

## UNDERSTANDING AND IMPROVING THE PRICE-QUALITY RELATIONSHIP IN RWANDA'S COFFEE SECTOR

By

Ruth Ann Church



## Food Security Policy *Research Papers*

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## GLOSSARY

**NYBOT C:** The New York Board of Trade “C” price is the publicly traded price for coffee at the New York commodities exchange. This price is the basis of most coffee contracts in the world.

**Commercial grade coffee:** I try to avoid using this term in this report because it implies significantly different quality levels to different audiences. For example, some exporters use the term commercial for coffee cupping 83 – 84 points and this coffee is often what is sold to two of the largest roasters buying from Rwanda. Exporters sometimes use commercial plus for coffee cupping 85 – 86 points. To others, commercial grade coffee is synonymous with commodity coffee (see below).

**Specialty grade coffee:** For the purposes of this report, specialty grade coffee will be defined as coffee cupping 83 points and better. Officially, coffee cupping 80 points and better is specialty, but today, coffees cupping 80 – 82 points are almost as ubiquitous as commodity coffee. Coffee cupping 80 – 82 points is, in reality, in a grey area between specialty and commodity.

**Commodity coffee:** This coffee cups 79 points or lower. Commodity coffee includes many tiers, as there are buyers for coffees that are too poor to score, coffee that is 79 points and everything in between.

**Ordinary:** Low-grade coffee from Rwanda. This coffee used to be defined by the process used for de-pulping. It was ordinary if it was processed on the farm by farmers with small hand-mills or, more likely, simply using a stone to scrape the cherry from the bean. Today’s market for ordinary is defined more by its low quality level than by processing. (See low-grade fully washed below.)

**Washed:** this is another term for the old definition of ordinary, which was based on the process used for de-pulping. Thus washed coffee was distinguishable from fully washed (see below). It seems to this author that the term washed is fading from use.

**Fully washed:** Fully washed defines the process used to de-pulp coffee cherry at coffee washing stations in Rwanda, (different from washed, see above). However, some stakeholders in the Rwandan coffee industry define fully washed to mean specialty coffee. To this author, this is such a gross generalization that it is highly misleading. Washing stations produce many grades of coffee, usually at least four. Sometimes they produce as many as six grades and some are low-grade green coffee.

**Low-grade fully washed:** Fully washing coffee creates many grades of coffee. Some of the grades that come out of the fully washed system are so low and such bad quality that they are labeled triage or waste. Others are slightly better, but still a low-grade coffee, comparable to ordinary (see above). This low-grade coffee, too poor to sell to specialty buyers, will be called low-grade fully washed in this report.

**Low-Grade and High-Grade:** These two descriptive terms will be used here to broadly convey quality level. Low grade means coffee scoring 82 or lower, meaning many high-end chain stores would probably not buy it. High grade means coffee scoring 83 and higher, meaning recognized coffee chains and other specialty buyers would be interested. Note there are many levels to both low and high grades, each with a different price potential.

## EXECUTIVE SUMMARY

At 15 years old, specialty coffee is a relatively new sub-sector of Rwanda's long-standing coffee industry. As such, structures and policies to maximize coffee quality are still evolving and have room for improvement. The problem examined in this report includes the obstacles preventing the sector from reaching the Government of Rwanda's (GOR's) stated goal of 80 percent high quality coffee instead of only 55 percent, (the status quo in 2017). The approach used by the author is to demonstrate and quantify the effects of not reaching the quality targets from three perspectives: that of the producer, the exporter, and the GOR. The models indicate that producers lost 125 RWF/kg cherry sold in the time period considered, exporters had 43 percent *lower* profits than might have been possible, and the country missed an estimated \$2.6 million in foreign exchange, just in 2016. The damage from potato taste defect is estimated at \$.30 - \$2.00 per pound FOB for exported green coffee, depending on the quality level.<sup>1</sup> These estimated, unrealized gains provide the impetus to examine possible solutions. Five case studies of exemplary East African coffee organizations give concrete examples of how some cooperatives and private companies have invested to improve cherry purchasing practices and improve quality. At the end, marketing and policy recommendations are offered to support further increases in the value of Rwanda's coffee.

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<sup>1</sup> Potato taste defect is a taste defect occurring in coffee in Rwanda's region. It creates a musty, vegetal taste, like a raw potato, in the brewed coffee.

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## ACRONYMS

AGLC	Africa Great Lakes Coffee
BIF	Burundi Franc
CoE	Cup of Excellence
CWS	coffee washing stations
ECX	Ethiopia's coffee exchange
ETB	Ethiopian Birr
FSP	Food Security Project
GOR	Government of Rwanda
ICO	International Coffee Organization
KG	kilogram
LMCP	Long Miles Coffee Project
NAEB	National Agricultural Export Development Board
METAD	METAD Hambela Estate is a private estate in the Oromia region of Ethiopia
MT	Metric Tons
NYBOT C	New York Board of Trade coffee C contracts price
PTD	potato taste defect
RCI	Relationship Coffee Institute
RWF	Rwanda Franc
SMS	Systems Management Server or Short Message Service
TWIN	A Non-profit Organization that owns a trading company
USAID	United States Agency for International Development
US\$	United States Dollar

## 1. INTRODUCTION

Rwanda, the land of a thousand hills, has an exceptional environment for growing specialty coffee. Rwanda's coffee renaissance started in 2003-2004, so specialty coffee is a relatively new phenomenon, only 15 years old, while many other coffee producing regions around the world have been producing high-quality, fully-washed coffee since the 1950s. Today, growth in Rwanda's coffee sector has stagnated, staying between 16 and 19 metric tons annually, and average price for exportable green remains between US\$4 and \$5 per kilo (Rwanda's National Agricultural Export Development Board [NAEB] 2015-2017). Of course, stagnant is better than the worst alternative, a vicious race to the bottom of quality in search of the lowest possible price. Rwanda cannot win such a race against high-volume players like Brazil and Colombia. The country has recognized the higher prices paid for specialty grade coffees, noted the forecasts for increasing global demand for high-quality washed Arabica (Rhinehart 2017) and taken stock of its own comparative advantages. This led the Government of Rwanda (GOR) to a strategy of shifting away from the commodity trade with its associated low-prices (NAEB 2013) and towards achieving higher and higher levels of quality.

