1.0 Coffee Sector

1.1 Background

The coffee sector continues to be a critical potential economic driver for Kenya. The sector's contribution to the economy peaked in 1976/77 when revenues reached $500 million. This is a substantial contrast to current revenue levels of $74 million. With respect to production, total annual production peaked in 1987/88 when the country produced as much as 130,000 tons, compared to the current level of 48,000 tons. Over 99% of the country's production of coffee is arabica, and while production has declined, Kenya continues to be a market leader in the premium coffee sector.

The near collapse of Kenya's coffee sector can be attributed to a multitude of factors. International market factors range from the collapse of the International Coffee Organization's (ICO) economic clause in 1989, expanded competition with Vietnam's entry into the global market, and market glut. Local factors include poor and incomplete market liberalization process, growing inefficiencies of the cooperative structure, uncompetitive agrochemicals sector, structural inefficiencies in the farm-to-market supply chain, government mismanagement and a range of other issues.

Currently, nearly 170,000 hectares of land is available for cultivating coffee. The coffee farming sector is dominated by smallholder farmers where nearly 113,333 hectares or two-thirds of all cultivation is handled by low yield, comparatively inefficient smallholder farmers with an average yield rate ranging from 0.2 – 0.7 tons/ha. It is compulsory for smallholder farmers to be a member of a cooperative to process and sell coffee. However, recent change in regulations has redefined the categorization for a plantation grower where plantations are defined as 'a person having a minimum of two or more hectares of coffee planted…and who is licensed to operate a pulping station.'[25]

Kenya's coffee market activities can be broadly divided into four areas: coffee farming; primary/secondary processing (pulping and milling); marketing/auctioning; and trading. While nearly all of the coffee grown in Kenya is exported – the local beverage market is dominated by the tea sector – there is slow but steady growth of a coffee culture within Kenya, where a number of traders have started local roasting for wholesale/retail sales. A profile of Kenya's coffee sector is presented below (Table 13).

[25] Coffee Rules 2002, Section 8(1).

Table 13: Kenya's Coffee Sector Profile

1.0 Area Under Cultivation (# of farms)	**170,000 hectar s**
1.3 Estate sector (large: 380; medium: 390)	56,666 ha
1.2 Smallholder (500,000)	113,333 ha
2.0 Current Production (2001/2002)	48,000 to s
3.0 Total Revenue	$74 milli n
4.0 Average yield	0.2 – 0.7 tons/ a
5.0 Primary Processing	
5.1 Processing method	Wet process
5.2 Total number of coffee pulping stations	2,680
5.2.1 Cooperatives	1,000
5.2.2 Small/medium estates	1,300
5.2.3 Large estates	380
5.3 Installed capacity	100,000 tons
5.4 Average processing cost	
5.4.1 Estates	Ksh 12,500 – 14,500
5.4.2 Cooperatives	Ksh 30,000 – 60,000
6.0 Secondary Processing	
6.1 Millers	6
6.1.1 Commercial	4
6.1.2 Private	2
6.2 Capacity utilization	<20%
7.0 Coffee Marketing Channel	**Nairobi Coffee Exchange (NCE)**
8.0 Research Facility	**Coffee Research Foundation (CRF)**
9.0 Coffee Varieties	
9.1 Hybrid	Ruiru 11
9.2 Traditional	K7, SL28, SL34
10.0 Growing Condition	
10.1 Altitude range	4,500 – 6,800 ft
10.2 Temperature range	15C – 30C
11.0 Principal Markets	
11.1 Germany	35%
11.2 Sweden	8%
11.3 U.S., Belgium, UK, Netherlands	7%
12.0 Employment generation	210,000

Source: Various

1.2 Coffee Farming

1.2.1 Characteristics of Smallholder Farmers

Green coffee production is split evenly between smallholder farmers and large estate farms. This split reflects a continued decline in smallholder production by 20 – 30 percent compared to the 1990s. Current estimates suggests that there are over 500,000 smallholder farmers with an average farm size of only 0.25 ha, with per hectare yield rates well below 400 kg of clean coffee. Since 1999, yield rates for smallholder farmers have declined dramatically where it is estimated that farmers are only harvesting 3 – 10 kg of cherries/plant, where in the past at least 30 kg/plant was possible.[26]

[26] Maximum yield achieved is approximately 45 kg/tree

Given depressed market prices for coffee, it is common to find farming costs exceeding auction prices at the market in Kenya. The high cost of farming and depressed market prices have contributed to a growing popularity among farmers to shift production away from traditional varieties such as K7, SL28, and SL34[27] towards a hybrid variety, Ruiru 11 (represents approximately 10% of planted area), a disease resistant variety that requires limited agrochemical inputs and can be grown more densely per hectare.[28]

Most smallholder farmers intercrop maize and beans to help supplement farm-based income, and for use in personal consumption. Coffee trees among smallholder farmers generally suffer neglect, particularly due to lack of fertilizer and spray applications, resulting in poor yield. Approximately 20% of the labor input among this category of farmers is devoted to weeding to accommodate intercropping.

While a large number of smallholder farms suffer from poor yield and poor farming practices, among the 500,000 smallholder farms, there are a number (17% – 30%) of efficient smallholder farmers producing yields above 600 kg/ha that account for over 50% of production in this category of producers. And even within this category of efficient producers, there are an elite group of producers (3% - 9%) that achieve yields above 1.8 tons/ha of clean coffee. Given inefficiencies among cooperative society, there is a growing trend among the elite smallholder farmers to register as an estate, which qualifies these farmers to by-pass the restrictive and inefficient structure of the cooperative society.

The elite smallholder farmers enjoy acceptable yield rates, but many continue to practice intercropping on at least a part of their cultivated land holding. In addition, given the high cost of agricultural inputs, a complete regiment of fertilization and spraying is often not realized.

It is estimated that Kenya has 2,500 small estate producers (farms with plots between 2 – 8 hectares). Most small estates achieve yields well over 1 ton/ha, and have the freedom to conduct their own primary processing (pulping) and can choose their own secondary processor and marketing agent. To help supplement farm-based income, such estates often grow tea, fruit, maize and other basic commodities.

1.2.2 Characteristics of a Commercial Estate

It is estimated that there are 380 large and 390 medium size estates operating in Kenya today. Large estates are those with more than 20 hectares under cultivation, while medium size estates range between 8 – 20 hectares. Estates, which are generally dependent on irrigated farming technique, continue to produce traditional varieties that require extensive use of agrochemicals, thereby raising the overall cost of production, allowing them to achieve per hectare yields well above 1 ton. Estate production accounted for over 23,000 tons of coffee in 2001/2002.

Given the depressed market price and high cost of production associated with estate production, most large estates are reportedly operating at a substantial loss.

[27] It has become increasing difficult to access root stock for traditional varieties.
[28] Plant density

Variety	Plant Density	Growing Characteristics
Ruiru 11	2,500 – 3,000 trees/ha	All regions
K7, SL28, SL34	1,329 – 2,660 trees/ha	K7: low altitude (serious leaf rust problem) SL28: low/medium altitude SL34: medium/high altitude with good rainfall

1.3 Coffee Farming Value Chain Analysis

Coffee farming can be divided into at least 5 categories of value adding activities for smallholder farms and as many as 7 value adding activities for large estate farms:

1. Land preparation;
2. Fertilizing;
3. Spraying;
4. Plant maintenance;
5. Irrigation (large estates);
6. Harvesting; and
7. Facilities maintenance (large estates).

This value chain analysis will contrast two types of farms. First a smallholder farm with 400 kg/ha yield, and a commercial estate producing approximately 1.76 tons/ha of clean coffee.

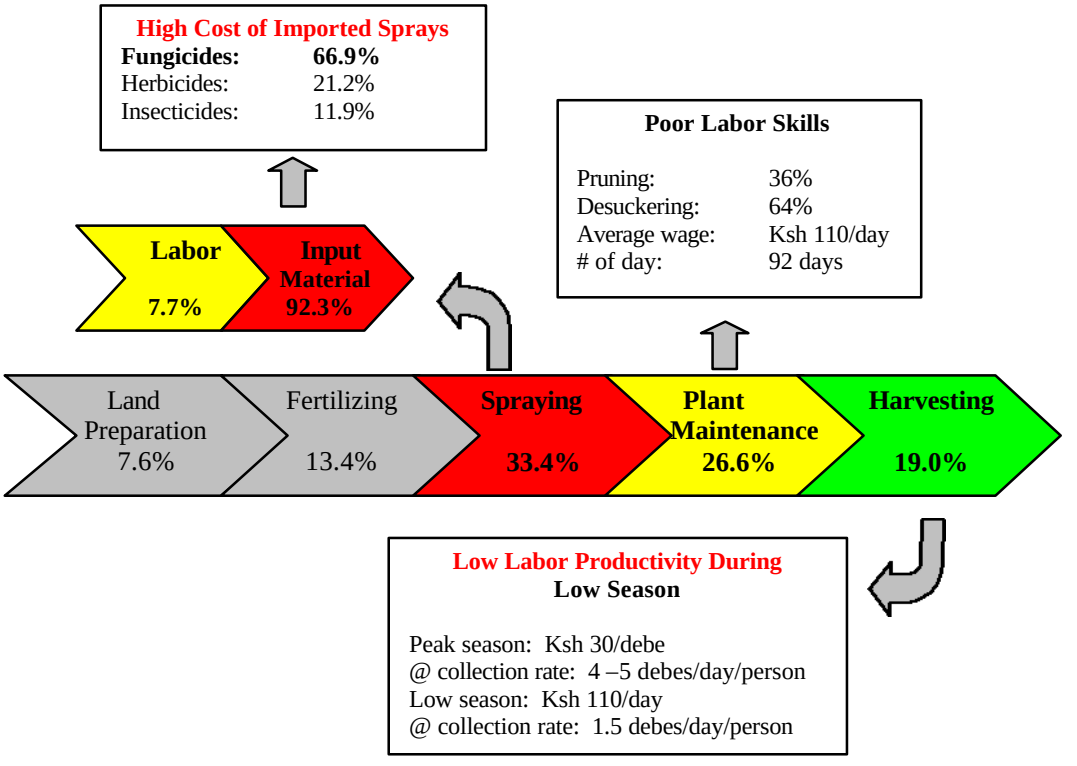
1.3.1 Value Chain Analysis: Smallholder Farm

The smallholder farm used for this example has a yield rate of approximately 400 kg/ha of clean coffee.[29] This translates roughly to 2,870 kg/ha of cherry at a cost of approximately $531.31/ha ($0.18/kg of cherry)[30] (Diagram 9).

