
APPENDIX 3: SUPPLY SIDE

STUDY TO IDENTIFY VIABLE BUSINESS PROPOSITIONS FOR THE DAIRY INDUSTRY TARGETING LOWER INCOME CONSUMERS



TABLE OF CONTENTS

List of Tables and Figures	3
1. Introduction	4
2. Outlining the Type of Suppliers of Raw Milk, Processed Milk and Milk Products	4
2.1 Structure of Production and Marketing	4
2.2 Types of Suppliers of Raw Milk to Nairobi BoP Consumers	5
3. List of Formal Processors with Name, Location and Short Company-Product Profile	7
4. Formal Processors that have Exhibited any Attempts to sell their Products to the Lower Income Brackets (BoP)	10
5. Technology Suppliers to the Formal Processors	13
5.1 Overview of Equipment and Technologies	13
5.2 Packaging	15
5.3 Informal Milk Traders and Processors Partnerships on Milk Pasteurization	18
6. Final Considerations	20
Annexes	22

LIST OF TABLES AND FIGURES

Table 1: Number of different players along the milk chain	7
Table 2: Kenya Dairy Board Year 2012 listing of Kenyan formal milk processors	8
Table 3: List of leading processors that have products targeting or reaching the BoP	9
Table 4: Processors and their products and marketing strategies for the BoP	11
Figure 1: Summary of the milk distribution chain in a Kenyan perspective	10
Figure 2: Milk process flow map	13
Figure 3: Photo of a milk dispensing unit	18
Annex 1: Milk cooling, processing and packaging equipment and suppliers	22
Annex 2: Quantity and value of total milk production in Kenya	25
Annex 3: Performance overview of the Kenya dairy industry in 2012	26

1. INTRODUCTION

This part of the BoP study was handled by an independent dairy consultant who has worked with a range of processors in the past. We are not aware of a current conflict of interest. This report focuses on section 5.2 of the agreed upon Terms of Reference (TOR), viz. the supply side. The scope of work was limited to the Nairobi milk supply chain and the study addressed the following bullet points in the ToR:

- Carry out an inventory of the different suppliers of raw and processed milk and milk products in selected low income sampling areas in Nairobi and describe outlets, products, volumes, packaging, prices and competition strategies.
- Make an inventory of formal processors and technology providers that have targeted products and business models to reach the BoP with processed milk and milk products, while describing the specific products, technologies and models.
- Inventorise and analyze trends and technologies for the 'informal' milk sector which point at moving from raw milk to pasteurised milk, whether packed or unpacked-e.g. batch pasteurisers', pasteurizing services, dispensing technologies and different business models around it.

2. OUTLINING THE TYPES OF SUPPLIERS OF RAW MILK, PROCESSED MILK AND MILK PRODUCTS

2.1 STRUCTURE OF PRODUCTION AND MARKETING

The Kenya dairy industry is the single largest agricultural sub-sector, larger than tea. It contributes some 14% to the agricultural Gross Domestic Product (GDP) and 3.5% to the nation's GDP¹. 80% of all milk (estimated at 5.1 billion litres/year by MoLD/KDB) is produced by an estimated 1 million smallholders with on average 2-5 cows. Kenyans consume more milk than almost anyone else in the developing world. On average, each Kenyan drinks about 115 litres of milk per year (DMP, 2010).

In 2011, Kenya's processed milk production increased to 555 million litres from 515 million litres produced in 2010 and 406 million litres produced in 2009 according to Kenya Dairy Board (KDB) statistics. The processed milk output is low when compared to the total raw milk produced in the country at 4.7 billion litres in 2010 and 5.1 billion litres in 2011. However, these statistics on total milk production are unreliable and generally believed to be inflated. In any case, they also include milk from goats and camels. The Kenya National Bureau of Statistics uses a figure for total annual milk production from cows of 3.7 billion litres (2010).

Less than 20% of the total milk produced is marketed as processed milk through formal channels. The remaining part is consumed by the farmers' households, used for calf rearing, sold to neighbors or rural institutions, or is marketed to Kenya's urban centres by traders and vendors being sold as raw milk to the end consumers, HORECA and institutions.

¹ Other sources estimate 4.5%. Exact numbers are not available.

2.2 TYPES OF SUPPLIERS OF RAW MILK TO NAIROBI BOP CONSUMERS

THE MILK CO-OPERATIVE SOCIETIES

Most co-operative societies have not yet invested in cooling or milk processing equipment. Those without such equipment, as well as cooperatives that are close to urban and peri-urban markets, are more likely to deliver their milk directly to traders, milk bars and consumers. They use their own delivery vehicles that would include 4-ton trucks and pickups. Often these societies have a number of outlet channels, including selling part of their milk to formal processors to spread risks and maximise income

The milk is normally ferried in plastic or aluminum cans and hawked within the low income residential estates like Mathare, Huruma, Kayole, and Korogocho among others. The cooperative societies also sell their milk through established milk bars in the same locations giving them an average margin of Kshs.5/- per litre. The current price range for raw unprocessed milk in Nairobi lies between Kshs.40/- to Kshs.50/- per litre, but this increase to as high as Kshs. 60/- to 70/- per litre in the dry season.

The only strategy used to grow volumes is price reduction to boost the retailer margins. There has been an effort to gradually improve on milk quality through carrying out of basis milk quality tests that include alcohol tests and organoleptic tests, and subsequent rejection of milk that does not meet the standards.

MIDDLEMEN/MILK BROKERS

These are individuals – milk traders who operate independently and who buy raw milk directly from the farmers, from established cooperative societies and also from medium-sized dairy processors who have surplus milk to sell. This group is involved in the farm-to-farm visits (hunting, collecting and bulking of milk), buying whatever quantity of milk they get from the farmer at low prices. They are not very concerned with milk quality and use preservatives like hydrogen peroxide to preserve the milk in the absence a (closed) cold chain.

Their business thrives especially when there are milk gluts and they can reap maximum profits. They often use 20-50 litre plastic containers to transport the milk to urban centres, which makes it heavily contaminated due to poor hygiene and handling practices. The milk is sold at low prices in plastic returnable-containers through motorbike and bicycle riders. Prices range from Kshs.30/- to 40/- per litre, depending on the supply and demand. Often, the milk is adulterated and diluted with water and other substances. Some brokers also operate their own milk bars within the busy BoP residential estates. Price reduction is the only common strategy to grow volumes, in addition to opening of more retail points for arms length availability to the BoP consumers.

INDIVIDUAL DAIRY FARMERS

These farmers supply milk directly to the low-end market consumers and thereby fetch higher prices than if they were to sell to dairy societies, milk processors or even to the middlemen. They create demand for their milk in hotels, restaurants and hotels, restaurants and cafeterias (HORECAS) among other institutions, and often do direct deliveries in 1-ton pickup vehicles.

Most of these farmers practice zero-grazing within the Greater Nairobi regions of Ngong, Kiambu, Githunguri that are close to the Nairobi prime markets. Some farmers also distribute their milk through milk bars. Their milk quality is comparatively better than traders, though it often fails in density parameters due to addition of water that is added in order to optimise profits.

Some farmers are keen on quality and price to gain a competitive advantage over the brokers and milk bars, especially those that target the HORECAS directly through personal selling. Delivered prices to the market are normally above Kshs. 45/- to Kshs. 55/- per litre.

RAW MILK FROM MILK PROCESSORS (MEDIUM SIZED)

The small and medium-sized milk processors normally have a mismatch between the raw milk they receive and the milk that they actually process, which is driven by market demand for their branded products. The surplus milk that they are unable to process is sold either directly to the consumers or through the middlemen/brokers.

However, this category of suppliers also supplies processed milk and milk products to the low end markets packed in plastic pouches, plastic jerry cans and aluminum cans (see the following chapter). The current average consumer price range of processed milk packed in pouches ranges from Kshs. 36/- to Kshs.45/- for the 500 ml pouch and between Kshs. 15/- to 25/- for the 200 ml pouch depending on the brand. There is very low recommended retail price (RRP) compliance by both the appointed distributors and the retailers in the BoP locations. Most processors have now adopted the Operational Excellence Platform to stay ahead of that entails supplying dairy products 'on time-in full-and error free. There have been some - unsuccessful – efforts, both by the milk processors and Kenya Dairy Board to enforce retail price compliance to make the products affordable at the BoP level.

