**

*For cost category except for average profit, farmer profiles with the minimum and maximum total production costs are displayed rather than individual minimum and maximum values

Source: Dalberg Interview and Analysis, 2019

Ministry of Livestock and Fisheries

Dalberg

High costs of inputs and poor animal husbandry practices are a hindrance to improving yields

Input providers | Production | Collection centers | Transport / Traders | Processing | Market demand

Demand and market for inputs:

- Quality inputs including breeds and feeds are expensive for most small-scale dairy farmers. Quality input providers are far in between which drives up costs for farmers
- Most small-scale farmers mix their own feeds which often results in poor compound feeds due to a lack of understanding of ratios
- Even when improved breeds and feeds are available, animal husbandry practices are not sufficient. Farmers in Arusha, complained of extension officers being unqualified leading to poor AI results
- Farmers do not fully understand the economics of using improved feeds. Farmers need guarantees of improved yields before investing in improved feeds
- Processors have resorted to providing inputs in exchange for consistent supply of milk
- Farmers prefer imported feeds and medicines on the basis of quality and effectiveness

Cost of input provision:

- Around 20% of the ingredients into inputs are currently imported, which drives up costs – this adds to logistics costs and cost of finance (trade finance between orders being paid for and goods being delivered)
- Koudijs, a premier Dutch animal feeds producer, is planning to open a warehouse in Tanzania a move projected to reduce costs of improved animal feeds

The input market is constrained by insufficient knowledge around the importance of quality inputs at the production point of the value chain

Sources: Dalberg Interviews and Analysis, 2019

Labour market: Strength of capability was identified to be weaker at earlier nodes in the value chain

	Input providers	Production	Collection centers	Traders	Processing	Market demand
Job creation potential	◐	●	◔	◔	◔	○
Insights	• Strong need for quality extension officers and veterinary services • Medium potential to create jobs including extension officers at the village level	• Strong need for better farming practices and know-how – particularly given many farmers are non-specialized • Risks associated with an ageing workforce – many dairy farmers are retired • Has potential to engage over 200,000 small dairy farmers	• Milk collection centers require strong emphasis on quality control to improve the quantity of milk going to processors • Low potential for job creation due to low manpower requirement 2 – 4 people (observed)	• Improvement opportunities exist in quality control and handling, particularly in the informal sector • Has potential to engage youth to transport milk on motorcycles "boda-boda" from remote farmers (capital investment required)	• Limited issues sourcing talent as there is a strong emphasis on developing in-house through apprentice models • c.50% of staff are non-technical (e.g. janitors) • Only a small number of quality control / technical staff need deep technical expertise (often expats)	• Some processors talked of the need for stronger marketing skills – noting very little innovative marketing effort • Low potential to create mass jobs

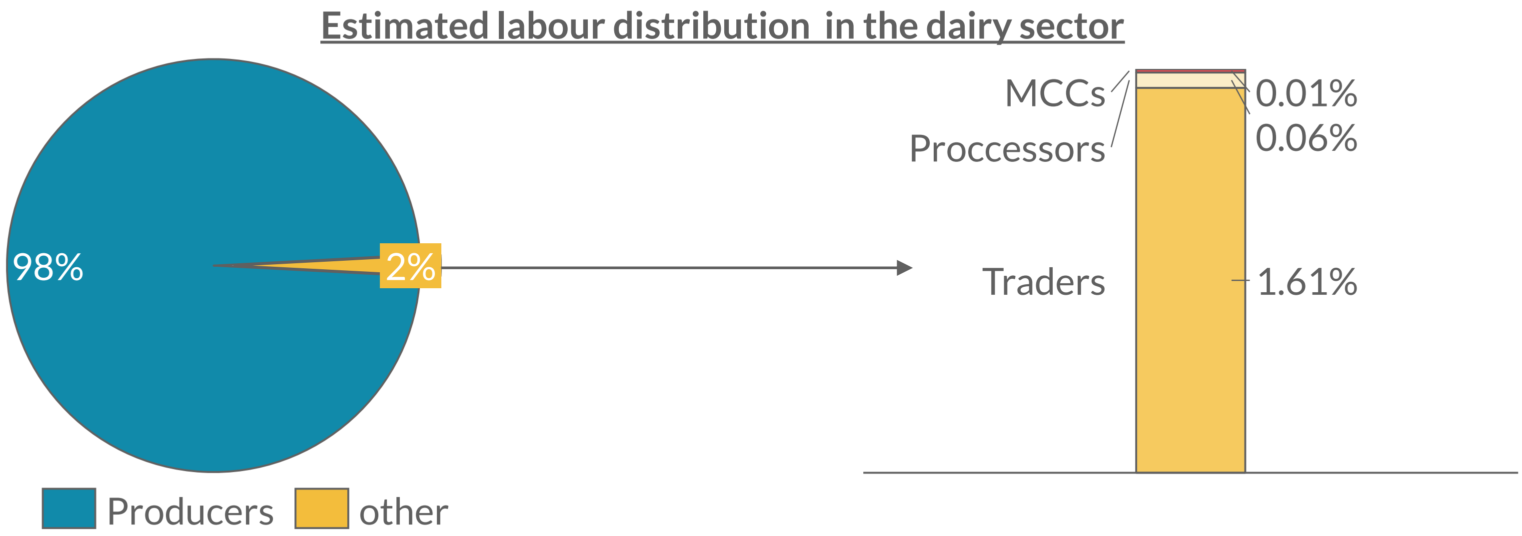
Key:

○ Low ◐ Medium ● High

Not all constraints are equally binding; challenges in early value chain nodes – especially around extension services, veterinary services, and good animal husbandry – drive the greatest impact on the system

Sources: Dalberg Interviews and Analysis, 2019

Investing in increased productivity will impact the largest share of people in the value chain



- **Producers** occupy the largest share in employment in the dairy value chain with 1.8 million households involved in dairy production of which 1.6 million use indigenous breeds and 200,000 using improved breeds
- **Traders** in the informal value chain are the second largest employment segment in the sector, maily influenced by the size of the informal market. Semi-informal traders exist, purchasing milk from the MCCs and selling to urban locations
- **MCCs** have the lowest proportion in the labor employment due to the small number of operating MCCs with low manpower requirement depending on the collection capacity
- **Processors** provide employment with demands for more dairy specialist, but while individual processors employ large numbers of people (varying from 10 to 30 employees), there are relatively fewer processors than traders, and producers

Producers are estimated from number of households involved in dairy production with each household having a single person dedicated for dairy activities. Traders where estimated from the capacity of milk carried per trader
Source: EADD, Dairy Consumer Market Study for EADD in Tanzania, 2016: Dalberg interview and analysis

Annex

SECTION THREE

Additionally, during the analysis many opportunities were identified to address challenges in the value chain – these now need to be prioritized

Reduce producer costs
- Provide subsidized artificial insemination (AI) to improve herd quality
- Facilitate bulk procurement of inputs including feeds and vaccines to reduce farmer costs
- Improve quality and coverage of extension services to drive better animal husbandry (including AI services)
- Provide affordable sources of input financing and receivables financing

Reduce processor costs
- Offer stronger incentives to processors to address value chain issues (e.g., incentives to run out-grower models or build MCCs)
- Improve rural infrastructure to facilitate wider milk collection
- Address levies (e.g. reduce 18% VAT on UHT milk) which will allow processors to pass on savings to customers through lower prices or to invest back into the value chain

Input providers → Production → Traders → Milk collection centers → Processing → Market demand

Formalize and expand trader role
- Work with traders to use them as (1) a vehicle to provide extension services, inputs etc., and (2) a route to market and to processors
- Provide training to traders on milk testing and handling to address safety and quality assurance issues at the farmgate

Increase market access
- Expand milk collection centres (MCCs) coverage to address market access barrier for farmers in remote areas
- Mandate all unprocessed milk go through MCCs where it will be tested before distribution
- Train MCC staff to serve as hubs provide extension services and inputs