[29] Crop consist of 5% Ruiru 11 and 95% SLs variety.

[30] These figures reflect only farming costs and do not include primary processing and post harvest handling charges.

Diagram 9: Coffee Value Chain for Smallholder Farmers



Source: Global Development Solutions, LLC™

The value chain analysis suggests, spraying (33.4%), plant maintenance (26.6%) and harvesting (19%), constitute over 79% of the total value added for smallholder coffee farming. A breakdown of spraying indicates that 92.3% of spraying costs are made up of imported fungicides, herbicides and insecticides (Table 14).

Table 14: Sample Cost of Sprays

Input Material	Ksh/ha	% of Total
Fungicides		
Copper	Ksh 5,225	44.4%
Daconil	Ksh 2,649	22.5%
Herbicides		
Sumithion	Ksh 2,500	21.2%
Insecticide		
Gramoxone	Ksh 1,400	11.9%
TOTAL	**Ksh 11,774**	**100%**

Source: Global Development Solutions, LLC™

As was the case with cotton, the cost of imported agrochemicals is extremely high even though the amount of agrochemicals used by smallholder farmers is well below the prescribed level to achieve competitive per hectare yield rates. Here again, a detailed review of registration requirements for new chemicals under PCPB and consideration for

allowing local formulation is expected to play a critical role in reducing the cost of agrochemicals.

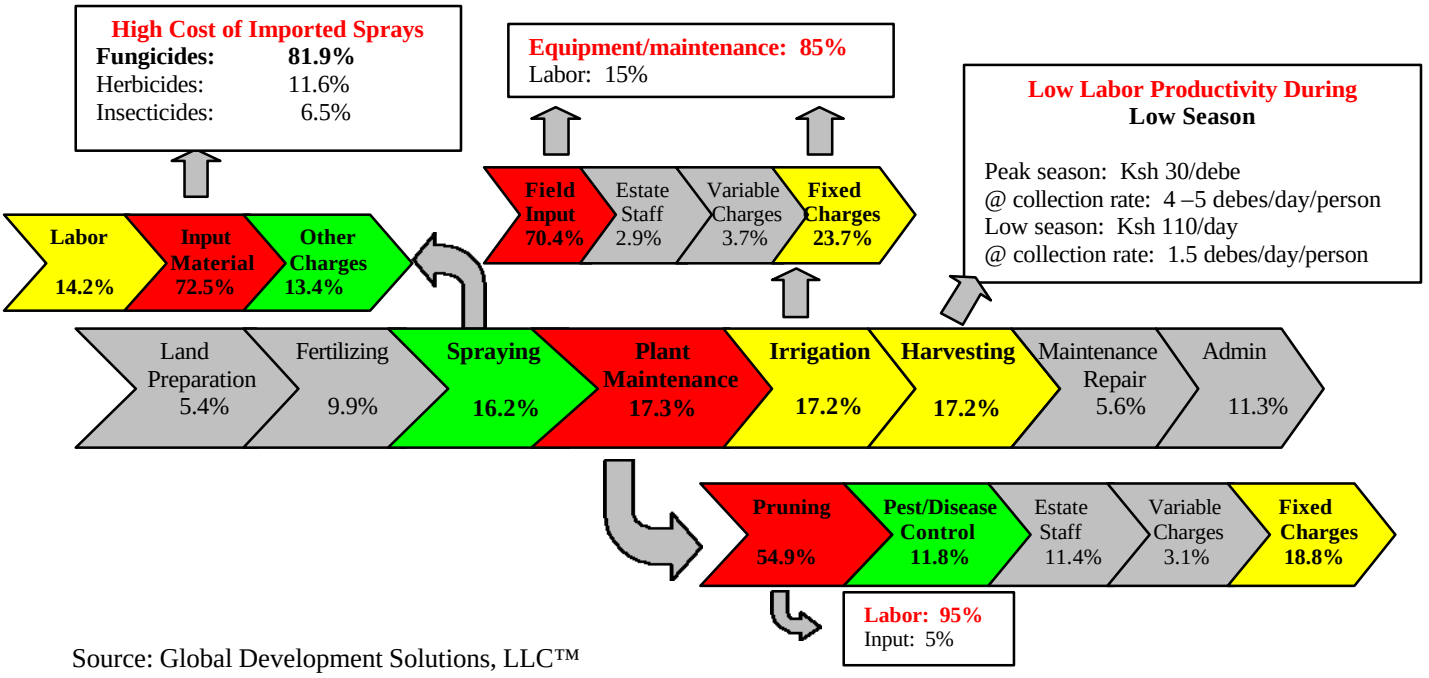
It should also be noted that low yield rates of smallholder farmers is a reflection of improper and inadequate application of fertilizers and sprays due to the high costs of agrochemicals, which limits the use of such inputs. The poor quality of fertilizers is the result of adulteration and improper handling along the distribution channel.

Coffee production in Kenya has a very large labor component, particularly among smallholder farmers. As evident from the value chain analysis, plant maintenance and harvesting constitutes over 45.6% of all inputs. The hallmark of Kenyan coffee production is its labor intensive nature. Specifically, the use of labor rather than mechanical harvesting, allows for only ripe cherries to be picked, thus improving the overall quality of each harvest. At the same time, however, as was the case in cotton farming, virtually no on-farm extension support is available to farmers. Consequently, labor productivity and the quality of labor continues to remain poor.

1.3.2 Value Chain Analysis: Large Plantation

The large plantation used for this example produces over 12,320 kg of cherry per hectare with a clean coffee yield rate of 1,760 kg/ha. The total farming cost per hectare is estimated to be approximately $3,369/83/ha ($0.27/kg of cherry). The use of irrigation and proper regiment of fertilization and spraying contribute to a higher per hectare cost of production, but per hectare yield rates are at least 4 times that of smallholder farmers (Diagram 10).

Diagram 10: Coffee Value Chain for Large Plantations



Source: Global Development Solutions, LLC™

Plant maintenance constitutes the single largest value added activity for a large plantation. Specifically, substantial attention is paid to pruning (54.9%), which is largely made up of labor (95%). In addition to spraying, pest and disease control (11.8%) is also an important feature of plant maintenance. Fixed charges generally represents repairs and upkeep of farm implements.[31]

Irrigation and harvesting both constitute approximately 17.2% of the overall cost associated with a large plantation coffee production. Unlike smallholder farms, use of irrigation contributes to substantial increase in per hectare yield rate. At the same time, however, there are associated costs principally presented by equipment costs and maintenance (85%).

As for harvesting, similar to smallholder farmers, labor costs associated with coffee farming is high for large plantations. In the case of large plantations, higher labor input costs for harvesting is understandable, particularly given that unlike smallholder farmers, plantations require a large number of pickers who they must truck to their facilities during peak season. Specifically, in the case of smallholder farms, tree density is approximately 2.16 kg of cherry per tree, as opposed to a similar variety in large plantations where tree density is over 9.11 kg of cherry per tree.

In a smallholder farm, the use of family labor is usually the norm. Consequently, in many cases, wages are not paid directly to workers. At the same time, however, large plantations must pay wages and in many instances must truck workers to their plantation. However,

[31] In the case of Indonesia, the per hectare yield rate for clean coffee was approximately 800 kg at a cost of approximately $0.35/kg. The value chain distribution was as follows: Land preparation (24.7%); Fertilizing (20.9%); Spraying (9.9%); Plant maintenance (32.1%); and Harvesting (12.4%).

interviews with large plantations indicate that the cost of transporting workers to a plantation costs approximately Ksh 125 per person per day. Taking into account that the average wage rate for a farmer is Ksh 110, the cost of transporting seasonal workers to a plantation easily doubles the cost of labor inputs for large plantations.

As evident from the value chain analysis, agrochemicals, including both fertilizers and sprays, constitute 28.1% of the total cost of production for large plantations. For both fertilizers and sprays, input material accounts for more than 72% of overall costs. In this context, reducing the cost of imported agrochemicals through revision of PCPB regulations on new registrations, and allowing for local formulation is expected to make substantial contribution towards reducing farming cost for both smallholder and large plantations coffee farmers.

This suggests that the revitalization of the coffee sector, particularly among large plantations, will need to be accompanied with dramatic improvements in extension services which will help increase labor productivity, and improve access to rural transport to help reduce the burden of costs associated with transporting large numbers of seasonal workers to support harvests in large plantations.

Summary of Constraints Faced by the Coffee Farming Sector in Kenya

Policy Based Distortions	Market Based Distortions
Restrictive registration process for agrochemicals under PCPB and prohibitive taxation related to local formulation is having a damaging effect on farming costs	High cost of imported fungicides, herbicides and insecticides
Poor farmer yield rates are partly to be blamed on the lack of monitoring and enforcement of regulations related to repackaging agrochemicals resulting in adulterated products being sold (dominate of the PCPB)	Poor labor productivity due to lack of available training, particularly among smallholder farms
	High cost of labor input, particularly for large plantations, as workers must be trucked to the harvesting sight

Source: Global Development Solutions, LLC™

2.0 Background on Primary (Pulping) and Secondary (Milling) Processing

Coffee "cherries" are picked by hand and measured using a tin container called a "debe". A single "debe" holds 15 kg of cherries. During peak season, workers are paid according to the number of "debes" picked each day. On average, a worker may pick between 4 – 5 "debes" for which a picker is paid Ksh 30/debe.