MILK BARS

These are retail outlets that are located within high human traffic areas within residential estates in urban and peri-urban locations. They exclusively sell (raw unprocessed) milk over the counter and some have invested in the basic cold-chain equipment like fridges and deep freezers. They get their milk either from brokers/middlemen, directly from dairy cooperatives or from processors who have surplus milk that cannot be sold as processed or branded.

They do not invest in any quality control equipment, hence are at the mercy of their suppliers who more often deliver adulterated milk, especially when it is sourced from middlemen. They currently receive their milk at delivered prices of between Kshs.40/- to 50/- and add a mark-up of about Kshs.5/- per litre. The innovative milk bars also make their own fermented products: unbranded yoghurt and mala selling a 200 ml home-made polythene sachet at about Kshs.25/- to 30/-.

Milk bars use Point of Sales (POS) materials to communicate about their competitive prices. They also vet their bulk suppliers to ensure they receive quality milk, since they have personal relationships and touch with their consumers - hence using word of mouth on quality to grow volumes.

	CATEGORY	NUMBER
1	Producers	2,468
2	Formal Processors	42
3	Cooling plants	67
4	Cottage industries	182
5	Milk bars/Milk traders	4,636
6	Mini Dairies	124

TABLE 1: NUMBER OF DIFFERENT PLAYERS ALONG THE MILK CHAIN

INFORMAL CHANNELS - CONCLUSION

The distribution channels that deliver raw unprocessed milk to the BoP, directly or through traders and milk bars, are more cost-efficient compared to the formal processors, since there are fewer stages. These channels (including milk bars) get their fresh milk into the market at a lower cost and consumer price as compared to processors. The difference in price varies between KShs. 10/- to Kshs.20/- per one litre of milk. However, the raw milk channel compromises on the milk quality since the very important cold chain is mostly absent and there are widespread cases of milk adulteration.

3. LIST OF FORMAL PROCESSORS WITH NAME, LOCATION AND SHORT COMPANY–PRODUCT PROFILE

According to the Kenya Dairy Board (KDB) report for the third quarter of 2012, Kenya had 42 registered formal processors and processed milk handlers (see Table 2). Some are completely inactive as per the KDB records, while others operate seasonally, especially when there is a raw milk surplus or glut.

The glut attracts processors due to the low raw milk prices that prevail at the producer level and stable prices at the consumer level, which makes the business viable and profitable. In the recent past, a number of medium-sized milk processors who have had under-utilised installed processing and packaging capacity, have resorted to what is commonly known as processed milk ‘Contract Packaging’ (Co-packing), to augment their revenue base and profits – hence supporting their running-overheads and operational costs. Their customers are companies/traders who have put pouch milk brands in the market, but do not own processing facilities.

It is worth noting that over 80% of all processed milk in the country is handled by the top 5 milk processors: Brookside Ltd, New KCC, Githunguri Dairy, Buzeki Dairy and New Sameer Agriculture Ltd. An independent survey carried out for SNV by Setpro (2013) indicated that 29 of the 42 listed processors were active in 2012. Fourteen of these have products targeting or reaching the BoP. These processors and their short profiles are listed in Table 2.

TABLE 2: KENYA DAIRY BOARD YEAR 2012 LISTING OF KENYAN FORMAL MILK PROCESSORS (SEE NEXT PAGE)

	Processor's Name	License Category	Factory Location	Current Product Category Portfolio	Current status
1	Brookside Dairy	Processor	Ruiru	Fresh Milk(FM), Long Life Milk(LLM), High Value (HVP), Powder Milk (PM)	Fully operational
2	Githunguri Dairy	Processor	Kiambu	FM, LLM, HVP	Fully operational
3	New KCC	Processor	National	FM, LLM, HVP,PM	Fully operational
4	Buzeki Dairy	Processor	Molo, Limuru, Kilifi	FM, LLM, HVP	Fully operational
5	New Sameer A & L	Processor	Kampala, Nairobi	FM, LLM, HVP, PM	Fully operational
6	Kinangop Dairy	Processor	Nyandarua	FM, HVP	Fully operational
7	Meru Central Dairy	Processor	Meru	FM, HVP, LLM	Fully operational
8	Kabianga Dairy	Processor	Kericho	FM, HVP, LLM	Fully operational
9	Limuru Milk Processors	Processor	Limuru	FM, HVP	Leased
10	Afrodane Industries	Processor	Kinungi-Limuru	FM, HVP	Fully operational
12	Sun Power Products	Processor	Tigoni- Limuru	Cheese Only	Fully operational
13	Aspendos Dairy	Mini Dairy	Kangema- Muranga	FM	Fully operational
14	Palmhouse Dairies	Processor	Kiambu	FM, HVP	Fully operational
15	Happy Cow Dairy	Processor	Nakuru	FM,HVP, Cheese	Fully operational
16	Donyo Lessos Creameries	Processor	Eldoret	FM, HVP	Seasonal
17	Pamside Dairy	Processor	Kiambu	FM, HVP	Fully operational
18	Eldoville Farm	Processor	Nairobi	HVP , Cheese	Fully operational
19	Bio Food Products	Processor	Nairobi	HVP, LLM	Fully operational
20	Kinyagi Food Processing	Mini Dairy	Kiambu	FM, HVP	Fully operational
21	Stanley & Sons	Processor	Nakuru	FM	Closed
22	Moi's Bridge Dairy	Mini Dairy	Eldoret	FM, HVP	Closed
23	Countryside Dairy	Processor	Nairobi	FM	Closed
24	Miyanji Dairy Farm	Processor	Coast	FM	Fully operational
25	Razco limited	Mini Dairy	Nairobi	HVP	Fully operational
26	Orchard spillers	Mini Dairy	Nairobi	HVP	Fully operational
27	Kibarani Dairy	Mini Dairy	Mombasa	FM, HVP	Fully operational
28	Farmers Milk Processors	Processor	Nakuru	FM	Fully operational
29	Teita Estates	Mini Dairy	Coast	FM, HVP	Fully operational
30	Hussein Dairy	Mini Dairy	Coast	FM, HVP	Fully operational
31	Raka Milk Processors	Mini Dairy	Nyeri	Cheese	Fully operational
32	Crown Creameries	Processor	Kiambu	FM –Dormant	Closed
33	Egerton University	Processor	Njoro-Nakuru	FM, HVP	Fully operational
34	Baraka Farm	Mini Dairy	Eldoret	FM, HVP	Fully operational
35	Palm Farm Ltd	Mini Dairy	Coast	FM	Closed
36	Silent Valley Creameries	Mini Dairy	Nanyuki	FM,HVP & Cheese	Fully operational
37	Solai Stores	Mini Dairy	Nakuru	FM, HVA	Fully operational
38	Snowpack Dairy	Mini Dairy	Ruai- Nairobi	FM	Closed
39	Bico Farm	Mini Dairy	Coast	FM	Fully operational
40	Mariakani Dairy Co-op	Mini Dairy	Coast	FM, HVP	Closed
41	Lari Dairy Alliance	Processor	Lari- Kiambu	FM, HVP	Fully operational
42	East African Dairies	Processor		FM- Dormant	Closed