Unfortunately, some structures and policies are still ill fitted to maximize Rwanda's potential for high quality coffee. I propose that a more cohesive policy framework can be devised to effectively reward and encourage organizations working towards positive, long-term relationships with buyers and suppliers of high-quality coffee. Coffee is a diverse and extensive industry in the sense that many quality levels and even coffee products (e.g., soluble versus roasted) exist. Rwanda can choose the segments that best suit its strengths. Rwanda also has neighbors, Kenya and Ethiopia that have long-standing, well-known reputations for quality coffee. Therefore, Rwanda must be strategic and focused in order to succeed alongside these East African giants. (Ethiopia is #5 globally, Kenya is #16, and Rwanda is #30.<sup>2</sup>)

The problem examined in this paper is Rwanda's challenge in moving to a market mix that is 80 percent high quality coffee instead of only 55 percent. Government reports cite this goal of 80 percent fully washed by 2018 (Gatarayiha 2016). At a broad level, there are two quality bands in Rwanda. First, there is low-grade coffee being sold at the NYBOT C price, plus or minus a few cents. Second, there is high-grade coffee being exported at prices well above the NYBOT C. In reality, there are many tiers of coffee quality within these two broad categories, but today they are not tracked. In this report, options for measuring and reporting new sub-categories based on quality criteria are considered in Sections 2.2, 2.3, and 5.4. Throughout this report, the terms high quality and low quality are used, referring to these two broad headings; it is assumed that 80 percent exports in the high quality category is a national goal.

In this report, the effects of the inability to reach quality targets are quantified from three perspectives: that of the producer, the exporter, and the Government of Rwanda (GOR). Using cost estimates from the sources listed here, I have modeled scenarios using different export and cherry prices. These models indicate that producers lost 125 (Rwanda Franc/kilogram) RWF/kg cherry sold in the time period considered, exporters had 43 percent *lower* profits than might have been possible, and the country missed an estimated \$2.6 million in foreign exchange, just in 2016. These

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<sup>2</sup> ICO Trade Statistics Tables, <http://www.ico.org/prices/po-production.pdf>.

estimated, unrealized gains provide the impetus to examine the problem of mixing low and high quality coffee in the value chain. The damage from potato taste defect is estimated at \$.30 - \$2.00 per pound FOB for exported green coffee, depending on the quality level.<sup>3</sup>

To find solutions that will reverse these losses, five East African coffee producers are reviewed for their exemplary innovations. Three are Rwandan, one is Burundian, and one is Ethiopian. These organizations address two key problems:

- How to incentivize more and better sorting at the farm, and
- Ways to evaluate color, damage, and density at the washing station at the time of cherry purchase.

With this backdrop, areas for change in the area of sales and marketing are discussed.

It is hoped that the ideas suggested in this report help motivate stakeholders in Rwanda's coffee industry, including producers, exporters and policymakers, to continue reaching for its highest quality targets.

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<sup>3</sup> Potato taste defect is a taste defect occurring in coffee in Rwanda's region. It creates a musty, vegetal taste, like a raw potato, in the brewed coffee.

## 2. THE MISSED OPPORTUNITY FROM NOT MAXIMIZING QUALITY

A widely held belief in specialty coffee is that producers of higher quality coffees can earn higher prices from roasters who demand distinguished and unique taste profiles. The literature points out, however, that there is no guarantee that markets will function this way or that the farmer will benefit. Programs and policies that increase the prospects for this to occur need to be actively encouraged (Daviron and Ponte 2005). This section seeks to substantiate the rationale for and importance of policies and programs that will improve the quality of Rwandan coffees. Financial returns to three segments of Rwanda's value chain, producers, exporters and the government are examined.

### 2.1 Low Returns for Farmers – Share of Export Price

Farmers' returns can be understood by measuring their share of the export price of the coffee. In this section, the producers' share of three export prices for different coffee quality types are presented, along with a weighted average of the three. The export prices for the three different grades of coffee (fully washed, ordinary and triage) are based on data from the NAEB for 2015. The weighted average export price is weighted by volume as reported by NAEB. Data on farmers' cost of production are from the Africa Great Lakes Coffee (AGLC) baseline survey, which measured costs in 2015, (see Appendix 1 for details on cost of production estimation methodology). For simplicity, we use the same cost of production for all three types of coffee in the model (fully washed, ordinary and triage). For exporters/processors costs, I used an estimate made available by a large buyer of Rwandan coffee.<sup>4</sup>

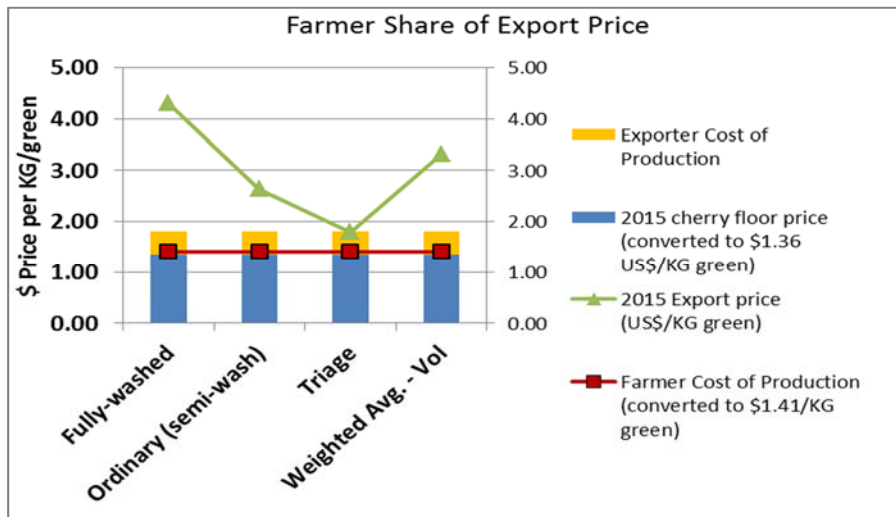
Figure 1 below shows how at low cherry prices such as 170 RWF/kg cherry (blue bars), exporters earn 50 percent margins on the average of the three types. The average in the figure (fourth bar, farthest to the right) is the mean export price of all three types of coffee, but uses the same estimates of farmer and exporter costs. Notably, at the 170 RWF/kg cherry price, producers make no profit (distance between blue bar and red line is zero).