During the off season, pickers are paid a daily wage, which on average is about Ksh 110/day. Harvest during off season is dramatically less where a picker may yield only 1.5 "debes" per day.

Cherries picked during the peak season are referred to as the 'main', and those picked during the off season are referred to as 'flying'. Once picked, cherries are packed in a 60 kg bag before they are transported to a processing facility.

A cherry must go through two processes before it can be sold: primary processing or pulping where the hard outer shell of the cherry is removed; and secondary processing or milling, where the inner skin is removed to reveal the green coffee.

It is estimated that there are over 2,680 pulping stations in Kenya with an installed capacity of approximately 100,000 metric

tons. As mentioned earlier, all smallholder farmers must be a member of a cooperative and can only sell their harvest through a cooperative. Most cooperatives have their own pulping facilities, which are inefficient and costly compared to pulping stations operated by large estates.

2.1 Primary Processing (Pulping)

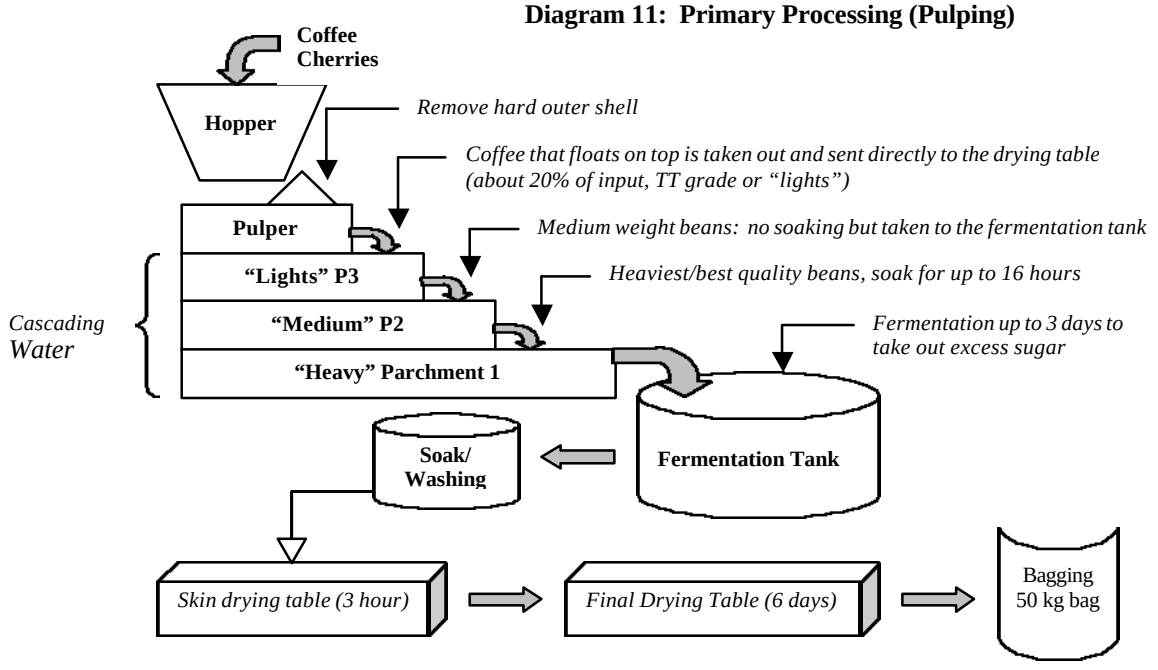
Ninety percent of all coffee processed in Kenya uses the 'wet method' where cherries are soaked in water as a part of the pulping process. The "dry method" relies solely on the sun to dry the cherry and de-husk the coffee bean.

Once cherries are delivered to the pulping station, they must now go through at least 8 stages of processing before they can be stored or transported for secondary processing. The 8 stages of processing include:

- Selection;
- Pulping;
- Fermentation;
- Soaking;
- Final wash
- Skin drying;
- Final drying; and
- Conditioning.

Pulping stations vary in their degree of sophistication. Small estates tend to rely on rudimentary apparatus, while larger estates have well established pulping procedures and equipment to help minimize damage and waste. The following diagram is an example of a basic primary process used by large plantations in Kenya (Diagram 11).

Diagram 11: Primary Processing (Pulping)



Source: Global Development Solutions, LLC™

After manual sorting to remove twigs and other debris, cherries are deposited into a hopper where they are 'pulped'. The first stage of pulping consists of removing the hard outer shell of the cherry. Once the outer shell is removed, the bean with its inner shell is dropped into the a large sieve like contraption filled with water. Approximately 20% of the deposited bean will float. These are referred as 'lights' (Parchment 3 – TT grade). These beans are of the lowest quality, fetching only 10% of the value of premium beans (Parchment 1 – heavy). Lights are removed and taken immediately to the drying table.

Through a cascading sieve like structure, Parchment 2 or medium weight beans end up at the second level. These beans are taken out and placed in the fermentation tank for 3 days. The remaining beans end up as Parchment 1 or 'heavy'. These beans are much more dense than Parchment 1 and 2, and thus tend to remain at the bottom of the sieve. After 3 days of fermentation, 'heavies' are then soaked for an additional 16 hours. Soaking helps to remove excess sugar from the fermented beans.

After the beans are fermented, soaked and washed, they are then taken through a two stage drying process. First, the wet beans are place on a skin drying table positioned outside to received the direct sun. The beans remain on a skin drying table for approximately 3 hours.

Once the skin is dry, the beans are then moved to the final drying table where they are left to dry for as long as 10 - 14 days. Once the beans are dried, the beans are placed in a conditioning bin for up to 2 weeks before it is bagged into 50 kg bags and stored, ready for delivery to the secondary processing facility.

It is during the pulping phase that a large part of the losses and damage occur to premium beans. This is largely due to the fact that operators of small pulping stations as well as some cooperative pulping stations are not adequately trained and often lack the necessary skills and knowledge for proper handling of beans. Over fermentation and physical damage to the beans are common problems among smaller, less experienced pulping stations.

2.2 Secondary Processing (Milling)

After primary processing is completed, the beans are ready for secondary processing. In Kenya, there are three types of millers: commercial, private and mini-mills. According to the Coffee Act private millers can process only their own harvest, while commercial millers are able to provide contract services to other farmers.

Installed capacity for milling is estimated at approximately 300,000 tons, with capacity utilization reaching only 20%. Major commercial millers currently operating in Kenya are: KPCU; Socfinaf; and Thika Coffee Mills.

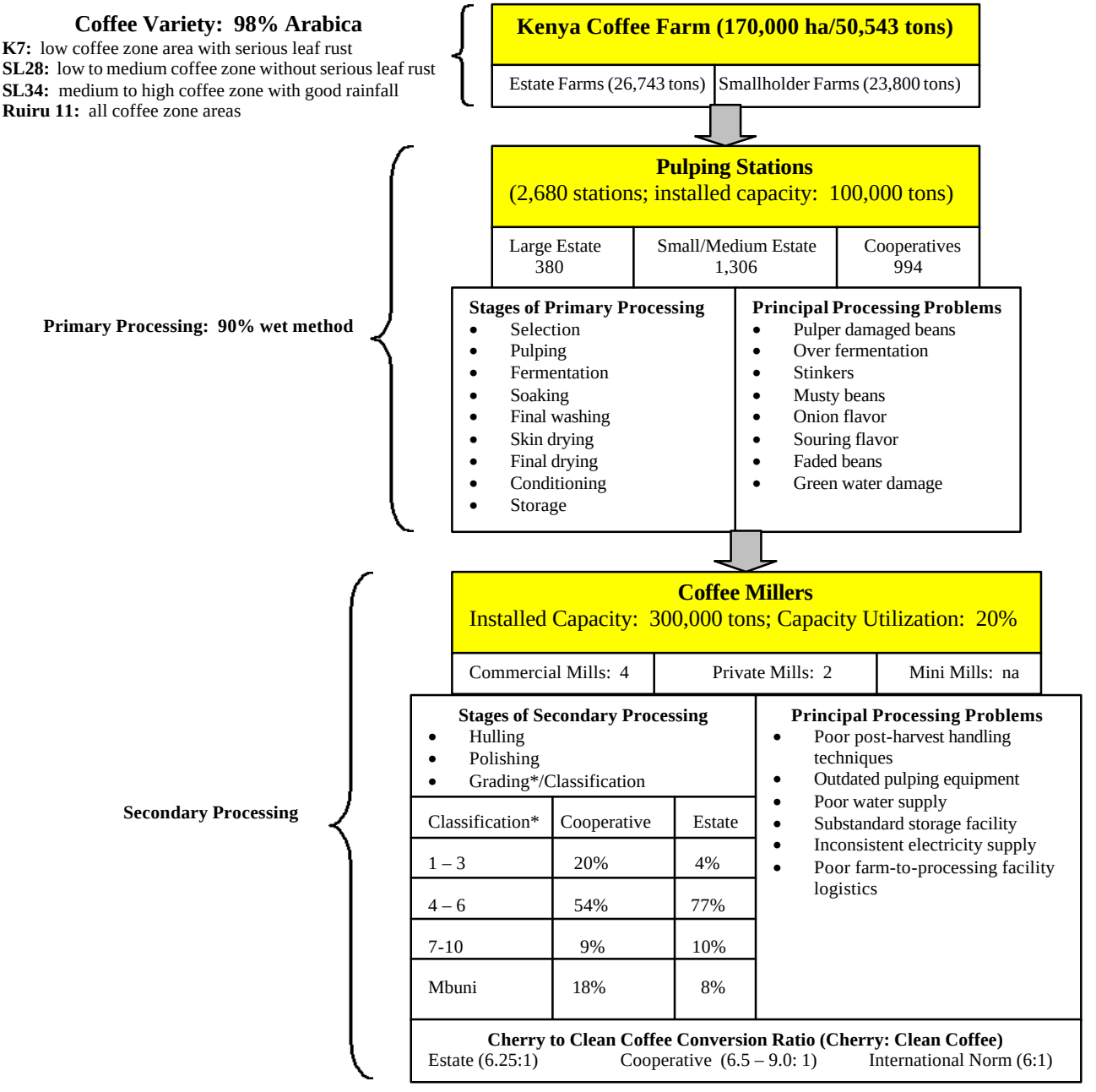
The principal function of a miller is to produce auction ready clean coffee. This encompasses hull and handling (polish, grade and classification of beans). Millers use 7 grades and 10 classifications to categorize clean coffee. Bean weight and density defines the grade of a coffee, while appearance, roast appearance and liquoring (taste) determines the classification of a coffee (refer to the Annex for detailed grade and classification).