	Name of Processor	Classification & Brands for BOP	Production Facility Location	Short Company and Product Profile.
1	Brookside Dairy	Processor Ilara, Tuzo	2 Factories, one in Ruiru and one in Nairobi Industrial Area.	Leading dairy processor, market leader in the region. Average daily intake over 450,000 litres, new daily capacity to hit 2.4million litres, privately owned firm with strong brands: Ilara, Tuzo (mainly targeted at the BoP consumers)
2	Githunguri Dairy	Processor, Zito fresh milk	Githunguri-Kiambu	Wholly owned by the Githunguri Dairy Farmers Co-operative Society, daily milk intake of 197,000 litres. Zito-pouch fresh milk, pouch Lala milk, cup yoghurt
3	New KCC	Processor; KCC Fresh, Gold Crown, Taifa Fresh	Nairobi, Kiganjo, Kitale, Nyahururu, Sotik	Quasi government organisation that process 345,000 litres of milk daily, with national and regional distributions channels.
4	Buzeki Dairy	Processor; Molo milk	Molo, Limuru and Kilifi- for the Coast market.	Privately owned processor with 3 processing plants, daily milk handling ranges between 83,000-100,000 litres. Pouch fresh milk, pouch UHT milk and value added products are common with the BoP consumers.
5	New Sameer A & L-Daima.	Processor; Daima Pouch fresh milk, Daima Cup Thick Yoghurt	Kampala and Nairobi-Industrial Area	Wholly owned by the Merali family. Has succeeded in penetrating the BOP segment with Extended Shelf Life Milk (ESL) packed in pouches, Tetra Fino packets, thick cup yoghurts packed in 150ml, 250 ml and 500 ml pack sizes. Daima brands numeric distribution within the BoP is high, driven by their direct route-selling to retailers. Strategy using their own vans especially on the value added products.
6	Kinangop Dairy	Processor; Jamaa Fresh –Whole Milk Kinangop Fresh Skimmed milk	Ndunyu Njeru- North Kinangop	Privately owned medium-sized with installed capacity of 80,000 litres but daily intake of 28,000 litres. All its flagship brands are targeted at the BoP within Greater Nairobi market. It is currently searching for a strategic partner to enable it invest in better production equipment for value added products and also a new UHT Production line.
7	Meru Central Dairy	Processor Mount Kenya Brands	Meru County	Owned by Meru Central Farmers Co-operative Society, runs a milling company. Daily milk intake is 27,000 litres. Its flagship brand is Mount Kenya Milk –that has an extended shelf–pouch package. Its main target market has been the Nairobi region market with a focus on the BoP.
8	Kabianga Dairy	Processor Premier Brand	Kericho	Privately owned with installed capacity for both fresh milk and UHTIs about 120,000 litres daily and 25,000 litres daily milk intake. Premier Fresh Milk is mainly sold within the Western part of the country and UHT Long Life milk is distributed country-wide.
9	Limuru Milk Processors	Processor Limuru Fresh	Limuru, Kiambu Country	Jointly owned by the Limuru Dairy Co-op Society at 70% equity and private investors at 30% equity. Due to governance related issues, it was almost insolvent hence the decision to lease it out to Buzeki Dairies in November 2012. Buzeki plans are to process and package its range of products that are currently being produced in their Molo Factory- about 200 Kms from its key Nairobi market.
10	Afrodane Industries	Processor Afya Brand	Kinungi, Kiambu County	Privately owned medium-sized processor with installed daily capacity of 50,000 litres but currently operating at 7,000 litres daily. It produces plastic bottle yoghurts targeted at the BoP in Nairobi and Nakuru.
11	Countryside Dairy	Co-Packing Halisi Pouch Brand	Co-Packing at Lare Dairy	These entrepreneurs have been operating for the last 8 Months but have been erratic in the pouch milk supplies into the BoP. They have been co-packing about 6000 litres of Fresh Milk at Lare dairies. Major constraint has been lack of raw milk due to mistrust with the farmers and middlemen who have been supplying them with milk.
12	Palm house Dairies	Processor Palm house Fresh	Thika – Kiambu County	Privately owned and located within Kiambu area. KDB data reflects a daily processing level of 12,000 litres. Daily though installed processing capacity is at 30,000 litres. The processor’s key target market is within the high end institutional customers like Hotels, Hospitals and Schools. Some of their Pouch milk products do reach the BoP within the Nairobi –low end markets.
13	Pamside Dairy	Processor. Pamside Fresh	Located near Thika Town- Kiambu County	Privately owned medium sized processor located in the outskirts of Thika town. It has an installed capacity of 25,000 litres but has only been processing about 6000 litres daily. Due to low product off-take and stiff competition from raw bulk milk within the BoP, this company has been looking for a strategic partner and also has plans to dispose of the factory.
14	Kinyagi Food Processing	Processor	Kiambu County	Privately owned and packs a brand known as Highlife Pouch milk and targets the BoP market within the low end Nairobi market segment. It sits within a fairly rich milk catchment area and is proximate to its key Nairobi low end market. Its daily throughput stands at about 3500 litres as per The KDB data with a capacity estimated at about 20,000 litres daily.

TABLE 3: LIST OF LEADING PROCESSORS THAT HAVE PRODUCTS TARGETING OR REACHING THE BOP

4. FORMAL PROCESSORS THAT HAVE EXHIBITED ANY ATTEMPTS TO SELL THEIR PRODUCTS TO THE LOWER INCOME BRACKETS (BoP)

OVERVIEW

On a global level there are about 2.7 billion consumers living in developing countries on a daily income of between 2-8 USD. (Kshs.170/- to Kshs.700/-). They make up 40% of the world's population and are responsible for about 40% of the total Liquid Dairy Products (LDP) consumption in the developing markets. This group is commonly known as the Base of Pyramid (BoP) or Deeper in the Pyramid (DiP) consumers and they represent about 50% of the combined population of all developing countries. Half of them live in India and China. The DiP consumers represent one of the biggest growth opportunities for the dairy industry in the years to come.

The processors listed above have all invested in production equipment and technology to process, pack and distribute dairy products targeted at the BoP segment, next to the middle to high end dairy product consumers within their wide product portfolio. This is evidenced through the installation of High Speed Pouch-Sachets Fresh pasteurised milk filling lines. Some have invested in extended shelf life (ESL) pouch machines, UHT lines, yoghurt cup filling machines and plastic bottle packing lines.

The key value proposition driving this segment is low cost packaging, small pack sizes at low prices (200 ml and 500 ml Stock Keeping Units (SKU)). The off-take by consumers at the retail level is, however, skewed in favor of the 500 ml at an 80% ratio 500ml versus 20% on the 200ml.

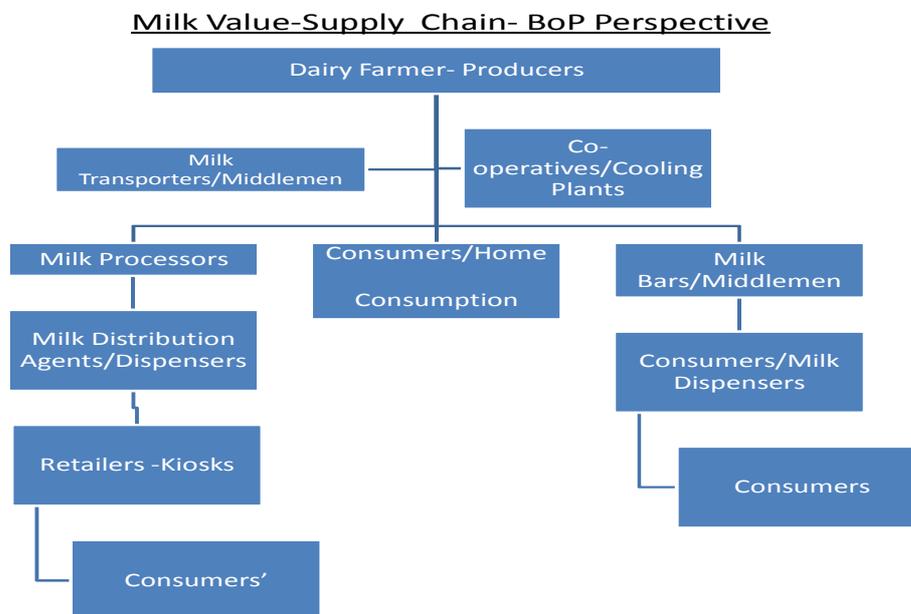


FIGURE 1: SUMMARY OF THE MILK DISTRIBUTION CHAIN IN A KENYAN PERSPECTIVE

The following table presents the findings of a case study of the major processors with products and marketing strategies developed for the BoP and other lower income groups.