By contrast, Figure 2 below illustrates a hypothetical cherry floor price of 300 RWF/kg cherry, but the same export prices for green coffee. Comparing Figure 1 to Figure 2 the differences in profitability for the producer are significant,  $-\$0.05/\text{kg}$  green in Figure 1 and  $\$0.98/\text{kg}$  green in Figure 2.

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<sup>4</sup> Large buyers often have significant insights on their suppliers' costs. However, this single estimate of exporter costs is a weak point in the analysis below. Further research gathering more data points of exporter costs is strongly recommended (see Appendix 6).

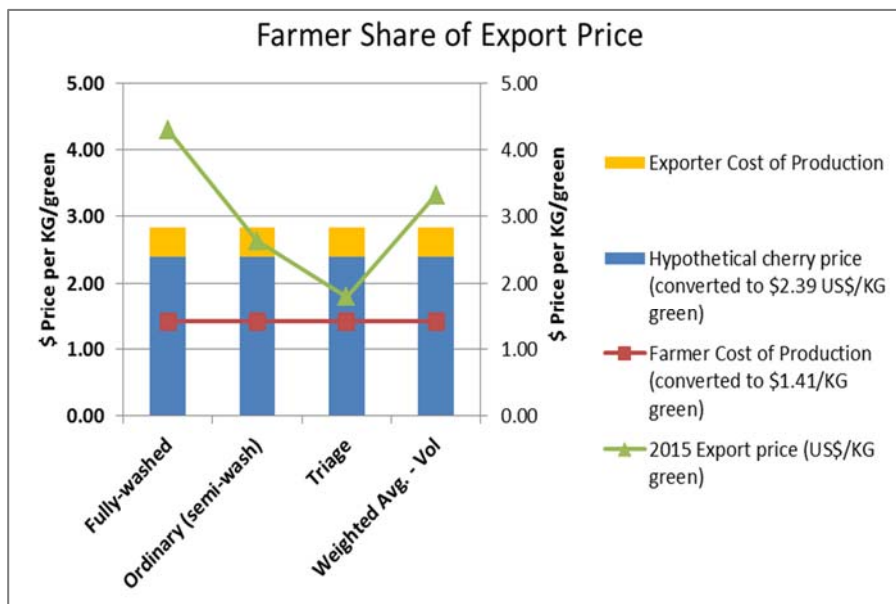
Figure 1. 2015 Cherry Floor Price of 170 RWF/KG Cherry



Source: All figures and diagrams by Authors unless otherwise noted.

Note: Figure 1. Cherry prices (blue bars) are practically equal to farmer cost of production (red line), meaning, on average, coffee farmers make no profits at any quality grade. Meanwhile, exporters do have margins. (Conversion rate of 5.3 is held constant across all quality grades for simplicity.)

Figure 2. Hypothetical 300 RWF/KG Cherry



Note: Figure 2. At 300 RWF/kg cherry, producers earn an average 41 percent gross margin for all quality levels and exporters earn a 34 percent margin for fully washed. Fig. 2 shows that exporters would lose money if they pay 300 RWF/kg cherry for coffee destined for buyers of ordinary/semi-washed or triage coffee, (green line is below the yellow area of bars)

In this 300 RWF floor price scenario, the producer earns a 41 percent margin on all grades of coffee, and the exporter can only earn a margin similar to that of producers on fully washed, the highest quality category. The average margin for exporters of all three quality categories is 21 percent. The following sections will examine how exporters can maintain the profits they had in Figure 1 by evolving to a model where low and high quality cherry is no longer bought and sold as a *mix*, and instead there is a stronger quality focus for both raw material purchase and coffee product sales.

The difference in margins for producers between Figure 1 and Figure 2 is \$.98/kg green. The equivalent in RWF/kg cherry is 125. This is a sizeable loss, considering cost of production is 177 RWF/kg cherry. (Cost of production is \$1.49 when converted into kg green coffee). In other words, \$.98/kg green is a serious reduction in profits to the producers. The result is a substantial disincentive for farmers to invest in producing higher volumes and higher quality cherry.

Is it a zero sum game? If producers earn a higher share of the export price, do exporters necessarily lose? My analysis in the following section shows that this need not be the case. In fact, in low cherry price scenarios, even the exporters are foregoing profits.

## 2.2 Foregone Profits for Exporters

To help visualize the opportunity to upgrade in quality and the potential returns to such investments, new terminology is proposed. Diagram 1 below shows two broad quality categories (low quality and high quality). These are separated into five sub-categories with new terminology, which enable better goal setting to achieve the objective of higher quality coffee. The fifth sub-category *fully washed excellence* is shown in Diagram 1, but eliminated from Table 1 and the detailed analysis that follows for simplicity.

**Diagram 1. New Terminology for Quality Sub-categories in Rwanda**

	Low-grade Quality (NY C price, +/- a few cents)			High-grade Quality (well-above NY C price)	
New Exporter/ CWS terms	Triage	Ordinary	Low-grade, Fully-washed	Fully-washed	Fully-washed Excellence

To help visualize the opportunity to upgrade in quality and the potential returns to coffee investments, Table 1 below uses hypothetical scenarios for prices, cherry-to-parchment ratios and estimated costs of processing from a single large buyer (as mentioned above).<sup>5</sup> Hypothetical profit margin outcomes from an exporter’s perspective are compared for ordinary, low-grade fully washed, fully washed, and fully washed excellence. Table 1 (below) models exporters’ gross margins per kg (bottom row) in relative terms and at various market prices. Exporters earn the lowest gross margins

<sup>5</sup> Parchment is the stage of coffee between ‘coffee cherry’ and ‘green coffee’ and is typically the form when coffee is transported from coffee washing stations. The term comes from the name of the fine, yellowish skin that covers the green coffee bean at this stage. This skin is removed prior to exporting.

of all the scenarios when they sell ordinary or low-grade fully washed (columns 1 and 2). They could, instead, pay higher cherry prices and earn higher margins (columns 3 and 4). In other words, with low and undifferentiated cherry prices, exporters are foregoing profits.