The quality of milling equipment and its output varies from mill-to-mill. Mini mills and some of the private mills rely on increasingly outdated equipment, while companies like Socfinaf continue to invest in state-of-the-art milling equipment.

Varying levels of equipment quality accounts for the differences in cherry-to-clean coffee conversion ratio. Generally, commercial processors (including primary and secondary processing) are able to realize a conversion ratio of 6.25:1 (6.25 tons cherries to 1 ton of clean coffee, while cooperatives achieve a ratio between 6.5 – 9.0:1. The international norm is approximately 6:1. The following diagram provides a 'road map' of Kenya's coffee process.

Secondary processing is relatively standardized and mechanical, thus there is very little price difference between millers. At the same time, however, a large concern among farmers is the lack of transparency, accuracy and traceability of coffee through the grading process. In this context, the current system of milling and grading does not have an information feedback system to inform farmers of the grade and sorting data for their crop (Diagram 12).

Diagram 12: Kenyan Coffee Processing Road Map



* *Refer to Annex for grading and classification scale*

Source: Global Development Solutions, LLC™

3.0 Value Chain Analysis for Primary and Secondary Processing

Commercial/large plantations and cooperatives share a similar proportional distribution of inputs along the value chain, but the overall cost is dramatically different between the two. For primary processing the commercial/large plantation can process one kilogram of beans for Ksh 13. At the same time, however, pulping stations operated by cooperative cost over 2.5 times more than commercial/large plantation. Specifically, cooperatives charge farmers as much as Ksh 34.79/kg to perform the same process.

Smallholder farmers are required to join a cooperative and must perform both primary and secondary processes through a cooperative. Historically, the cooperative structure was a critical pillar supporting the development of Kenya's coffee sector; however, market glut, corruption, competition and an array of other factors have had a substantial negative impact on the cooperative system and the plight of smallholder coffee farmers.

While there are a number of efficient cooperatives currently operating in Kenya, the value chain analysis for primary processing among cooperatives, particularly when contrasted against large estates, is frocked with inefficiencies.

3.1 Primary Processing (Pulping)

Table 15: Primary Processing: Cooperative

		Primary Processing			34.79 Ksh/kg	
	Transport	Processing	Packing	Maintenance	Transport	TOTAL
Unit Cost	2.33	23.76	1.56	4.39	2.75	**34.79**
% of TOTAL	6.7%	**68.3%**	4.5%	**12.6%**	**7.9%**	**100.0%**

Source: Global Development Solutions, LLC™

Primary Processing: Large Plantation

		Primary Processing			13 Ksh/kg	
	Transport	Processing	Packing	Maintenance	Transport	TOTAL
Unit Cost	0.8	9.518	0.461	1.76	0.46	**13.00**
% of TOTAL	**6.2%**	**73.2%**	3.5%	**13.5%**	3.5%	**100.0%**

Source: Global Development Solutions, LLC™

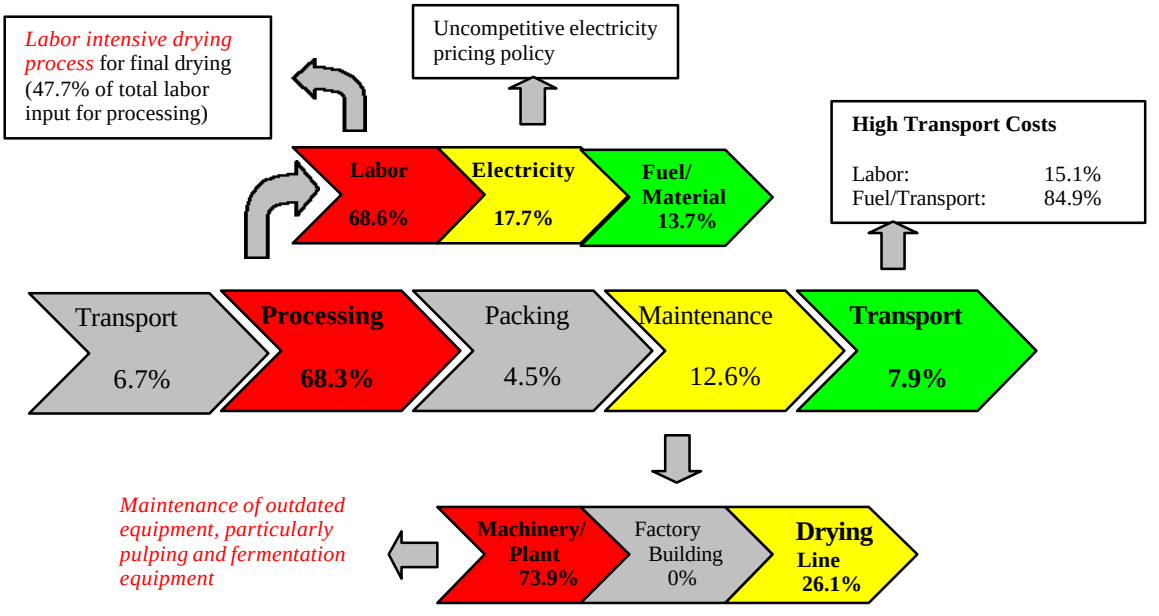
The distribution of costs associated with value adding activities is similar between large plantations and cooperatives, but the actual cost for each stage of value adding activity is nearly 2.5 times more for cooperatives (Table 15). Taking into account that smallholder farmers are required to process through their cooperative, and are restricted from outsourcing to other, more efficient processors, this immediately casts a big question regarding the merits of the current cooperative structure with respect to facilitating the needs of small rural coffee farmers.

Further breakdown of the value chain for cooperatives and large plantations suggests that cooperatives have a higher distribution of labor during the processing phase (68.6%) compared to large plantations (44.7%) – Diagram 13. Similarly, large plantations have a higher distribution of resources for electricity during processing (26.3%) as opposed to cooperatives (17.7%). This may partly be explained by the fact that outdoor drying using the sun as an energy source is the principal form of energy used for final drying. While there are no fuel costs, the process is labor intensive as beans must be turned constantly to ensure proper drying. Proper

drying is critical to prevent further fermentation from taking place and to avoid molding. Sun drying can reduce the moisture content of a bean to about 12%. However, the desired moisture content is approximately 10%. Achieving this moisture content level may require mechanical drying. As seen in the cotton-to-textile value chain, a reoccurring factor inhibiting competitiveness among Kenyan industries is uncompetitive electricity pricing policy of the Government.

A comparative schematic of primary processing for cooperatives and large plantations is presented below to highlight this point.

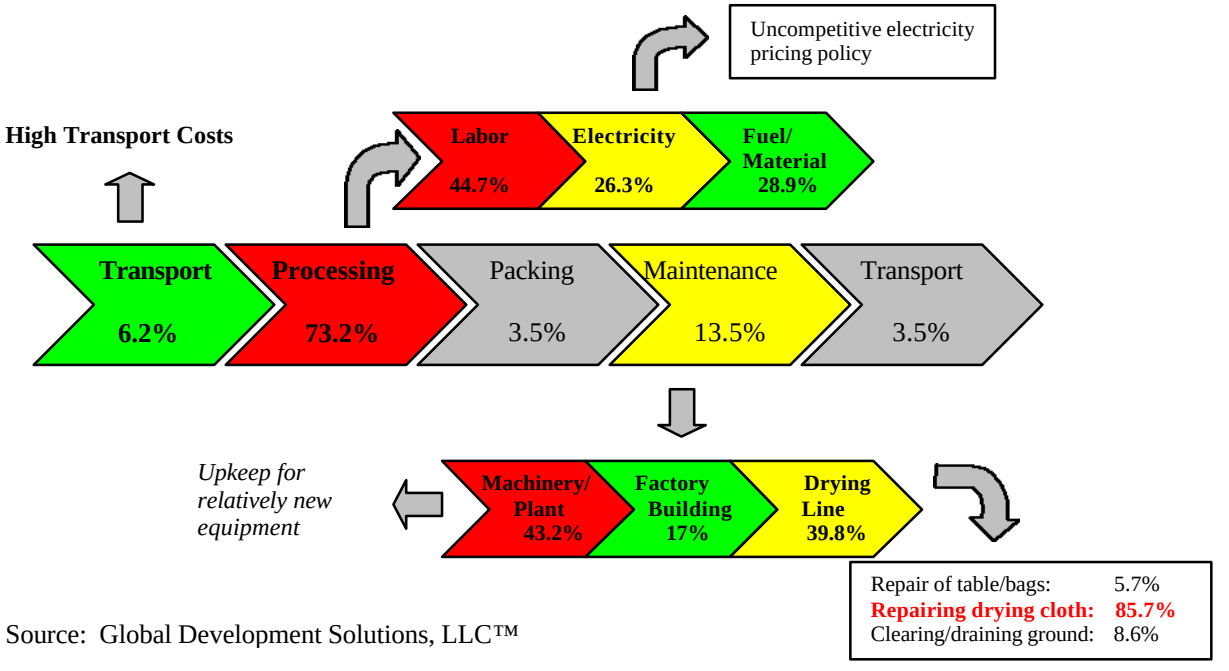
Diagram 13: Coffee Primary Processing Value Chain: Cooperatives



Source: Global Development Solutions, LLC™

In addition, machine and plant maintenance is another area where distribution of costs are high for both cooperatives and large plantations. In the case of cooperatives, 73.9% of maintenance costs are devoted to the repair and upkeep of outdated equipment. On the other hand, large plantations spend proportionately less (43.2%) for maintenance activities, particularly as expenditures represent upkeep of relatively up-to-date equipment (Diagram 14).