PROCESSOR DETAILS	PRODUCTS/ BRANDS SOLD	UNIQUE VALUE PROPOSITION	DISTRIBUTION CHANNEL USED TO SELL PRODUCT.	MARKETING ACTIVITIES EMPLOYED TO SUPPORT THE PRODUCT.	WHY THE PRODUCT HAS SUCCEEDED/ FAILED
<p>1. Sameer Agric. Ltd</p> <p>Daima brand</p>	<p>Daima – Fresh milk, Extended Shelf Life (ESL) Milk, Long Life milk – UHT- Tetra Fino and Tetra Classic Aseptic (TCA) Yoghurt, Fermented Milk – Lala</p>	<p>-Product packed in small pack sizes- from 150ml, 250ml and 500 ml, prices as low as Ksh.20/-</p> <p>-ESL- due to lack of cold chain in BoP areas.</p> <p>-Affordable Thick Yoghurt in 150 ml Cups.</p> <p>Fresh milk Pouches are priced from Kshs.42/- per 500 ml.</p>	<p>-Through Appointed Distributors who resell to Retail Outlets- kiosks, dukas.</p> <p>-Direct delivery to key retail outlets –Key supermarkets.</p> <p>-Route selling using company vans into virgin markets creating awareness and demand.</p> <p>-The value added products like Yoghurts/Lala require refrigerated delivery trucks for re-distribution.</p>	<p>-The top 5 Processors listed above have a heavy spend on Above the Line (ATL) advertising on Radio, TV and Press media- to create Product awareness.</p> <p>-Below the Line (BTL) advertising support- includes Consumer promotions, Wet sampling of new products, Road Shows, Buy One Get One (BOGO) consumer Promotions.</p> <p>-Effective and efficient Route to Market model- of strong aggressive distributors and bicycle riders to deliver products to Retailers.</p> <p>-Investment in strong well trained and equipped field sales staff.</p>	<p>Daima – has been successful due to embracing innovation and product differentiation; ESL milk – with longer shelf life, Thick Yoghurt in 150 ml , 250 ml at affordable prices and strong margins for the Trade channel, 200 ml UHT pack that sells at Kshs.20/- per packet.</p>
<p>2. Githunguri Dairy</p> <p>Fresha & Zito brands</p>	<p>-Fresha and Zito Pouch Fresh milk- 200 ml and 500 ml</p> <p>-Fresha Lala 250 ml and 500 ml.</p> <p>-Yoghurts Cups and Bottles- 150 ml, 250 ml, 500ml</p> <p>-Bulk milk in 50 litre cans –Pasteurised.</p>	<p>Their pouch milk consumer prices range from Kshs.38/- to 40/- per a 500 ml whole milk –full cream packet.</p> <p>Hygienic and convenient packaging</p> <p>-The Swahili name ‘Zito’ actually means ‘heavy’ in English - objective being to endear the brand to the BoP consumers whose believe is that Full Cream Whole milk is healthier and has value for money.</p>	<p>Selling through Appointed Distributors within the BoP.</p>	<p>Fresha Field staff creates demand and awareness at the retail level through actual kiosks and retail outlet visits.</p> <p>Fresha brand is also a heavy spender on Above The Line (ATL) and Below The Line (BTL) marketing support programmes.</p> <p>Fresha has grown volumes through numerous consumer promotions that include the ‘Buy One Get One (BOGO) Free –where consumers buy one packet and gets one free. They have also been running the ‘Extra Free Milk’ to consumers offering 550 ml and 220 ml at the price of 500 ml and 200 ml Pouch milk price respectively.</p>	<p>Fresha and Zito are successful Fresh milk brands within the BoP.</p> <p>Their success is historical since Githunguri Dairy started off business by selling raw chilled milk to the low end markets in and around Nairobi.</p> <p>Consumers noted the quality consistence of the raw chilled milk that gave them the confidence that even the Fresha/Zito processed milk was of superior quality at a competitive price.</p>
<p>3. Brookside Dairy Brands</p> <p>Tuzo and Ilara brands</p>	<p>-200 ml and 500 ml Pouch fresh milk.</p> <p>-Yoghurts in bottles and Cups.</p> <p>-Flavored milk (UHT) in 250 ml Packs- Tetra Classic Acceptic (TCA)</p>	<p>-Consumer Prices of Kshs.42/- to 45/-per 500 ml packet, Kshs.20/- for 200 ml packet.</p> <p>- Other value propositions as per other brands above.</p>	<p>Brookside has targeted export markets on the UHT White milk, UHT Flavored milk and Value Added Products- Ghee and Yoghurts.</p>	<p>Brookside brands that are targeted at the BoP are Tuzo and Ilara brands.</p> <p>The Tuzo and Ilara brands currently contribute 70% of the total revenue mostly through BoP.</p> <p>Brookside marketing spend is the largest in the industry estimated at about 100 million per year- mostly above the line advertising and consumer promotions.</p> <p>The company has endeared itself to the masses through football sponsorship by its brands Tuzo and Brookside.</p>	<p>It attempted to sell its Ilara Pouch brands directly to households and faced massive resistance from the retailers who were being denied the source of income.</p>
<p>4. Buzeki-</p> <p>Molo Milk brand</p>	<p>-Same as above</p> <p>-Buzeki also introduced Flavored Milk- with Extended Shelf Life (ESL)- Chocolate Flavor packed in Pouches.</p>	<p>As above</p>	<p>Buzeki has the generic distribution model of distribution agents, who service retail outlets that subsequently, sells milk to the consumers.</p>	<p>Buzeki –Molo Milk invested heavily in an above the line marketing campaign for 6 months that yielded great volume growth.</p> <p>The Pouch milk and Yoghurts volumes have grown 3 fold.</p>	<p>Buzeki Flavored milk project failed due to various factors:-</p> <p>Price point and product positioning done wrongly.</p> <p>Consumer awareness on product attributes lacking.</p>

<p>5.New KCC</p>	<p>NKCC has targeted its Pouch brands to the BoP –that includes the Gold Crown, KCC Fresh Green packets.</p>	<p>As above</p>	<p>KCC has lost market share and volumes due to demotivated distribution agents. Their frequent price fluctuations’ and stock outs especially during the dry spell have contributed to this drop.</p>	<p>KCC has been running consumer promotions especially during the glut season. The brands have in the past sponsored the Kenya National Athletics Team –hence creating awareness countywide.</p>	<p>KCC Brands have not exploited their full potential in the market due to distribution Route to Market issues, quality issues and Product stock outs.</p>
<p>6.Kinangop Dairy Ltd (KDL)</p>	<p>Production of Pouch milk 200 ml and 500 ml, fermented milk– Lala and Yoghurts packed Plastic bottles- 250 ml and 500 ml,</p>	<p>-Price differentiation based on Butter Fat content of the Fresh milk. - -Low Fat milk competitively priced than Whole milk - hence affordable. -Volume growth due to Price parity</p>	<p>KDL – Field sales staff assigned to distributors with daily targets to sell and Retail outlets to visit and create demand.</p>	<p>Kinangop brands –Jamaa Fresh and Kinangop Fresh have grown organically with no marketing support. The distribution agents have also been aggressive within the BoP – availing the Jamaa and Kinangop brands at arm’s length availability at the kiosk level.</p>	<p>KDL has grown its volumes organically in the last 18 months due to consistence in quality, on time deliveries into the market at before 4.00 am in the morning.</p>
<p>7.Afrodane, Apendos, Kinyagi Foods, Palmside Dairies</p>	<p>The 4 Processors represents most of the medium-sized Milk processors who sell over 80% of their pasteurised milk into the low end –BoP Markets. Their key product being pouch milk packed in 200 ml and 500 ml and raw bulk milk and pasteurised bulk milk.</p>	<p>Out of the 4 ‘P’s of Marketing namely:- Price, Product, Place and Placement-distribution, these medium-sized processors only focus on Price and Distribution to drive their milk volumes. The examples being their 500 ml Pouch milk that as at Jan.2013 is being retailed at between Kshs.32/- to Kshs.34/- per a packet or Kshs.64/- to Kshs.68/- per litre. They sell their raw milk to milk bars at ave. price of Kshs.55/- per litre and Kshs.60/- per 1 litre of pasteurised milk.</p>	<p>They have a similar distribution chain –whereby Milk distribution Agents are appointed in different parts of the market in and around the Nairobi region and Greater Nairobi –with a radius of about 80 kms. The milk is dropped to the agents from 8.00 pm to about 5 am for re-distribution into retail outlets using Bicycles, wheel barrows and hand carts depending on the terrain. The retailers then sell to the consumers. The companies, however, deliver the bulk milk directly to the Milk Bars. Most of their milk delivery fleet is not refrigerated hence do not achieve the cold chain and have frequent cases of milk spoilage and subsequent losses.</p>	<p>Very low marketing support activities are carried out by this category of processors. They mostly play the price game as an incentive to the BoP to purchase their product –through lowering the prices. They also create many milk drops off points in the BoP locations to achieve an arm’s length milk availability for the consumers.</p>	<p>These brands have succeeded within the BoP due to the strong partnership with their respective distribution agents and retailers. The competitive margins paid out to the agents and retailers in a market that brand loyalty does not count has motivated them to stock the brands at the cost of other ‘superior’ Timely deliveries into the market – early high consumption morning and evening deliveries have also contributed positively. ‘Hawking’ of milk in the evening has also moved their volumes- this entails displaying the packets on the roadside in the BoP residential high human traffic areas –where the consumers buy the pouches as they ‘walk’ home.</p>