**Table 1. Estimated Exporter Profit Margins for Different Quality Levels of Rwanda’s Coffee**

<b>BOLD = real market price</b>	<i>Italics = assumed economic value - not market prices</i>			
	1	2	3	4
	Ordinary (NOT FW)	Low grade FW	FW	FW - excellence
C2P ratio	7	7	7	7
<b>Cherry price, RWF/KG</b>	<b>114</b>	<b>200</b>	<b>300</b>	<b>350</b>
Parchment price (cost to WS) RWF/KG	<b>800</b>	1400	2100	2450
Green cost to exporter, RWF/KG	640	1120	1680	1960
Green cost to exporter, USD/KG	\$0.76	\$1.34	\$2.01	\$2.34
Estimated wet and dry mill costs, USD/KG green	\$0.45	\$0.45	\$0.45	\$0.45
Avg. price exportable green USD/KG	<b>\$2.00</b>	<b>\$3.00</b>	<b>\$4.25</b>	<b>\$5.00</b>
Gross Profit (Sales less COGS) USD/KG green	\$0.79	\$1.21	\$1.79	\$2.21
<b>Gross Margin %</b>	<b>39.3%</b>	<b>40.4%</b>	<b>42.2%</b>	<b>44.2%</b>

Source: Authors for all tables unless otherwise noted.

Table 1 Note: Direct labor, such as machine operators and workers who sort green coffee, are included in the dry mill cost numbers above. Indirect labor (managers, accountants, etc.), sales and other administrative overhead costs are not included in gross margin. These costs must be paid out of the gross margin.

**Tables 1 and 2 Assumptions**

<b>FX RWF to USD</b>	837
<b>Conversion Cherry to Parch (all columns)</b>	7
<b>Conversion Parch to Green</b>	0.8

To quantify the exporter’s unrealized gains, however, one must evaluate quantities sold in each category. In Table 2 below, two different exporter scenarios, A and B, are illustrated. In each scenario, the exporter has the same volume of coffee, 1,000 metric tons (mt), but in each scenario the 1,000 mt are sold in different quality and price categories. The total profits are calculated in the far right columns.

**Table 2. Foregone Profits for Exporters Selling Low Grade Fully Washed**

1000 MTs green coffee	1	2	3	4		
	Ordinary (NOT FW)	Low grade FW	FW	FW - excellence		
C2P ratio	7	7	7	7		
Cherry price, RWF/KG	114	170	300	350		
All costs for green coffee, USD/KG	1.21	1.79	2.46	2.79		
Avg. price exportable green USD/KG	\$2.00	\$3.00	\$4.25	\$5.00		
Gross Margin %	39.3%	40.4%	42.2%	44.2%		
<b>Exporter Scenario - assume 1000 MTs green</b>	<b>MTs sold</b>	<b>MTs sold</b>	<b>MTs sold</b>	<b>MTs sold</b>	Profits on 1,000 MT (\$ 000s)	% Difference to Scenario A
A "Today"	100	900	0	0	\$1,169	--
B "Tomorrow: different prices for different quality"	200	0	600	200	\$1,674	43%

Table 2 illustrates in scenario A, how exporters and processors today appear to be paying one low price for all cherry (170 RWF/kg), and in turn they are only able to earn a low export price (\$3.00/kg). However, the proposed movement to scenario B eliminates the “low grade fully washed” category. Instead, low quality cherry is forced into the ordinary market because washing stations reject it. Simultaneously, the high cherry price allows washing stations to put quality requirements on farmers without losing farmer loyalty. This initiates the virtuous cycle of washing stations competing for high quality cherry instead of competing for quantity only. Using the assumptions and best estimates available, Table 2 suggests that exporters could increase profits by 43 percent in scenario B.

The challenges to this proposed shift are significant. For example, the high-grade quality market has high demands for information, responsiveness, and marketing skill. In addition, to move to this new market, the lower grades and higher grades must be sorted out early in the value chain. In Section 3, the case studies give examples of how this can be done. It should be noted that adding these additional quality measures may raise costs per hectare or per tree (therefore, they are termed *investments*), but should not increase costs per kg cherry produced. Indeed, cost of production (CoP) per unit output (RWF/kg cherry) should be measured over time as new practices are incorporated. Additional practices should only be adopted long term if they lower CoP per kg cherry and increase quality. This will enable improved margins for producer organizations, which should be equitably shared with farmers via the cherry price.<sup>6</sup>

### 2.3 Reduced Export Revenues for Rwanda

Increasing the quality of coffee is a strategic goal for the GOR. Evidence of this is in Rwanda’s five-year strategic plan, which sets targets such as achieving \$104 million in revenues from coffee by

<sup>6</sup> In general, sorting lower grades from higher grades earlier in the value chain reduces overall costs by reducing waste. If done in conjunction with skilled marketing, this practice allows increased revenues from buyers with higher quality demands. Decades of lean literature (Gupta 2013) review these principles.



2018, with 71 percent of the volume coming from the fully washed category (Tumwebaze 2017). Other government reports cite a goal of 80 percent fully washed by 2018 (Gatarayiha 2016).

Regardless of terminology, the goals are ambitious given the 2016 result of \$58.5 million in revenues, and fully washed was 54 percent of volume.<sup>7</sup> Clearly, leaders in Rwanda’s coffee sector believe there are sources of foreign exchange that remain untapped in the coffee sector.

Table 3 shows that the trend in export volumes (row 2) has plateaued just below the 20 million kg mark for several years. It also shows that in years where production (row 1) is high, such as 2015 and 2017, sales did not increase enough to absorb the larger volumes. In fact, row 5 shows a concerning increase in unsold stocks over a six-year period.