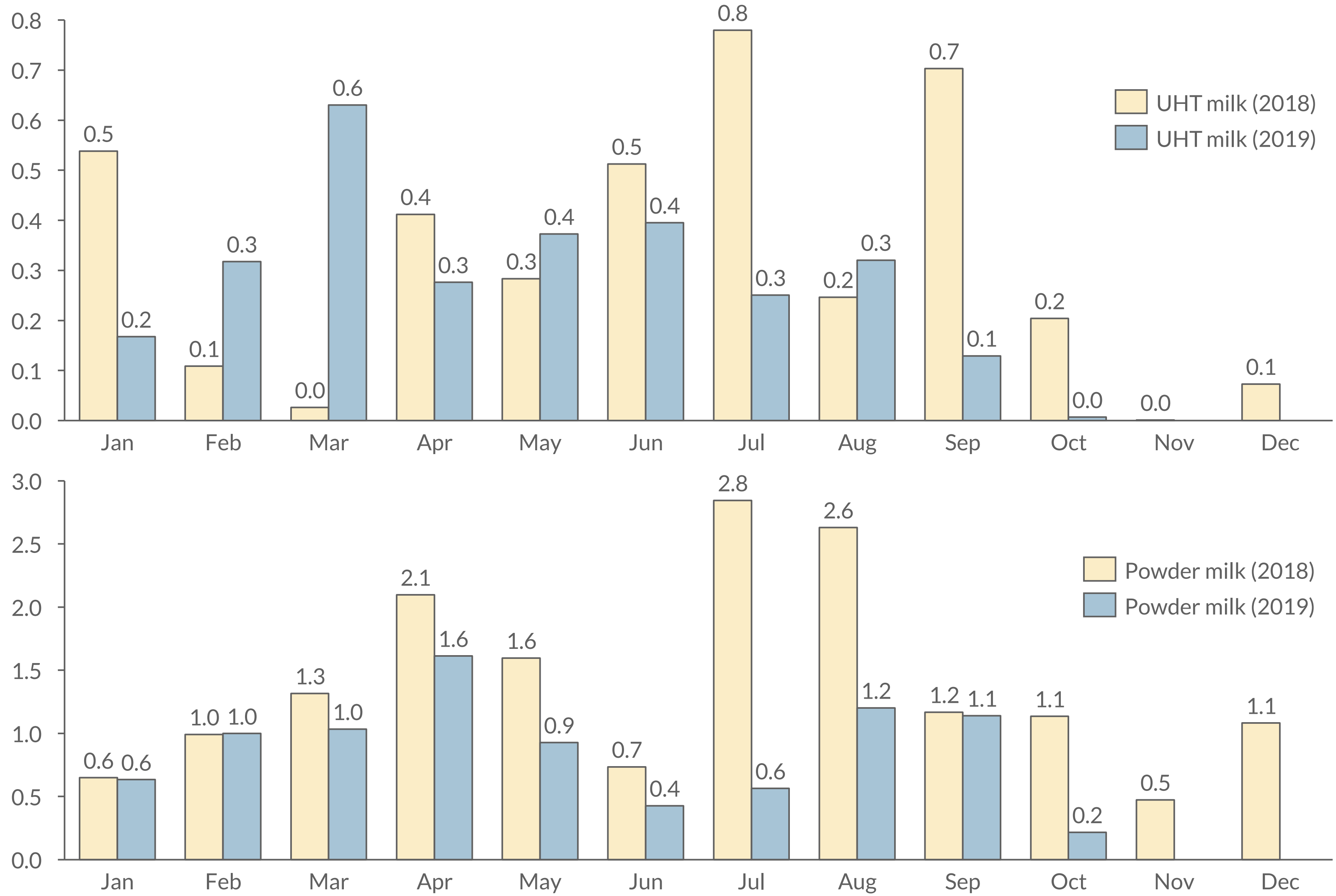
Activate demand
- Increase demand through promotion of nutrition and safety benefits of processed milk while enforcing compliance on informal milk
- Change tariff application to milk equivalent for powdered milk imports

This captures the top opportunities identified during the analysis phase – not all opportunities are equally viable or desirable, and each should be executed by the right actor (e.g., government vs. private sector)

sources: Dalberg Interviews and Analysis, 2019

Drop in UHT milk and powder millk (LME) imports

Milk importation – Liquid milk equivalent (LME), million liters



Ministry of Livestock and Fisheries

Dalberg