Diagram 14: Coffee Primary Processing Value Chain: Large Plantation

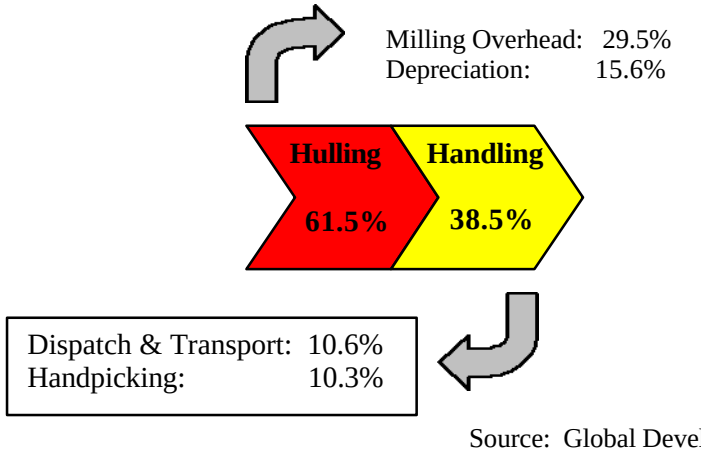


Source: Global Development Solutions, LLC™

3.2 Secondary Processing (Milling)

Secondary processing is principally a process of extracting the dry inner skin of the bean, grading green beans into various grades and classifications, and bulking in preparation for auctioning. The process is straight forward, but depending on the age of the equipment used, there may be a slight variance in costs and processing damage. Generally, the cost of milling ranges from $0.062 - $0.065/kg and does not seem to vary dramatically between different millers (Diagram 15).

Diagram 15: Secondary Processing: Kenyan Coffee



Source: Global Development Solutions, LLC™

Summary of Constraints Face by the Coffee Processing Sector in Kenya

Policy Based Distortions	Market Based Distortions
Uncompetitive electricity pricing policy is contributing to high processing cost	Low quality pulping, particularly through the Cooperative system due to poor training, often results in over fermentation and bean damage, which translates into less income for farmers
Coffee Act requires smallholders to pulp through an inefficient and poor quality pulping services system offered by Cooperatives. In the absence of a competitive environment for the provisioning of services, farmers will continue to face low returns on their harvest	Low cherry-to-clean coffee conversion ratio due to wide variability of milling equipment used by millers
	Lack of transparency with regards to coffee grading and classification is contributing to increasing skepticism and mistrust among farmers toward coffee millers
	Absence of an information flow back system between millers and farmers, particularly with regards to the grading and classification process
	Smallholder farmers required to process coffee through inefficient cooperatives is costing farmers 2.5 time more for pulping when compared to private processors

Source: Global Development Solutions, LLC™

3.3 Milling-to-Auction

Once coffee is milled, it must now be warehoused before it is ready to be auctioned. In the past, the Coffee Board of Kenya (CBK) was the principal warehousemen, but the role of the CBK has been minimized in this area as all three marketing agents now have their own warehouse and warrant arrangements (Diagram 16).[32]

The new Coffee Act removed the "marketing" responsibilities of the CBK and allowed three commercial operators, namely KPCU, Socfinaf, and Thika Coffee Mills to take on the role as interim 'marketing agents'. The principal role and responsibility of a marketing agent can be summarized as follows:

- Collect, prepare and catalogue coffee for auction;
- Warehouse and warrant coffee in preparation for auction;
- Prepare and make available samples for licensed buyers prior to auction;
- Represent growers during auction; and
- Collect and distribute proceeds to growers following final sales.

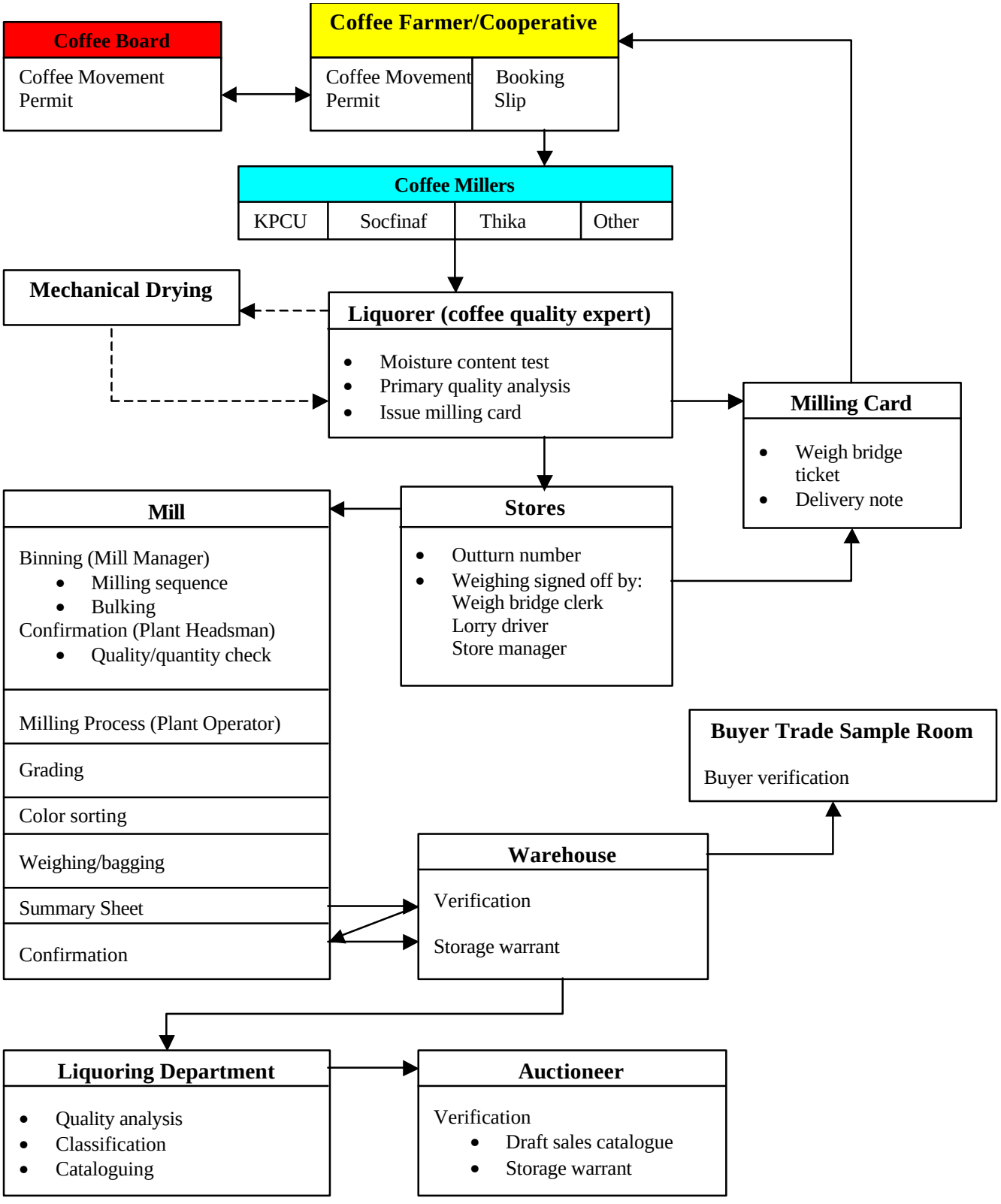
Currently, marketing agents receive a flat fee of $50/ton for their service. As marketing agents must oversee the auctioning of coffee with varying degrees of quality, a fixed fee system has a disproportionately costly impact on lower grade coffee. In addition, in the same way that information on grading and sorting during the secondary processing is not available to growers, even less information is available to coffee growers with respect to the liquor quality of the coffee that buyers establish. Specifically, while one lot of AA coffee may fetch $95, another may fetch as much as $200. Information regarding the variance in auction price is not made available to growers. This lack of information flow has created substantial mistrust between growers and dealers, where growers are now accusing dealers of collusion to drive auction prices down.

[32] KPCU: KPCU warrant in Ghala warehouse; Socfinaf: Trans-Ami warrant; Thika: TCM warrant in Kahawa House.

While the principal role of the marketing agent is actually to provide logistic services to coffee growers, this role must be expanded to include an information feedback system to dispel the growing mistrust between growers, marketing agents and dealers. In particular, the role of the marketing agent should include the collection and dissemination of information at two stages. First, immediately following secondary processing, they should provide growers with feedback on the grading and sorting status of their beans. Secondly, upon completion of the auction, the marketing agent should be required to provide feedback on the rating of each bag of coffee given by dealers to help explain the auction price.

In many respects, the role of the marketing agent should be one of logistic support, awareness raising and information provider that help growers better appreciate the placement of their beans, as well as to gain better understanding of market demand, particularly with regards to cup quality.