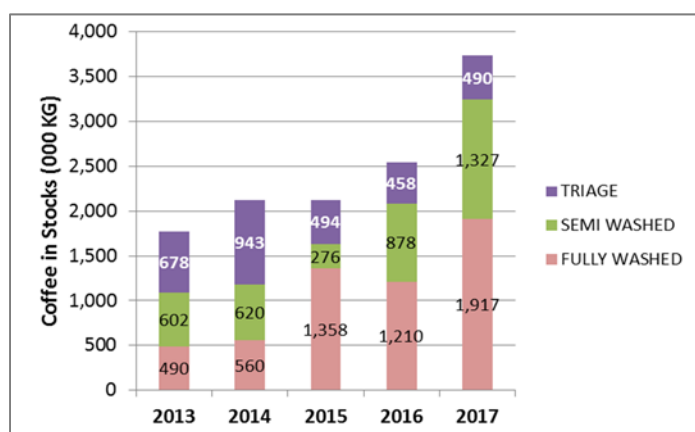
**Table 3. Coffee Trend: Production, Exports, Revenues and Average Export Price**

Row #		2011	2012	2013	2014	2015	2016	2017
1	Total Production KGs	16,371,360	19,955,309	18,346,252	16,379,961	22,182,579	19,155,945	23,668,026
2	Total Exports KGs (current yr + stocks sold)	15,596,618	16,989,730	19,969,713	15,973,377	17,219,924	18,641,135	18,670,718
3	Total Revenues (USD)	\$74,604,393	\$60,886,260	\$55,207,516	\$59,677,998	\$57,158,992	\$58,490,086	\$64,115,952
4	Avg. USD per KG exported	\$4.78	\$3.58	\$2.76	\$3.74	\$3.32	\$3.14	\$3.56
5	STOCK -KG UNSOLD - current year		134,400	1,772,220	2,124,084	2,130,610	2,548,020	3,792,307

Source: NAEB 2011 – 2017.

Rising stocks in coffee could be part of a hedging strategy; however, given the pressure to reach a strategic goal of \$104 million revenue from coffee, a lack of markets is more likely to be the reason. If, in fact, unsold stocks are rising in Rwanda because the coffee was not sold, officials might assess which grades of coffee are in these stocks. Figure 3 indicates stocks of fully washed and semi-washed have each grown an average of 50 percent annually over the past five years. Stocks in both categories grew over 50 percent in 2017. Triage stocks have remained relatively constant.

**Figure 3. Coffee Stocks (Unsold)**



Source: NAEB.

<sup>7</sup> NAEB production reports.

The growth in fully washed stocks is most concerning. Having a large portion of unsold stock in high quality coffee is costly because of the higher rate at which it loses value compared to lower grades. One-year old triage or semi-washed coffee might lose 50 percent of its value, whereas fully washed value can decrease 75 percent in the same period. The costs of rising stocks of fully washed are especially high.

**Table 4. Rwanda Coffee Exports by Quality Grade and Year (Kilograms)**

Row #	Exports	2013	2014	2015	2016	2017
1	Fully Washed KGs	5,462,270	6,263,464	8,159,781	8,966,237	9,716,622
2	Semi-Washed KGs	8,930,400	6,202,740	6,861,480	5,367,580	3,868,320
3	Triage KGs	2,019,538	1,625,963	1,970,863	2,126,838	2,415,219
4	FW as % of total	33%	44%	47%	54%	60%
5	SW as % of total	54%	44%	40%	32%	24%
6	Triage as % of Total	12%	11%	14%	15%	15%

Source: NAEB (2013 – 2017).

Tables 4, 5, and 6 form a series related to further understanding quality issues. Table 4 shows export volumes by quality grade. Rwanda has achieved impressive growth of the fully washed category in a short time, moving from 33 percent in 2013 to 60 percent in 2017. Table 4 also shows what may be a quality concern for NAEB officials. Instead of the triage (lowest grade) category declining over this period, it has seen a slight uptick. The middle-quality, semi-washed category has declined, as one would expect, but perhaps not as much as it should have. Ideally, as Rwanda heads toward producing 70-80 percent fully washed, triage grade coffee will be reduced to its absolute minimum.

Triage, in Rwanda, is the lowest quality of leftovers of the coffee processing process. Triage is the insect damaged, old, small, black, and broken beans. It looks blackish and often has a bad odor. However, there are buyers for it, and thus it makes sense that processors collect, transport and sell it. The source of triage needs to be seriously considered. While it cannot be entirely eliminated in an agricultural process, the GOR could focus on reducing triage as much as possible. In theory, if there were less severe insect damage and old coffee picked from the ground, there would be increased volumes of higher quality coffee. Officials seeking the highest levels of quality production might consider determining what would be the smallest amount of triage possible per kg of fully washed coffee, and under what conditions is such a minimal amount possible?

The government might be interested in the revenues associated with increasing quality.<sup>8</sup> Table 5 shows the actual revenues achieved and the volume levels for 2013 – 2017.

<sup>8</sup> Clare Akamanzi, executive director of Rwanda Development Board, quote: "Rwanda needs the foreign exchange that exporting coffee brings to the economy." Al Jazeera, "[Rwanda's reluctant love affair with coffee.](#)" September. 11, 2018.

**Table 5. Export Revenues by Quality Grade**

Row #	Revenues (USD)	2013	2014	2015	2016	2017
1	Fully Washed USD	\$19,837,178	\$30,758,005	\$35,161,023	\$35,988,429	\$42,990,634
2	Semi-washed USD	\$22,110,108	\$22,340,734	\$18,139,695	\$13,652,069	\$10,017,948
3	Triage USD	\$2,214,642	\$2,508,831	\$3,545,542	\$3,273,511	\$4,270,956
4	FW as % of total	45%	55%	62%	68%	74%
5	SW as % of total	50%	40%	32%	26%	17%
6	Triage as % of Total	5%	4%	6%	6%	7%

Source: NAEB.

Table 5 shows that revenues for the fully washed category (row 1) have increased year to year, but with inconsistent increments. Comparing 2014 with 2013 there was a 55 percent increase whereas the following years post 14, 2 and 19 percent increases. To understand this variation, one needs to look at price, since revenues are a product of volume and price. Table 4 shows the relevant volumes and Table 6 shows export prices by quality grade.

**Table 6. Average Export Prices (USD per KG) by Quality Grade**

Row #	Avg. Price (USD/KG)	2013	2014	2015	2016	2017
1	Fully Washed USD/KG	\$3.63	\$4.91	\$4.31	\$4.01	\$4.42
2	Semi Washed USD/KG	\$2.48	\$3.60	\$2.64	\$2.54	\$2.59
3	Triage USD/KG	\$1.10	\$1.54	\$1.80	\$1.54	\$1.77
4	Current yr exports	\$2.68	\$3.92	\$3.32	\$3.20	\$3.56

Source: NAEB data. Average prices calculated by dividing annual revenues by annual volume.