TABLE 4: PROCESSORS AND THEIR PRODUCTS AND MARKETING STRATEGIES FOR THE BOP

5. TECHNOLOGY SUPPLIERS TO THE FORMAL PROCESSORS

5.1 OVERVIEW OF EQUIPMENT AND TECHNOLOGIES

The market for dairy equipment and technology is dominated by a few multinational companies that have their head offices in Europe, South Africa, the USA, Israel and India. The dairy technology suppliers provide equipment to support the following activities in milk collection, bulking and processing:-

- Cold chain: chilling/cold storage/refrigeration from the farm (large scale farmers), the collection routes, the CBEs and bulking stations, the processors to the retailers and end-consumers.
- Milk production (extraction) and transport (milking machines, aluminum containers, tankers)
- Milk reception (testing and weighing equipment)
- Milk processing (all processing equipment, including batch and mini-pasteurisers, yoghurt and cheese lines).
- Product packing and dispensing
- Support functions: Cleaning in Process (CIP), steam generation, compressed air generation
- Water and electricity provision.

Milk Process Flow Mapping



FIGURE 2: MILK PROCESS FLOW MAPPING

Easy access to quality and affordable dairy equipment is an important driver for cost efficiency across the value chain. The benefits can be augmented if this is backed-up by effective maintenance service models, and equipment is operated by skilled and well-trained personnel. This has an impact at sector level on both the quality and the price of milk. Hence it will also benefit the BoP segment. Annex 1 of this report provides a list of most common cooling, processing and packaging equipment and their suppliers.

This chapter of the report focuses on some of the technology providers that have come with innovative solutions where mainstream businesses have not yet penetrated (this section), and on low cost and/or appropriate solutions used in Kenya for packaging and distribution of milk (the next section). Under this section the following technologies are briefly discussed:

- Milking and transport solutions. An example for Kenya is the pilot of Global Good (BMGF) wide-mouthed Milking Container (MC). This is an easy to clean and low-cost PVC container that is used by the farmer to milk in, and to transport the milk to the milk collection point. Field tests in various dairy societies in Kenya showed significant reduction of bacterial loads through the use of this device. Currently this innovative product is waiting for approval/accreditation from KEBS and Kenya Dairy Board to be launched in the market.
- Off-grid cooling or chilling equipment. A number of innovations are being developed and piloted to cool/chill milk at farm level or in the collection routes by using solar energy. One of these pilots is a Dutch partnership between Mueller Lichtenvoorde BV/Celtic BV/LEI Wageningen/BoP Innovation Centre. This project entails the testing of a proto-type stainless steel milk cooler of 320 litres whereby solar energy is used during the day to make an ice-bank of maximum 150 kgs, that will cool down the evening and the morning milk from 36 to 4 degrees Celsius. Another pilot on solar milk chilling is that of RIWIK East Africa <http://www.riwikeastafrica.com/> RIWIK is piloting the chilling of 225 litres containers with an investment in solar system of KES 185,000. Other pilots use biogas conversion-into-electricity technology. Most of these initiatives are yet to retain the status of “proven-technology”, and need to be validated on commercial viability.
- Use of small satellite chilling tanks (500 litres) in the milk collection routes (on-grid). This is an option that is interesting for collection of evening milk and to avoid mixing of evening milk with morning milk on farm. It will also reduce to frequency and cost of collection. An important advantage is that these small cooling tanks can work on 2-phase electricity.
- ICT solutions. An area that was not covered here but is still important to look into, is ICT solutions for easy administration of volumes and quality of milk supplied by the farmer (electronic weighing devices) and integrated electronic payment systems. Reducing transaction and administration costs - and increasing transparency – importantly contributes to enhanced cost efficiency along the milk value chain. A recent product brought into the market is from Virtual City Ltd, a Nairobi-based ICT provider.
- Introduction/feasibility studies for batch pasteurisers or mini-processors for pasteurised fresh milk and added value products like yoghurt and cheese. Decentralization of production and reducing the costs of end-product – e.g. by removing steps in the value chain – could be achieved by dairy societies with volumes from 5,000 upwards investing in mini-processors. However, this still requires significant investments, high skilled technical and management staff and ability to penetrate the market and compete with the larger processors or find a niche market. Proper feasibility studies that include all these aspects, should be carried out on a case by case basis, prior to driving farmers and dairy societies into this direction.

5.2 PACKAGING

Packaging (size, materials, design, branding etc.) plays an important role in marketing of products and determines cost price of the end product to an important extent. For example small packages are widely used to reduce the unit price of consumer goods, thereby making the product accessible for lower income groups. The following packaging technologies/devices are found in the Kenyan dairy market.

FRESH PASTEURISED MILK PLASTIC POUCHES – TARGETED AT THE BOP CONSUMERS

- Plastics solution for pasteurised milk
- Local supply chain for both packaging material and equipment
- Business model based on low margins and high volume
- Available in 200/500ml sizes (500ml caters for about 80% of total volumes sold in the market)
- Low investments hence low barriers to entry
- Low cost equipment and local spares and services
- Low operational cost and easy to operate
- Limited distribution due to reliance on the cold chain
- Fresh milk packing machines and Packaging Materials Suppliers include – Filmatic, Nichrome with local players Bobmill & PIL in Kenya for the polythene paper.
- Most milk processors use this system incl. the leading brands.

ASEPTIC PLASTIC POUCH

- Plastics solution for ESL/UHT milk- especially targeting the BoP.
- Local supply chain
- Business model based on low margins and high volume
- Service & spares network coverage in all markets
- Main players include Dupont, Elecster, Zhongya, Nichrome, Samarpan
- Local APP Suppliers- Packo, Elecster, Shangahi Precise Packaging Co
- Roll-fed Vertical Form-Fill-Seal machines
- Daima launched last year and is gaining traction and eating into the share of pasteurised plastic milk. 4 new entrants anticipated in 2013

HDPE BOTTLES

- Plastics solution for pasteurised milk
- Local supply chain for both packaging material and equipment
- Premium positioning
- Available in 1 litre, 2 litre & 3 litre sizes
- Limited distribution due to the cold chain
- Only available in the premium brands by the main players

CARTONS: TETRA PAK

- Tetra Pak is a multinational food packaging and processing company of Swedish origin with head offices in Lund, Sweden and Lausanne, Switzerland. Has been in Kenya for over 50 years.
- The company offers packaging solutions, filling machines and processing solutions for dairy, beverages, cheese, ice-cream and prepared food, including distribution tools like accumulators, cap applicators, conveyors, crate packers, film wrappers, line controllers and straw applicators
- Main supplier of carton packaging for both Aseptic and Chilled in Kenya
- Office and factory based in Nairobi's industrial area offering sales, marketing, supply chain and technical support.

THE CASE OF DAIMA ESL POUCHED MILK

Sameer was the first to launch the ESL 500ml pouch labelled as “*Farm Fresh - aseptically packed - three layer pouch, no refrigeration required*” (its guaranteed shelf life before opening is 4 weeks). The pack is aimed at controlling returns and the issue of refrigeration at the distributor and retail levels. When it was launched in 2012, it was sold at the same price as the Daima fresh and most people did not know the difference. From the supermarkets and competing processors that were interviewed in a separate study by an international marketing bureau in May 2013, it was found that this ESL pouch is doing well and is recognised as an important innovation in the dairy sector. Due to the extended shelf life and the lack of refrigeration purchase it is being driven by shop owners in the low income and rural areas who do not have fridges. Other processors have followed this innovation as Buzeki purchased an ESL line and launched their product with a Ksh 5 premium price from the normal fresh. This year Githunguri has budgeted to purchase an ESL line to help them reach markets outside of Nairobi.