Diagram 16: Mill-to-Auction Process Flow Map for Kenyan Coffee



Source: Global Development Solutions, LLC™

3.4 Auction

The auction process is in a state of flux as the Kenya Coffee Auction, Ltd (KCA) is now being replaced by a newly revived Nairobi Coffee Exchange (NCE). The new structure is expected to give more responsibility to the marketing agents where the central role of the NCE will be to display samples at the central sample room and to facilitate the auction process. At the same time, the marketing agent would now be responsible for: cataloguing coffee to be auctioned, distribute pre-auction samples to licensed dealers; auction coffee on auction day, and prepare invoices following auction;

The Coffee Board of Kenya would then be responsible for:

- Maintain export entitlement records; and
- Issue Certificate of Origin (ICO).

As of October 2003, KPCU was granted a auction license. This has resulted in both confusion and mistrust, particularly taking into account that there is a conflict of interest for KPCU to be both a marketing agent trying to sell coffee and an auctioneer selling the coffee at the same time. Similarly, the other two marketing agents, namely Thika Coffee Mills, and Socfinaf are reluctant to have coffee auctioned by their biggest competitor, for obvious reasons. In addition, KPCU's new role now opens up an avenue for it to indirectly control the reserve price of coffee which they would bid for.

The gradual verticalization of KPCU's role in the coffee industry is seen by most private concerns as the first step towards the collapse of the coffee industry. Smallholders face particularly bleak prospects due to the monolithic institutional arrangements now evolving around KPCU which are limiting possibility of their receiving the best price on the market.

Summary of Constraints Face by the Mill-to-Auction in the Kenyan Coffee Sector

Policy Based Distortions	Market Based Distortions
Lack of rationale and transparency associated with licensing procedures as reflected in the awarding of an auction license to KPCU, as a result, KPCU now has indirect control over the reserve price for coffee for which they would bid	Fixed fee marketing arrangement is disproportionately expensive for smallholder farmers, particularly those that tend to produce lower quality coffee
Vertical integration of KPCU as miller, marketing agent, dealer and auctioneer is creating a monolithic institution which threatens to reduce the competitiveness of the coffee industry	Marketing agents have failed to be an effective conduit for information between dealers and farmers. Growing skepticism and distrust among farmers with regards to dealers is driven by the lack of transparency and information about intricacies associated with cup quality that differentiate auction prices even within the same grade

Source: Global Development Solutions, LLC™

4.0 Exporters and Dealers

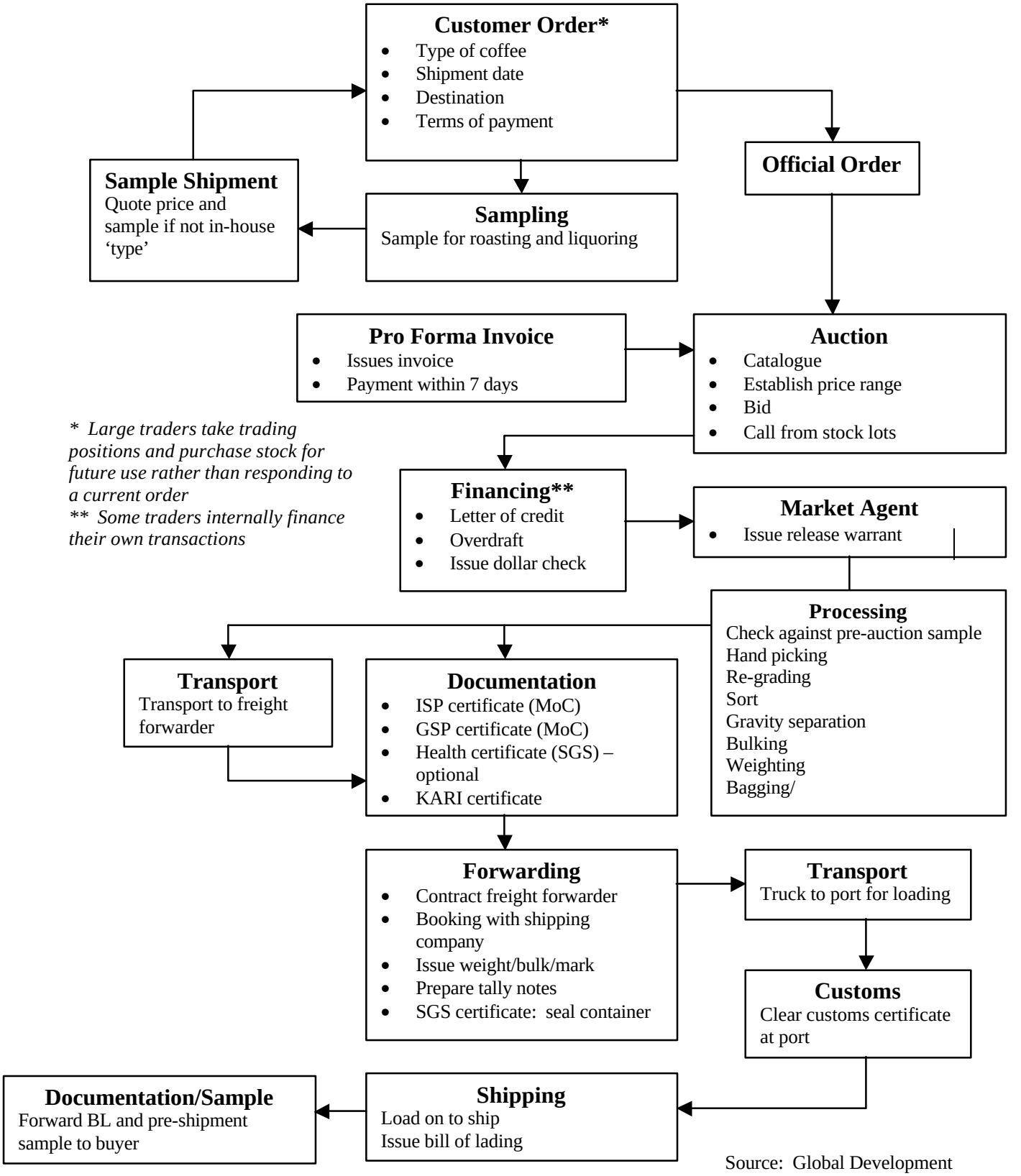
The role of exporters and dealers is grossly misunderstood by coffee farmers. Here again the problem revolves around the issue of poor information flow about placement of coffee and its transformation from the time a coffee grower, particularly smallholder farmers, deposits coffee with a cooperative and when it is exported. When coffee giants such as Starbucks sell Kenyan coffee at shops in the U.S. at such high prices, it creates skepticism among coffee growers about the role played by exporters and dealers, as well as raises the issue of whether Kenya should be involved in the direct export of roasted coffee.

The principal role of exporters and dealers is a complex one of balancing current supply of coffee through the auction and the current and future demand for particular cup quality

sought by its buyers. In this context, the role of a dealer can be summarized as follows:

- Test the cup quality of coffee during pre-auction sampling;
- Confirm orders from buyers against what is already in stock;
- Blend coffee into one of many 'in-house' brand or 'type' to coincide with the desired cup quality sought by its buyers;
- Ensure regular cup quality and delivery;
- Finance the initial purchase of coffee to be blended; and
- Oversee the delivery of coffee to its buyers.

Diagram 17: Auction and Delivery Process Flow Map for Kenyan Coffee



Source: Global Development Solutions, LLC™

Medium and large dealers may have as many as 10 – 20 'in-house' brands or types which represents various cup quality. Buyers refer to such 'in-house' brands or 'types' as a reference to place an order from a dealer. In this context, it is estimated that only 1 –2 percent of all coffee exports are 'single factory coffee' – unblended coffee. Generally, dealers have a complex cup quality rating system which revolves around acidity, body and flavor. It is this know-how in blending and the ability of dealers to respond to shifting consumer demand, which defines some of the success that Kenyan coffee has enjoyed, particularly in the ultra-premium coffee sector (Diagram 17).

Once a dealer receives coffee from the auction, a range of processing activities must now be undertaken. First, coffee must often be re-graded. For example, 95% of AA coffee should be above screen 18,[33] but millers continue to deliver AA coffee of which 75 – 80% are over screen 18. In general, the following activities are undertaken by dealers after purchases are received from the auction.

- Check delivery against pre-auction sample;
- Use or store the purchase depending on the volume and delivery requirements of it buyers;
- Experiment with various blends;
- Process the coffee, which includes:
  - Hand picking;
  - Regarding;
  - Sorting according to texture and color sorting;
  - Gravity separation
- Bulking into 300 – 350, 60kg bags;
- Mark according to client specification or;
- Bagging into 60 kg bags for shipping;
- Bulk load into 21 ton container;
- Seal container; and
- Transfer to inland container yard for shipping.

It is estimated that between the time coffee is purchased from the auction and the above processing is undertaken, cost to the dealer is approximately $4/50kg, which includes direct overhead such as storage, handling and processing. Taking into account that many of the major dealers purchase substantial volume of coffee, financing as much as $500,000 per week of purchases has a significant implication on the cost of capital, something which is clearly underestimated by other players along the supply chain.

In this context, taking into account all costs associated with processing and handling between auction and FOB, added value, including margins for a dealer is estimated to be approximately $10 – $12 per 60kg bag ($0.17 - $0.2/kg). With some exceptional coffee, dealers may enjoy a gross margin (including all costs) as much as $20 - $25/50kg, but this is rare. The gross margins presented here does not account for process loss.

[33] Screens with various size mesh are used to grade coffee according to size.