Observing row 1 in Table 6 one can see that price was indeed an important factor in the slumping revenues between 2015 and 2016. Many in coffee would account for this price variability as *characteristic* of the coffee market, and, indeed, there was a distinct drop in the NYBOT C between 2014 and 2015 (from an average of \$1.77 to \$1.32/lb.). However, there was no significant drop in the NYBOT C between 2015 and 2016 (average of 132 compared to 136 cents/lb.—see Appendix 1b). It seems unlikely that declines in the average export price in 2016 (compared to 2015) are related to the C market. I posit that the average 2016 export price for FW could have at least matched the 2015 FW price of \$4.31/kg (see Table 6) if other factors internal to the Rwandan coffee industry had been different. These factors deserve consideration, because if the 2016 average price for FW had been thirty cents higher, Rwanda’s economy would have earned \$2.6 million more in coffee revenues.

Without counterfactuals, one can never know if a different result was possible. However, when scanning possible reasons for an export price decline when the international market was stable, I found two related factors. First, a lower price for raw material, (the cherry price), in 2016 meant exporters could charge buyers a lower price, sell the coffee faster and still earn the same margin (see

Table 7). However, all else equal, they would not *have* to charge lower prices. This leads to the second, related reason: weak marketing capacity. Exporters with strong marketing skills would seek to maximize profit and maintain steady and competitive export price structures for foreign customers. Letting prices fall in one year makes it much harder in the following years to raise them again. Section 4 elaborates further on marketing related recommendations for the Rwandan coffee industry.

**Table 7. Rwandan Cherry Price (Farm Gate Price), 2015 – 2017, RWF per KG Cherry**

	2015	2016	2017
Avg. Govt Floor Price	170	161	249
Avg. Cherry Price Paid	198	172	270
% change		-13%	57%

Source: AGLC 2017a.

To summarize this section on reduced export revenues for Rwanda, there is some logic, but not proof, that the lower cherry price of 2016 cost the value chain approximately \$2.6 million in foreign exchange. As noted above, the cost of carrying growing stocks of fully washed coffee is another source of revenue loss. Fortunately, Rwanda re-gained some of these losses with a strong result in 2017. With the recommendations in this report, hopefully such gains can be continued.

## 2.4 Potato Taste Defect Affects Price

One cannot discuss price and quality for Rwandan coffee without also addressing potato taste defect, or PTD.<sup>9</sup> It is different from other defects because it cannot easily be identified at origin and it can occur in one bean or many, meaning it occurs in very low to very high frequencies. According to one roaster, the average incidence is one instance per 1,000g roasted coffee (expressed as 1:1000), which at Counter Culture Coffee (CCC) will result in a 3-point reduction in cup score (100-point scale). According to a representative of CCC's buying team, the resulting price reduction is proportionate to the coffee's overall price. A coffee that might otherwise score 83 points and cost \$3.00/lb. might be punished \$.30 - \$.50. A coffee with an otherwise high cup score like 86 points and costing \$3.50/lb. green could lose \$1.00-\$2.00/lb. green off this value.<sup>10</sup>

One exporter of Rwandan coffee estimated the impact of PTD at a macro level on the sector. For Rwanda's ordinary coffee in 2013, he estimated a \$.15 per pound *PTD discount* versus Honduran High Grown, which most traders would consider a comparable coffee (Smith 2014). He estimated this cost as \$3.4 million for 2013 for ordinary coffee only. For the fully washed category, one estimate put the PTD discount at \$.50 per pound when comparing a high quality Rwandan to a comparable Kenyan. He estimated the specialty PTD discount for 2013 at \$6.8 million, making a \$10.7 million total discount on price alone.

<sup>9</sup> PTD is a taste defect occurring in coffee in Rwanda. It creates a musty, vegetal taste, like a raw potato, in the brewed coffee.

<sup>10</sup> Author's notes and emails with CCC head buyer, June 2017.

These are the best estimates available on the effects of PTD on price, translated into lost revenue. However, those familiar with the PTD problem all point to a second area of losses related to PTD – volume losses on both the supply and the demand side. On the supply side, the antestia pest is known to reduce yields up to 40 percent (Bigirimana 2018). On the demand side, the risk of PTD limits the volumes that roasters are willing to buy. CCC confirms this is the case. They have been buying from Rwanda for over ten years and they have not increased the volume at all during this time. In other East African countries, they have increased volumes 4–7 times in the same time period.<sup>11</sup>

In this section, Rwanda’s losses have been quantified at three levels: that of the producer, the exporter, and the Rwandan government. To find solutions to reverse these losses, the next section summarizes learnings from case studies of organizations, which have tackled the problem of better sorting and incentives. Then Section 4 reviews the importance of attracting the right customers, and finally in section 5, a series of policy recommendations are outlined.

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<sup>11</sup> Author’s notes and emails with CCC head buyer, May 2017.

### 3. COFFEE WASHING STATION CASE STUDIES

In the value chain, coffee washing stations (CWSs) play a critical role in determining coffee quality through farmer training and the quality control function. This latter function, quality control of cherry upon reception at the CWS, was found to be poorly understood and inadequately executed in relation to the expectations for quality improvement at NAEB.<sup>12</sup> This section of the report shares examples from CWSs that are examples of good quality control practices. These CWSs are addressing the problem of mixed quality in Rwanda through elevated quality control practices. With these innovations, they are experimenting and finding ways to:

- incentivize more and better sorting at the farm, and
- ways to evaluate color, damage, and density at the washing station at the time of cherry purchase.

These are areas for focus recommended to bring Rwanda's quality to the next level. However, ongoing research in this area is also needed. Studies could be done to comparatively evaluate the effectiveness of the different mechanical sorting technologies and the methods of behavioral quality control through multi-tier pricing. Understanding which quality control solutions have the best results (highest profits) at different washing stations could be a valuable resource to the coffee sector. Studies could segment CWSs based on volume, ownership type (cooperative or private) and customer base (e.g., percent specialty buyers).

The case studies were developed through in-person interviews this author had with at least one key individual in each organization, and sometimes several. The individuals interviewed ranged from an owner who is Rwandan and foreign-educated, to a washing station operations manager in charge of dozens of employees, multiple operations and several sites. Interviews took place between January 2017 and January 2018.<sup>13</sup> Only the core learnings from each organization are included below. More details from each case appear in Appendix 2.