MILK DISPENSING UNITS

This is a relatively new milk distribution and selling concept that has potential for reaching the BoP with processed milk. Consumer awareness was created during the last Eastern and Southern Africa Dairy Association (ESADA) conference held in Nairobi. Various exhibitors from Europe and their East African distribution agents displayed the dispensing units. These are available in different sizes and capacities. Some are mobile units, while others have the capacity to dispense all types of Liquid Dairy Products (LDP) that include yoghurts and fermented milk (mala), in addition to white processed milk.

The world market leaders in this technology are Italian manufacturers who have established local agents distributing the Latte Box and Latteria brands. This concept and technology entails the feeding of loose fresh pasteurised milk into the dispenser tanks of different capacities and holding it at 4 degrees Celsius. The consumer slots in coins of various denominations into the machine that is fully computerised and preset to only dispense milk quantities based on the coin denomination.

The quality of the dispensed milk/dairy product is achieved through the cold chain, since its inbuilt refrigeration system keeps and dispenses the pasteurised milk at 4 degrees Celsius at all times. It also has an inbuilt Cleaning In Process (CIP) system for the piping systems and portable, interchangeable storage tanks that enables removing a tank for cleaning while the 2nd tank continues dispensing the milk.

The dispensers will be addressing the key pasteurised-milk-affordability factor, since it economises on packaging costs. For example 1 litre of milk packed in a pouch packet will cost Kshs. 3/- in packaging material. Other cost saving will be on distribution, since it by-passes the milk distributor who normally earns about Kshs.4/- for distributing 1 litre of packed milk. Thus the total saving per litre of milk sold through the dispensing units will be Kshs.7/- per litre, which can be passed on to the BoP consumer.

In Nairobi supermarkets (Tuskys but others are bound to follow) dispensers are placed at the retail outlet – targeting the high human traffic locations in the supermarket. The dispensing units attract new customers or more frequent visits by the current customer base, who are also likely to buy other basic items from the same supermarket. This way the milk dispensing unit works as a consumer-puller.

The prime advantage observed to-date within BoP residential areas where the dispensers have been placed, is the shift of milk consumers from buying raw unprocessed milk from milk bars, and moving to

the milk dispensers selling points, where they are assured of hygiene and quality milk at affordable prices- with price differentials of about Kshs.5/- per litre. An additional advantage of the dispensing units is that this concept can be expanded into the dispensing of other Liquid Dairy Products (LDP) to include yoghurts and mala.

Portable dispensing units are a great advantage since the operators would tow the trailer-mobile unit to the areas where demand is high, especially during the prime hours when milk is purchased during early mornings and evenings within the BoP residential locations.

Some of its challenges/disadvantages would be the need to have a continuous power supply point for it to run the cold chain efficiently and also to dispense the milk. Hence it is ideal in the urban and peri-urban set ups where electric power is likely to be available with an alternative - though costly - option of using a generator.

Current dispenser operators are mainly supermarket chains that receive pasteurised milk in aluminum cans that are eventually emptied into the dispenser storage tanks by their staff. This can create an avenue for milk contamination. A tanker delivery would be ideal since human intervention and handling would be minimal. Losses due to spillage at the point of dispensing are also a concern but can be overcome through consumer training on how to operate the dispensing machine. Contamination of milk by a dirty consumer plastic jerry can is possible, though retail outlets are encouraging consumers to purchase re-usable but hygienically clean containers at the point of sale.

The biggest challenge for fast roll out of this model is the initial investment, since landed costs into Kenya from Europe per unit ranges from Kshs. 600,000/- (USD.7,000) to Kshs. 1,800,000/- (USD.21,200) for the larger milk storage capacity units.

The major concern by other stakeholders is that most milk processors may eventually see excess capacity on their milk packing lines, since consumers seem to be adopting the milk dispenser concept fast. Supermarkets where milk dispensers have been placed have recorded up to 40% drop in the off-take of processed milk packed in pouches. The implication will also be that less polythene will be purchased for packing milk in pouches - a great benefit for the environment. Crate manufactures may gradually lose their business volumes, since the milk is delivered in mini-tankers and aluminum containers. The pouch milk distributors may lose part of their revenue streams, since they re-sell fresh milk and other value added products to the retailers and earn a commission from the processors on daily basis. And milk bars may also see sales volumes drop.

Established Kenyan milk processors have been offended by the heavy presence of the milk dispensing model in some of the leading supermarket chains, and also within the BoP - where over 70% of all processed white milk sold by the key processors is sold through their 'Fighter Brands'. Milk sold through the dispensers has a price difference of between Kshs.10/- to 20/- per litre, and the consumer can purchase in denominations as low as Kshs.5/- (Kadogo economy in milk).

Indications so far are that after an initial fast acceptance of the milk dispenser model by some of the supermarket chains, scaling up and enhanced growth of this model is not as it was expected. This is mainly related to the high costs of the dispensers that are launched in the Kenyan market.

In Europe, USA and other international markets, there are manually operated dispensing systems/ devices used in institutions and caterers which are more affordable, easy to operate and hygienic. These chilled dispensers are manually operated and charged with 10–20 litres plastic disposable or re-usable bags/containers, which are filled, sealed distributed to the institutions and HORECA by the processors. This is a technology that could be successfully piloted in Kenya, as it is targeting a market segment (schools, hospitals, and other institutions) with high growth potential as far as the demand for affordable safe and hygienic milk and milk products is concerned.



FIGURE 3: PHOTO OF A MILK DISPENSING UNIT

MILK DISPENSER UNIT FEATURES

- Auto feeding pump with anti foam unit
- Certified flux meter to millilitre of unit
- Electronic control for pricing and dispensing unit
- Integrated with coin payment system and prepaid keys
- Sanitizing systems for dispensing tap after each dispensing
- Electronic temperature data logger for HACCP
- GSM module (mobile monitoring of temperature and malfunctioning of the dispenser)
- Audit key for easy access and download of the sale data

5.3 INFORMAL MILK TRADERS-PROCESSORS PARTNERSHIP ON MILK PASTEURIZATION

Based on the Kenya Dairy Board statistics, the proportion of milk production marketed is 65%, leaving 35% for home consumption. Out of the 2.9 billion litres of milk marketed, less than 600 million litres are handled in the formal market through the processors (Note: total volumes of processed milk by the formal processors dropped in 2012 to under 500 million from 550 million in 2011 due to prolonged drought and disturbed lactation cycles in part of the country: see Annex 3).

The remaining 2.3 billion is handled through the informal market outlets dominated by the hawkers.² Even if taking into account that official statistics on total (cow) milk production are inflated and might easily be 1.0 billion less (KNBS), this still leaves a massive raw milk market.

This raw milk is predominantly consumed by the lower income groups and their infants, who are therefore structurally exposed to unsafe - often adulterated products - with high bacterial load. One way to increase access of the BoP to processed liquid milk could also be through partnership(s) between milk traders and formal processors. The objective of the partnership would be to rope in the milk handled by the informal milk traders into the processing facilities, through a mutually agreed and commercially driven service contract.

Currently, there are a number of medium-sized dairy processors who have excess and underutilised processing capacity to pasteurise, separate and homogenise milk. Those selling processed milk in bulk normally factor in Kshs.7/- per litre to convert raw milk to pasteurised hygienic ready to drink milk. With actual conversion cost being Kshs. 5/- per litre they make a profit of Kshs. 2/- per litre (40% margin). This is an attractive profit margin. The key cost element is only labor and electricity used in heating the milk as the processor simply fills up his excess capacity.

All registered CBEs in Kenya pay on a monthly basis, 20 cents per litre as cess to the Kenya Dairy Board (KDB). The processors pay 20 cents as a levy. The levies are paid in the understanding that KDB as the government regulatory body fights off the informal milk traders through surveillance at different entry points into the urban and peri-urban centres. This includes the arrest of the traders and subsequently taking them to courts for prosecution. In actual practice KDB does not have the capacity (or political muscle) to effectively implement this task.

Considering that all processors are currently handling about 1.5 million litres per day, KDB gets about Kshs. 300,000/- per day from the levy, or Kshs. 110 million per year (US \$ 1.3 million). This amount with the support of other stakeholders would be used to subsidise the processing costs of the informal milk, using the processors with excess capacity initially and on a pilot basis. The processed hygienic milk would then be sold back to the milk traders who would be requested to invest in deep freezers in all their retail outlets and achieve a cold chain before selling the milk.