Summary of Constraints Face by Exporters/Dealers in the Coffee Sector in Kenya

Policy Based Distortions	Market Based Distortions
Current law prohibits direct purchase of coffee from farmers, which dramatically reduces opportunities for some smallholder farmers from developing a regularized purchasing relationship with premium coffee buyers	Lack of collaboration between marketers and dealer/exporters to channel information about the auction pricing system and buyer preference to farmers
	While individual corporate level efforts have been attempted, there continues to be an absence of an organized initiative by dealers and exporters to work with farmers to raise awareness among farmers regarding in-house blending, buyer preferences, cup quality and other factors that impact the price at auction
	Poor and inconsistent milling and grading by millers requires dealers to re-grade their purchase before in-house blending can be undertaken
	Lack of awareness among farmers regarding various stages of processing required and the high cost of financing the blending process
	Need for awareness raising with regards to the type of cup quality sought by international buyers, particularly as farmers are gradually moving away from the more desired varieties of coffee such as Ks and SLs to more pest resistant but less unique Ruiru 11

Source: Global Development Solutions, LLC™

5.0 Freight

Once coffee is bagged, it is ready to be loaded into a container. It is common to use 20 foot containers, whether it is bulk loading or by the bag. On average, a 20 foot container can hold up to 19.2 tons of coffee or 320 bags weighing 60kg each.

Freight forwarding costs of a 20 foot container from Nairobi to Mombasa is approximately $780 ($0.04/kg), which includes terminal handling charges. Once loaded onto a boat, shipping cost per 20 foot container to the United States (depending on west or east coast) can range from between $1,500 - $2,000 ($0.078 - $0.104/kg).

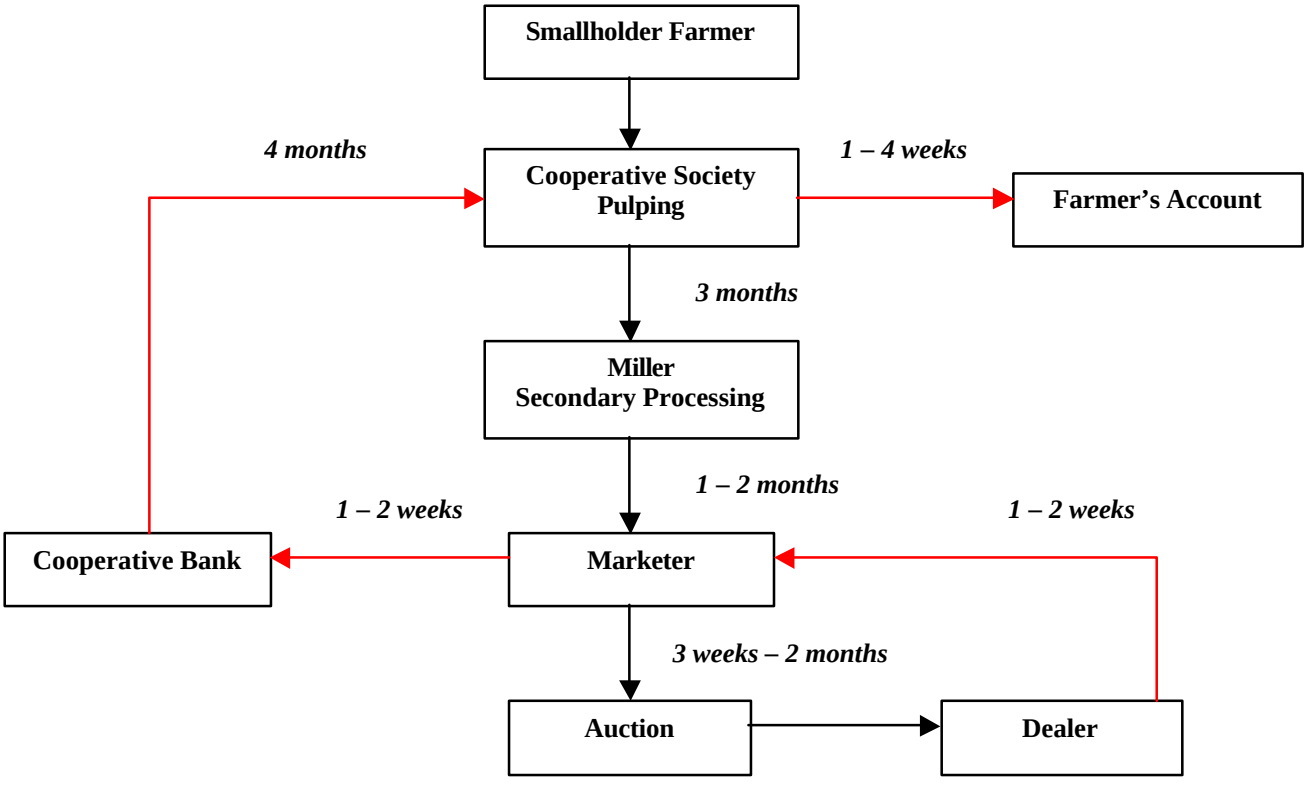
5.1 Systemic Issues in the Farm-to-Cup Supply Chain for coffee

The coffee sector faces a number of critical systemic challenges that need to be resolved. There are at least four systemic issues that require immediate attention to help improve the competitiveness of the coffee sector.

5.1.1 Long Payment Cycle for Smallholder Farmers

Under the Coffee Act, smallholder farmers are required to process and sell coffee through a Cooperative Society. In this context, the growing inefficiency and lack of capacity in some Cooperatives is having a detrimental impact on smallholder farmers. According to current estimates, the lapse between the time a farmer delivers cherries until the time payment is made is at a minimum 6 to 9 months. In some cases, it has taken over one year for farmers to be paid.

Diagram 18: Smallholder Farmer Payment Cycle



Source: Global Development Solutions, LLC™

The long payment cycle has a number of critical implications (Diagram 18).

1. It has forced coffee farmers to inter-crop or divert attention away from coffee farming towards subsistence agriculture simply to make ends meet during the long payment cycle. Consequently, coffee farming has become more of a supplementary rather than a core farming activity.
2. The principal focus of Cooperatives is to provide financing to its members for purchases of agricultural inputs. Interviews with Cooperatives suggests that even though farmers have fulfilled their commitment to deliver their harvest to the Cooperative, interest on the farmer's loan continues to accrue during the long payment cycle.

To further aggravate this issue, once a farmer's crop is auctioned, payments are made, in most cases, to the Cooperative Bank, where Cooperatives hold an account on behalf of their members. Although payments have already been made to the Cooperative, payment to farmers is withheld until a large portion of the Cooperatives holding is sold. Consequently, a farmer whose harvest is sold during the first auction may end up waiting months before being paid. During this period, proceeds from the auction are paid into an account in the Cooperative Bank where it does not accrue interest. As a result, smallholder farmers

are indirectly penalized twice. First, by having to continue payment of interest to the Cooperative for its borrowing even though the harvest was delivered. Secondly, farmers do not enjoy accrued interest from sales proceeds through the Cooperative Bank during the long period between the time when coffee is auctioned and payment is made to a Cooperative for re-distribution to its members.

5.1.2 Excessive Licensing Requirement

The role of the Coffee Board of Kenya has continued to diminish in the past several years, but one role that the CBK continues to play is in the area of licensing. The CBK is the focal point for issuing over 11 licenses to the coffee sector, all which are renewable on an annual basis.[34] The following licensing requirements were identified (Table 16).[35]

[34] Refer to Section 18 of the Coffee Act.
[35] Figures as of July 2003.

Table 16: Licenses Issued by the Coffee Board of Kenya

License Type	Applicants	Approved	Issued
A License (Export)	87	57	39
B License (Import/Export/Transit)	na	na	na
Buni License	na	na	na
Marketing License	13	6	2
Millers License	15	4	2
Roasters License	25	6	5
Auctioneers License	9	4	4
Warehousemen License	32	15	13
Packers License	27	7	4
Pulping Station License	111	71	46
Management Agent Certificate	10	8	3

Source: Global Development Solutions, LLC™

It is not clearly evident that all of the licensing requirements imposed by the CBK has contributed to improving the quality and competitiveness of the coffee sector, particularly taking into account that players in the coffee sector are required to renew on an annual basis. In the case of a marketing license, the CBK has failed to issue a license to one major marketing agent, which continues to operate openly at the auction. In this context, streamlining licensing requirements and improving the transparency of the approval process is viewed as an important step towards enhancing the competitiveness of the coffee sector.

5.1.3 Inability to Sell Direct

According to the Coffee Act, coffee farmers are barred from selling directly to buyers and dealers and must sell through a marketing agent and the auction. All other commodities grown and sold in Kenya do not face this restrictive practice, including tea. The most prominent argument given for not allowing direct sales is that smallholders would be taken advantage of and that it would promote sales of poor quality coffee, which would in turn contribute to the deterioration of Kenya's image as an exporter of premium coffee.

According to key players along the entire supply chain from farm to retailer, all but the KPCU agree with the argument that the development of the coffee sector in Kenya will require the ability of growers and processors to sell some of the premium crops directly to buyers. While the auction is seen as a critical venue for facilitating sales of coffee, equally important, especially for premium coffee, is the ability of growers and processors to deal directly with their buyers. Players along the supply chain suggest that opening the coffee market to direct sales will improve the ability of farmers and processors to command premium prices, particularly for premium AA, while other lower grades would continue to be traded actively at the auction.

5.1.4 Lack of information flow

Coffee farmers continue to express concern over their loss of control over their product after a harvest has been delivered to a cooperative or a private miller. The lack of information flow back to the farmers, particularly with regards to price setting for their crop at the auction, continues to brew mistrust between players along the supply chain. Currently, farmers do not receive feedback from their marketing agents regarding cup quality, particularly regarding the rationale behind the large variance in price between coffee in the same grading category. Taking into account that marketing agents are merely providing logistics support for the delivery of coffee to the auction, the fee taken for this service should cover the cost of

information collection, analysis and distribution to coffee farmers.

Should the Kenyan coffee market move towards a parallel market where direct sales and auction sales are recognized, information flow to farmers regarding cup quality, market demand, international prices and buyer preferences will define the responsiveness and dynamics of the coffee sector. In the absence of information feedback to the farmers, a growing number of growers are now threatening to pull out their trees and shift production to more predictable cash crops.