#### 3.1 Kivubelt – Teuscher – Private

##### 3.1.1 *Incentives to Sort on the Farm through Multi-Tier Pricing*

Kivubelt was beginning their fourth year in operation in 2017. The quality implications of a high cherry price became clear to the team quickly after the 2017 floor price of 264 RWF/kg cherry was announced by NAEB. This was a sharp increase over the 161 RWF/kg average cherry floor price in 2016 (see Table 7 above). They had been thinking they could pay 250 and be above everyone else. Now they would try paying 300 RWF/kg cherry as an extra incentive for quality. As they started doing this, the detrimental impact of every kg of *poor* quality cherry they purchased became obvious. As a business, they could not afford to pay 300 RWF/kg for poor quality. Therefore, they devised the multi-tier pricing system summarized in Table 8 below.

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<sup>12</sup> Based on a purposive sample of 13 washing stations visited by the author, and data collected via the AGLC coffee washing station survey of 16 washing stations.

<sup>13</sup> The method for recording was hand-written field notes.

**Table 8. Kivubelt Multi-tier Pricing**

Price Tier	Criteria to be in the tier	Level of inspection	Cherry price in 2017 (flr price was 249 RWF/kg cherry)	End-of-season premium paid	Customer paying export price of:
Tier 1 <sup>14</sup>	Member of farmer group with track record of high quality.	Strict	300+ RWF/kg cherry	Yes	\$3.00/lb. green (\$6.60/kg)
Tier 2	None	Less strict	Market rate	Yes	Estimated \$2.00/lb. green (\$4.42/kg) <sup>15</sup>
Tier 3	None <sup>16</sup>	None – these were sorted out	150-160 RWF/kg cherry	Yes	Estimated \$.80/lb. green (\$1.77/kg) <sup>17</sup>

This tiered pricing system as implemented in 2017, unfortunately, did not achieve the expected results. Kivubelt faced the challenges of developing new markets (mentioned in Section 2.2 above) and rising overall raw material (cherry) prices in the area of their washing station. The problem Kivubelt faced may have been this: in 2018 Kivubelt paid 300 RWF for Tier 1 cherry, expecting this to encourage farmers to supply higher quality cherry. However, the overall market moved to 300 RWF (no longer 270 as in 2017). Thus, at 300 RWF farmers had no incentive to put in extra effort and supply a more highly sorted product. Therefore, Kivubelt found they could not require additional practices at the 300 RWF price.

The solution for effective pricing for Kivubelt, or any processor wishing to pursue high quality markets, will be to pay a significant amount *above the prevailing market price* for cherry in their region, rejecting any deliveries that do not meet the quality criteria. The differentiated price should create a supply that may be small in year one, but will grow over time. The key is to understand what price is *market rate*, and then determine the critical price difference needed to incentivize farmers to implement additional practices.

Table 9 shows a basic calculation to help washing stations price for quality assuming 10 RWF is the critical price difference, and assuming an average 10 percent of each cherry delivery is floaters.

<sup>14</sup> Further study is recommended to document whether the Tier 1 farmers, who receive higher prices than others do, also have higher average yields than those in lower tiers and in a control group.

<sup>15</sup> NAEB average export price for FW.

<sup>16</sup> Note: Kivubelt is *fully washing* these low-grade cherries and they become part of the low-grade, fully washed green category. The rationale for purchasing this third tier is not fully clear to this author. Other processors turn away low-grade cherries, thus eliminating the effort it takes to manage a product that does not fit their brand.

<sup>17</sup> NAEB average export price for triage.

**Table 9. Two-Tier Price Formula for Coffee Washing Stations**

Goal: pay farmer on average 10 RWF above market rate, making it worthwhile to float		
Formula: $(\text{Price}(\text{mkt}) + 10 \text{ RWF}) = (\text{Price}(\text{high}) * .90) + (\text{Price}(\text{low}) * .10)$		
	<b>RWF</b>	
Market rate in the sector/district:	300	
If "low quality" price is:	100	assume "low quality" is 10% of delivery,
<b>Then pay this price for "high quality":</b>	<b>333</b>	<b>&lt;--- <math>=((\text{Mkt Price} + 10) - (\text{Lo Q Price} * 0.1)) / 0.9</math></b>
<i>Providing the farmer +10RWF over the market rate when averaged at a "high quality" rate of 90% high quality per delivery.</i>		

An example of how this pricing gives farmers who float an advantage is shown in the Table 9 Example below. Assume the non-float farmer receives the market rate (300 RWF/kg cherry) for all cherry, whereas the float farmer receives the high quality price (333 RWF/kg cherry) for the sinkers, and the low quality price (100 RWF/kg cherry) for the floaters. We see that the float farmer takes home RWF 31,000 and the non-float farmer has only RWF 30,000. The incentive to float is achieved.

**Table 9 Example**

<b>Assume both have 100 Kg cherry</b>	<b>RWF take-home</b>
Non-float farmer	30,000
Float farmer with 10% floaters	31,000

The pricing formula in Table 9 has thus helped the CWS create two-tier pricing that will achieve the desired objective of motivating farmers to deliver well-sorted cherry and to prefer to bring cherry to this washing station, as opposed to others in the area.

### *3.1.2 Mechanical Density Evaluation – the Cyclone*

At the beginning of the 2017 season (January) Kivubelt installed a new Cyclone mechanical floating tank for sorting cherry (see details about the machine in Appendix 3). Kivubelt had heard from others that this relatively low cost attachment to the depulper had significantly improved quality, and reduced incidents of potato taste defect. The machine is a silo-shaped column that fits between the cherry reception area and a MacKinnon depulper. Unfortunately, this strategy also did not perform as well as Kivubelt had hoped. It required large volumes of water and processed the cherries at a slower rate compared to the usual floating tank. Thus, the cyclone sorter remains unused at their washing station at this time.