Those selling in bulk would have to invest in 1-4 ton refrigerated trucks so as to maintain the cold chain at 4 degrees upto the point of delivery, especially those serving the HORECAS and other institutions like schools and hospitals that normally have cold rooms to store their perishable products.

The above project would initially be rolled out on a pilot basis, starting with the Nairobi and surrounding dairy farming zones that would include Kiambu, Ndumburi, Limuru areas that contribute huge amounts of raw milk that is consumed within the Nairobi market due to its proximity.

² The upper bound of the estimates for this number is 80% informal versus 20% formal channels. Reliable information on the exact value is not available.

This project would ideally be supported by KDB through a campaign to create awareness that consumers now have a choice of buying fresh, hygienic pasteurised milk at an affordable price from selected milk bars and other points of sale.

A key advantage of this approach is that this programme can also be integrated with milk dispensing. In this scenario the informal milk traders and milk bars will be encouraged to purchase automated milk dispensers through low interest and medium to long term loans (asset finance programmes) to sell their pasteurised milk from - hence achieving a common overall objective of national interest. Alternatively, processors could think of developing a franchise-chain of branded milk bars with traders and the milk bar operators.

Another advantage would be that KDB would now create a credible data base of the 'informal milk traders' since they would have to register to participate in any of the rolled out programmes. The government would also net them for tax purposes where applicable, including paying cess and levies to KDB to enable national roll out of the project in other areas. Consumers' health will be catered for, since the Public Health department and Kenya Bureau of Standards (KEBS) would be involved in the quality control and assurance process for all milk handled through this process.

Organised milk traders groups would with time be ripe for further investment in the high margin value added dairy products like yoghurts, mala, butter, cheese and ghee, hence making them achieve financial freedom and uplift their living standards and mopping up more milk for the formal milk channel.

Processing of raw milk handled by the informal milk traders will also enable the dairy industry achieve price stability during glut. It is in this season that traders buy milk from farmers at very low prices and sell the same unprocessed milk at rock bottom prices to consumers, hence affecting the established processors packed milk off-take and causing lower taxes being collected by the government.

6. FINAL CONSIDERATIONS

The Kenya Dairy Board (KDB) statistics confirm that about 80% of all milk consumed locally is through the informal trade channel and only 20% is consumed as processed. The bulk of this unprocessed milk is consumed by consumers living below USD 8 per day – called Deeper in Pyramid (DiP) or Bottom of Pyramid (BoP). Many of them have aspirations to consume (instead or in addition to raw milk) processed packed, branded milk and milk products, as their economic status improves and these products can be made more affordable. This represents one of the biggest growth opportunities for the dairy industry.

Small, medium-sized and multinational dairy players can grab this golden opportunity. They should identify strategies and models to provide healthy, nutritious and safe packaged dairy products. With the limited incomes, the BoP consumers' still focus on providing the best for their infants and young children. Thereby reducing other expenses rather than to compromise on basic nutritional food stuffs like milk.

The 3 key focus areas for the dairy industry would be:

- To make products which are affordable to the people living below the Kshs. 700/- per day.

- To make the product available in every kiosk, duka, grocery, town, market or city through an innovative, effective and efficient route-to-market distribution model.
- To develop and avail products that are attractive, offering quality, convenience and value for money, with a special focus on kids who ultimately be the next generation of dairy products consumers (Cradle to Grave Business Model).

Our dairy industry will hence need to make products, packaging and processing more cost effective and affordable to reach the BoP.

It was noted in this report that the distribution channel that delivers milk to the BoP through the milk bars is more (cost-) efficient than the one that passes through the processors since it has fewer stages.

However, this channel gets its milk into the market at a lower consumer price that on average is less Kshs. 10/- to Kshs.20/- per litre compared to processed milk. It compromises on the milk quality since the very important cold chain is mostly absent and the microbial activity in milk is very vibrant, in addition to widespread cases of milk adulteration by some unscrupulous middle men and milk bars operators. Any shift towards the provision of processed milk at affordable prices will benefit the BoP consumers and the economy at large. The consumption of unsafe or unhygienic unprocessed milk presents the nation with a massive health bill, due mainly to the spread of many zoonotic and contagious raw milk borne diseases like brucellosis, typhoid and cholera, present the nation with a massive health bill. This is not to say that there is no hygienic raw milk, or to turn this round unhygienic and unsafe processed milk. Rather what is implied here foremost, is that a quality controlled chilled and processed milk supply chain from “grass to glass” is the preferred scenario in maturing consumer markets, as it significantly reduces the risk of health issues due to unsafe food handling and consumption practices.

It seems that for the BoP to have access to affordable and safe processed milk or milk products, the business model is likely to incorporate both the informal and formal milk trading and supply channels. The informal milk trade channel handles over 70-80% of the total milk marketed in the country and sells about 80% of that milk into the Base of Pyramid market segment. This confirms a fully established distribution network that penetrates the depth and width of this consumer base.

Attempts to penetrate Deeper into the Pyramid and the BoP with safe, processed milk and milk products, (including fortified/enriched milk products), may therefore need to ride on this already established informal milk traders’ network through partnerships between the informal and the formal channel. This could be as described above under par. 5.3, but it could also take shape through innovative distribution models and franchises with milk bars, operators of dispensers, institutions like schools/HORECA, and supporting them with training, loans for equipment and marketing.

ANNEX 1: MILK COOLING, PROCESSING AND PACKAGING EQUIPMENT AND SUPPLIERS

MILK PROCESSING PHASE	PROCESSING /PACKAGING EQUIPMENT SUPPLIED AND PURPOSE	TECHNOLOGY AND EQUIPMENT MANUFACTURERS AND SUPPLIERS TO THE KENYAN FORMAL PROCESSORS.
1.Milk Production at the farm level	Raw Milk Farm Cooling Tanks. The tanks chill milk at 4°C to inhibit microbial activity, hence better quality milk.	Delaval (Pty) – Part of Tetra Pak Group. Tetra Pak; It’s a multinational food packaging and processing company of Swedish origin with head offices in <u>Lund, Sweden</u> and <u>Lausanne, Switzerland</u> . Group also includes:-Tetra Pak, Delaval, Sidel and Tetra Laval International.
2. Raw Milk Reception Stage	Milk cooler – Ice Bank or Plate Heat Exchangers (PHE) - further chills the raw milk for better quality.	APV-SPX World leaders in Flow Technology, designs, manufactures markets and provides solutions to the Dairy and other related industries. Has its headquarters in Charlotte –North Carolina- USA
	Milk reception pump - pumps milk into the Pasteurisers.	APV-SPX- As above
	Raw Milk Tanks- stores milk in sanitised stainless tanks waiting processing.	Desbro, ASL – Local suppliers.
3. Milk Processing Stage	Milk Pasteuriser (PHE) - Process entails heating milk for a length of time and cooling it to mitigate the microbial activities and reduce spoilage.	APV-SPX- As above
	Pasteuriser pump	APV-SPX- As above
	Pasteurisers Hot Water Buster Pump	APV-SPX- As above
	Milk Separator – mechanical process carried out by the centrifugal cream separator – to separate cream from the milk.	Seital –Part of SPX Group with HQ –in Santorso- Italy and is market leader in design and manufacture of disk centrifuges – clarifiers and separators’ used in the dairy industry and edible fats.
	Milk Homogeniser- treatment that prevents cream layer from separating out of milk – and retain the required butter fat content. The homogeniser breaks up the fat globules.	APV-SPX- as above
4.Milk Filling and Packing Stage	Milk Packing and Filling line. The machines fill and seal the pouches with pasteurised and homogenised milk under hygienic conditions hence locking out milk contamination and making it safe for human consumption straight from the packet.	Nichrome, India: -Market leader in the manufacture of the Form –Fill and Seal Pouch packaging systems. Located in Pune- Mumbai- Maharashtra- India. Filmatic Packaging Systems. Regional office in South Africa. Manufactures specialised liquids & Food packaging equipment and machines- customised to customer requirements and turnkey projects. Has supplied several Extended Shelf Life (ESL) machines to various processors in Kenya and rest of Africa
	Milk Filling Pump	APV-SPX