The lack of dynamism and understanding about the international coffee market, particularly among farmers and processors within the coffee sector in Kenya can be blamed on the poor information flow amongst players in the supply chain. Here the problem is both with respect to the absence of a structure along the supply chain to exchange information between key players, as well as the lack of information, analysis, interpretation of data and a coordinated response by the sector. In short, a comprehensive chain strategy is absent in the coffee sector, precisely as a result of the absence of information and information flow among players in the coffee supply chain.

Summary of Systemic Constraints Face by the Coffee Sector in Kenya

Policy Based Distortions	Market Based Distortions
Excessive and opaque licensing requirements, and the lack of transparency in the license approval process is inhibiting competition in the coffee sector	Inefficient payment structure under the Cooperative system is helping to accelerate the level of indebtedness of smallholder farmers. In particular, the relationship between Cooperatives and the Cooperative Banks needs to be more transparent in order to reduce excessive period of interest payment imposed on farmers • Farmers are forced to continue paying interest on their loan even though proceeds from sales of their harvest is already deposited in the Cooperative Bank • Farmers do not enjoy accrued interest from proceeds that have already been paid to the Cooperative Bank, but yet to be disbursed to farmers
Inability of farmers to sell directly to buyer limits opportunities for smallholder farmers to fetch premium prices and to establish medium and long term relationships with strategic buyers in the international market	Long payment cycle has force farmers to intercrop, consequently loss focus on required weeding and plant maintenance regime, which in turn has contributed to the continued decline of smallholder yield rates
	Lack of information flow and the resultant distrust between players along the entire supply chain has resulted in a complete absence of a comprehensive supply chain strategy for the coffee sector
	The sector lacks an apex organization to take leadership in bringing together players along the entire supply chain to promote dialogue, information exchange and to develop and implement a comprehensive supply chain strategy
	Complete lack of a 'country branding strategy' and image building targeted towards the average consumer is hindering Kenya from effectively capturing and expanding the ultra-premium coffee market – a need for a private sector led strategy

Source: Global Development Solutions, LLC™

Table 17: Summary Coffee Value Chain ($/kg)

	Farming Cost	Primary Processing	Secondary Processing	Marketing Fee	Subtotal	Auction Fee	Statutory Charges	Subtotal	Auction Price	Processing and gross margins	FOB Price	Trucking/ THC	Shipping to (US)
Smallholder	$ 1.33	$ 0.47	$ 0.065	$ 0.05	**$ 1.92**	$0.0031	$ 0.1256	**$ 2.0439**	$ 3.14	$ 0.30	$ 3.44	$ 0.04	$ 0.13
% of Auction Price	**42.4%**	**15.0%**	2.1%	1.6%	61.0%	0.1%	**4.0%**	65.1%	100.0%				
							Profit margin		**53.6%**				
Large scale	$ 1.91	$ 0.18	$ 0.062	$ 0.05	**$ 2.20**	$0.0031	$ 0.1256	**$ 2.3311**	$ 3.14	$ 0.30	$ 3.44	$ 0.04	$ 0.13
% of Auction Price	**61.0%**	**5.6%**	2.0%	1.6%	70.1%	0.1%	**4.0%**	74.2%	100.0%				
							Profit margin		**34.7%**				

Source: Global Development Solutions, LLC™

Summary of both value chains for smallholder farmers and large plantations suggests that profit margins for high quality coffee fetching $157/bag is substantial (Table 17). And yet, what farmers receive after auction does not reflect the high profit margins as indicated in the above table. For smallholder farmers, cost of capital, specifically, interest rate for their loans is not reflected in this price. In addition, little documentation could be found to trace the movement of funds after the auction from the marketer, to the cooperative bank, then to the cooperative, and finally back to a farmer. This exercise suggests that there is substantial 'leakage' of funds between the time coffee is auctioned and the time farmers receive payment for their coffee.

As for large plantations, the healthy margin reflects the benefits of high per hectare yield. And yet, managers of large plantations often complain about the high cost of operating in the Kenyan market, continued losses due to poor market prices, and difficulties associated with cost containment. At the same time, however, poor cost accounting may also contribute to the cost overruns. What is certain, however, is that given the above cost structure, auction price below $115/bag would result in losses for a large plantation. It is only in recent weeks that a bag of AB plus quality coffee has fetched a price of $157/kg. On average, auction price of AB/FAQ (fair average quality) usually goes for about $110/bag. This suggests that given the price structure of large plantations, as presented above, would yield negative revenue. In this context, cost containment, particularly with respect to on-farm activities is critical for the survival of large plantations.

For smallholder farmers bound to selling through cooperatives, poor quality of services offered by cooperatives with respect to pulping is immediately evident. While large plantations have pulping costs of approximately $0.18/kg, costs associated with pulping through a cooperative is 2.5 time more. This fact alone suggests that in the absence of improved service performance offered by cooperatives, market liberalization should be considered to allow smallholder farmers to select service providers for primary and secondary processing based on price and quality of services.

A further issue worth noting is the high cost of statutory charges. Both smallholder farmers and large plantations expressed concern over the fact that they receive virtually no services from government organizations, particularly given the fact that statutory costs constitute 4 percent of the auction price. In this context, policy review to reformulate or even eliminate statutory charges may be required. Specifically, in the case of the Coffee Research Foundation, rather than statutory charges, fees for service activities to promote a more commercially driven service may be a possible option.

Another important aspect of the aggregate value chain is that it helps to dispel the myth that dealers/traders are taking up a large margin in the value chain, and thus oppressing coffee farmers. What the value chain analysis suggests is that there is a critical problem in the flow back system for the payment of farmers after the auction. In this context, the role of the "marketing agents" as a central point for information dissemination needs to be strengthened. Currently, it is not clearly evident that marketing fees charged to farmers are having a beneficial effect on farmers. As such, providing farmers feedback on quality, rationale regarding auction pricing, trends in buyer markets, and other data to help improve the transparency of transactions that take place along the value chain is of utmost importance in regaining trust among key players along the coffee value chain.

Summary of Critical Challenges Facing the Coffee Value Chain

Coffee Farming	Coffee Processing	Mill-to-Auction	Export/Dealer	Systemic Constraints
Policy Based • Restrictive registration process for agrochemicals under PCPB and prohibitive taxation related to local formulation is having a damaging effect on farming costs • Poor farmer yield rates are partly to be blamed on the lack of monitoring and enforcement of regulations related to repackaging agrochemicals resulting in adulterated products being sold (dominate of the PCPB)	**Policy Based** • Uncompetitive electricity pricing policy is contributing to high processing cost • Coffee Act requires smallholders to pulp through an inefficient and poor quality pulping services offered by Cooperatives. In the absence of a competitive environment for the provisioning of services, farmers will continue to face low returns on their harvest	**Policy Based** • Lack of rationale and transparency associated with licensing procedures as reflected in the awarding of an auction license to KPCU, as a result, KPCU now has indirect control over reserve price for coffee which they would bid for • Vertical integration of KPCU as miller, marketing agent, dealer and auctioneer is creating a monolithic institution which threatens to reduce the competitiveness of the coffee industry	**Policy Based** • Current law prohibits direct purchase of coffee from farmers, which dramatically reduces opportunities for some smallholder farmers from developing a regularized purchasing relationship with premium coffee buyers	**Policy Based** • Excessive and opaque licensing requirements, and the lack of transparency in the license approval process is inhibiting competition in the coffee sector • Inability of farmers to sell directly to buyer limits opportunities for smallholder farmers to fetch premium prices and to establish medium and long term relationships with strategic buyers in the international market

Source: Global Development Solutions, LLC™

Market Based • High cost of imported fungicides, herbicides and insecticides • Poor labor productivity due to lack of available training, particularly among smallholder farms • High cost of labor input, particularly for large plantations, as workers must be trucked to the harvesting sight	**Market Based** • Low quality pulping, particularly through the Cooperative system due to poor training, often result in over fermentation and bean damage, which translates to less income for farmers • Low cherry to clean coffee conversion ratio due to wide variability of milling equipment used by millers • Lack of transparency with regards to coffee grading and classification is contributing to increasing skepticism and mistrust among farmers toward coffee millers • Absence of a information flow back system between millers and farmers, particularly with regards to the grading and classification process • Smallholder farmers required to process coffee through inefficient cooperatives is costing farmers 2.5 time more for pulping when compared to private processors	**Market Based** • Fixed fee marketing arrangement is disproportionately expensive for smallholder farmers, particularly those that tend to produce lower quality coffee • Marketing agents have failed to be an effective conduit for information between dealers and farmers. Growing skepticism and distrust among farmers with regards to dealers is driven by the lack of transparency and information about intricacies associate with cup quality that differentiate auction prices even within the same grade	**Market Based** • Lack of collaboration between marketers and dealer/exporters to channel information about the auction pricing system and buyer preference to farmers • While individual corporate level efforts have been attempted, there continues to be an absence of an organized initiative by dealers and exporters to work with farmers to raise awareness among farmers regarding in-house blending, buyer preferences, cup quality and other factors that impact the price at auction • Poor and inconsistent milling and grading by millers require dealers to re-grade their purchase before in-house blending can be undertaken • Lack of awareness among farmers regarding various stages of processing required and the high cost of financial the blending process	**Market Based** • Inefficient payment structure under the Cooperative system is helping to accelerate the level of indebtedness of smallholder farmers. In particular, the relationship between Cooperatives and the Cooperative Banks need to be more transparent to reduce excessive period of interest payment imposed on farmers • Farmers are forced to continue paying interest on their loan even though proceeds from sales of their harvest is already deposited in the Cooperative Bank • Farmers do not enjoy accrued interest from proceeds that have already been paid to the Cooperative Bank, but yet to be disbursed to farmers

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Source: Global Development Solutions, LLC™