5. Milk Storage at 4°C	Cold Rooms- Milk is stored under large refrigeration warehouse at 4°C awaiting dispatch to the market.	ScanPro Market leader in Engineering, designing and supply of process plants in the dairy and juice industry. Headquarters in Aarhus, Denmark and Chile.
	Compressors – air and ammonia compressors assist in feeding the milk processing with chilled water.	Bitzer Worldwide suppliers of air Compressors –for refrigeration and air conditioning systems. Headquarters in Sindelfingen, Germany.
6. Refrigeration System	Ice Banks – as above.	Evapco - HQ- located in Allendale-Taney, USA. Manufactures and providers of solutions to all Heat Transfer Applications problems; this includes evaporative cooling and Industrial refrigeration systems.
	Ammonia Compressors – as above	Grasso and Sabroe (HOS-B.V) Netherlands - Manufacturers and suppliers of Air and Ammonia Compressors, Evaporators, Condensers', Water Chillers and has several production sites countrywide.
	Ice Water Circulation Pumps	Grandfos – HQ- based in Poul Due-Jensen Vej 7 Denmark. Market leader in manufacture of all types of Pumps for the dairy industry and water pumping solutions.
7. Cleaning In Process (CIP) within the Factory after every production run.	CIP Forward and Return Pumps- CIP is carried out using special milk piping system cleaning detergents that kill any pathogens within the production equipment.	APV –SPX - as above.
8. Factory Steam Generation	Boilers- can be Fuel oil or Firewood driven. Normally used to produce steam for use within the dairy factory to heat and also clean.	Thermax Present in 75 countries worldwide- Africa, Asia, Middle East, USA. Market leader in Energy and Environmental sector. Key products for the dairy sector includes:- Boilers, Heaters, Power Plants, Heat pumps. Also produces products for waste water management. It is in partnership with SPX Company in different markets
9. Compressed Air Generation.	Air Compressor	Atlas Copco - Is a Swedish company that is well represented in the Kenyan market. Leader in manufacture of compressors, construction and mining equipment.
10. Water Storage and Allied Equipment	Over-head Water Tanks. Water is very essential in milk processing – with a requirement ratio of 1 litre of milk processed to 3 litres of clean treated water. The tanks are used for buffer water storage.	CMC, David Engineering Leading local manufacturers of stainless steel overhead tanks and steel structures.
	Bore Hole Pumps, Submersible Pumps, Buster Pumps – Filtration, Sand Filter Pressure Bar	Davis and Sharliff Market leader locally and East Africa in the supply of water pumps and water purification equipment. Based within Nairobi-Industrial Area with regional sales support offices.
11. Electric Power Generation	Hydro Power Supply – Electric power used to run most processes in the factory.	Kenya Power – Quasi government institution that supplies electric power in Kenya –generated by KenGen- another parastatal –from Diesel power, geo-thermal power and hydro power.

	<p>Back Up Generators – due to Kenya Power outages, most factories invest in backup generators that support production in case of outage.</p> <p>A 350 KVA Generator would run a 50,000 litre capacity milk processing factory.</p>	<p>Blackwood Hodge</p> <p>Local suppliers of their branded generators- based in Nairobi.</p>
12. Packaging Materials	<p>Polythene Packaging Materials –Pouch Sachets’- used for packing the processed milk.</p>	<p>Bob Mill, Plastic Industries Ltd (PIL) - Locally owned Plastic pouch suppliers and manufacturers.</p>
	<p>Plastic Crates- processed milk in pouches are packed in crates- 18 packets for 500 ml and 45 packets for the 200 ml.</p>	<p>Kenpoly Ltd, Acme Kenya – locally owned manufacturers of Plastic crates and containers.</p>
13. Milk Dispensing Units.	<p>Automatic and Semi- Automatic Milk Dispensing/Vending Machines.</p>	<p>Latteria ProMeta</p> <p>Based in Italy- leading manufacturer of Milk dispensing units that are sold to the Kenyan market through various distribution agents. It is highly likely that in future, milk dispensing units will be used to serve the consumers within the BoP - due to the convenience of small affordable pack sizes based on the cash available to the consumer at any one time.</p> <p>It has gained momentum within the Nairobi low end BoP areas with a litre of unpasteurised milk being dispensed at between Kshs.45 to 55/- due to the current short supply.</p>

ANNEX 2: QUANTITY AND VALUE OF TOTAL MILK PRODUCTION IN KENYA (2012)

QUANTITY AND VALUE OF NATIONAL MILK PRODUCTION, 2012			
	Quantity (litres/kgs)	Average unit value (KShs)	Total value (KShs)
FARM LEVEL PRODUCTION			
Total production of raw milk	5,200,000,000	35	182,000,000,000
Less raw milk marketed through formal/informal channels	(2,860,000,000)	30	(85,800,000,000)
Total Quantity/Value (consumed at producing households)	<u>2,340,000,000</u>		<u>96,200,000,000</u>
RAW MILK INTAKES FOR PROCESSING/INFORMAL MILK SALES			
Raw milk received from farmers for processing ¹	497,337,516	35	17,406,813,062
Raw milk sold through informal channels ²	2,362,662,484	50	118,133,124,198
Total Quantity/Value (Raw milk sales)	<u>2,860,000,000</u>		<u>135,539,937,259</u>
MARKETING OF VALUE ADDED PRODUCTS			
Pasteurised milk	301,326,877	80	24,106,150,189
Long life White Milk	76,092,343	140	10,652,928,008
Mala	10,686,580	120	1,282,389,571
Yoghurt	19,606,459	190	3,725,227,262
Butter	904,126	560	506,310,449
Ghee	672,463	380	255,535,941
Cheese	436,655	450	196,494,930
Cream	1,001,690	600	601,013,941
Whole milk powder	4,968,235	280	1,391,105,756
Flavored Milk	2,307,293	160	369,166,909
Total Quantity/Value (Value added products)	<u>409,050,646</u>		<u>43,086,322,956</u>
Total value of the dairy industry			<u>274,826,260,216</u>

Notes:

1. The 497,337,516 litres received from farmers for processing was converted to value added products amounting to 409,050,646 kgs
2. Informal milk sales (2,362,662,484 litres) include sales of raw milk between rural households and sales of raw milk in local trading centres and towns.

ANNEX 3. PERFORMANCE OVERVIEW OF THE KENYA DAIRY INDUSTRY FOR 2012

1. There was no overall growth in milk production which was attributed to the following reasons:
 - a) The long and severe drought experienced in the early months of 2012;
 - b) Failure of the maize crop in South Rift which affected supply of human food and animal feedstuff;
 - c) Disruption of breeding cycles (hence lactation cycles) in the dairy herd especially in the North Rift due to the drought experienced in early months of 2012;
 - d) Transition to other types of farming such as growing of passion fruit and sugarcane in the North Rift.
2. Milk production in Central Kenya grew mainly because of the stable zero grazing system of milk production.
3. There was increased investment by processors and dairy farmer groups to expand the network for bulking and cooling of raw milk to maintain quality.
4. The milk received for processing also went down from 549 million litres in 2011 to 497 million litres in 2012 (a drop of 9%). This was attributed to the drought experienced in 2012.
5. A major generic milk consumption campaign was undertaken by Kenya Dairy Processors Association (KDPA) and Kenya Dairy Board to promote milk consumption in Kenya.
6. The dairy industry continued to experience heavy investment in processing capacity including over the last two years:
 - a) A 100,000 litres per day ultra-pasteurised milk processing line by Buzeki Dairy;
 - b) A 120,000 litres per day UHT milk processing line by Githunguri DFCS;
 - c) A 30,000 litres per day pasteurised milk processing line by Kinangop Dairy;
 - d) A 120,000 litres per day long life milk processing line by Sameer A&L;
 - e) Upcoming UHT milk processing line by Meru Central;
 - f) Upcoming milk drier by Brookside Dairy with a daily capacity to handle close to 300,000 litres per day.
7. The organisation of the dairy industry continued to be strengthened through stakeholder associations such as Kenya Dairy Processors Association (KDPA)), Kenya Dairy Farmers Federation (KDFF), Small-Scale Dairy Farmers Association (SSDFA) and Dairy Traders Association (DTA).