### **3.2 Sustainable Harvest – Relationship Coffee – Private/Cooperative Mix**

Sustainable Harvest/Relationship Coffee has tested many innovative tools as the two all-female cooperatives they started working with in 2014 have been building and growing. One new idea was



to reward the farmers for their behavior, something they could control, instead of a consumer outcome, like cup quality of brewed coffee. They set up a rewards system that worked hand-in-hand with the lessons the women were receiving from regular visits from agronomists. The system offered four categories of prizes, the first category being smaller items like a hoe or a scythe, and the fourth being larger items like a mattress or a sprayer-backpack for pesticides. So far, the program has been well received and is being replicated as Relationship Coffee's network in Rwanda grows. (More detail in Appendix 2.)

### **3.3 Dukunde Kawa Musasa Cooperative**

#### *3.3.1 Exemplary in Many Ways*

Dukunde Kawa is one of the largest, oldest, and best-organized cooperatives in Rwanda. They are not only a cooperative of coffee farmers; they are also a cooperative of dairy farmers, offering their members a fully functional dairy and many amenities at their main campus. They were one of the first cooperatives to build their own coffee dry mill in the remote and rural area of the Gakenke district where they are located. Their newest purchase is a mechanical dryer with 5 tons of parchment capacity.<sup>18</sup> Dukunde Kawa, like Kivubelt mentioned above, understood the need for incentivizing farmers to do selective picking and sorting on the farm. They were paying 300 RWF/kg cherry throughout the 2017 season (well above the average floor price of 249 RWF/kg cherry). In 2018, they added floatation of cherry (in basins filled with water) as a further quality control step that farmers must perform (at the CWS reception area) before their cherry is weighed. They paid a high price for the dense, red-ripe cherry and a low price for the lightweight, damaged floaters.

#### *3.3.2 Mechanical Density Evaluation – Pinhalense Sorter*

During the 2015 season, Dukunde Kawa bought a Pinhalense mechanical cherry sorter for the Musasa washing station, partially because they thought it would reduce PTD. They say they had *some* PTD in 2015 and none in 2016 after the sorter was in use the entire season.<sup>19</sup> The machine can process 11 mt of cherry per hour. (See Appendix 4 for detail.)

### **3.4 Long Miles Coffee Project (LMCP) in Burundi – Private**

Incentives to sort on the farm.

Long Miles Coffee Project (LMCP) is the name of an organization with South African and American ownership in Burundi. LMCP built two washing stations, one in Kayanza, and one in Muramvya. The cherry price LMCP pays is the Burundi floor price (e.g., 400-450 Burundi Franc [BIF]) plus a consistent fixed amount above that price, (e.g., +100 BIF/kg cherry, plus 50 BIF for transport bonus, plus another 50 BIF per kg cherry premium at the end of the year after all invoices are paid). Notably, the transport bonus is paid to all farmers whether the farmer delivers to a collection site or the washing station. Even on the busiest collection nights, however, strict quality control measures

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<sup>18</sup> It reduces humidity at the rate of one percent per hour.

<sup>19</sup> At the time of the interview, no PTD in the 2017 season had been detected.

are enforced by LMCP staff at the washing station. For example, farmers are required to float the cherry to separate sinkers from floaters before the cherry is weighed. The farmer is required to take the poor quality cherry home, usually with the admonishment that better sorting at the farm will reduce the weight of the return bag next time.<sup>20</sup> Contrary to expectations of some in the industry, the number of farmers delivering to LMCP has increased, not decreased, over the years. Farmers have adapted their practices on the farm so that they can receive the higher prices when they deliver to LMCP. (See details in Appendix 2.)

### **3.5 METAD Hambela Estate in Ethiopia - Private**

METAD Hambela Estate is a relatively new private estate in the Oromia region of Ethiopia. They maintain a robust community-buying program, which they call their out-grower program. We include this Ethiopian estate as a case study because of their unique pricing policy to these local small farmers supplying coffee cherry. They incentivize not only high quality, but also *high volumes* of high quality. First, METAD pays a high cherry price, in cash, the day the farmers deliver their cherry. Last year they paid 18 ETB/kg cherry, while the national floor price set by the government was 11 ETB/kg cherry.<sup>21</sup> Similar to the LMCP case (above), METAD does not buy the low-grade cherries that the farmers sort out; the farmers take those home.

The unique part of their pricing policy relates to volume. Farmers delivering at least 1,000 kg of high quality cherry receive +2 ETB/kg cherry – a volume bonus. In other words, larger-volume farmers receive an extra incentive, and smaller-volume farmers have a direct incentive to invest in more trees or more land to grow more trees. Finally, METAD also pays a second payment after the season of about .5 ETB per kg cherry (about 2 US cents).

The price policy at METAD is not only making it worth the time of the farmer to pick selectively and sort the cherry at home, they are incentivizing increased volumes in each cherry delivery. This incentivizes optimal investments at the farm level, and there are efficiencies for the washing station and each step of the value chain. See details in Appendix 2.

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<sup>20</sup> TWIN Trading's *Wet Processing* guide presented in Kigali on July 20, 2016 includes floating cherry before weighing and requiring the farmer to take the rejected cherry home, (TWIN 2016).

<sup>21</sup> \$1 = 27 ETB in February 2018.

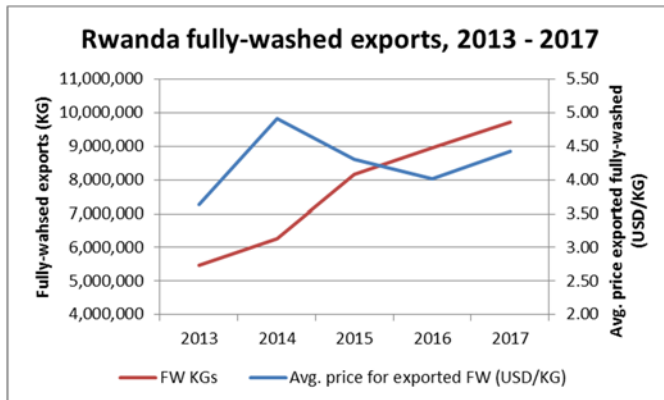
## 4. FINDING BUYERS OF HIGH QUALITY

The companies highlighted above are not only successfully buying high quality cherry, they are successfully selling to foreign buyers willing to pay for that quality over multiple years.<sup>22</sup> The ability to sell high quality green coffee and export it efficiently is an important piece of the solution to avoid the losses described in Section 2 of this report. Thus areas for marketing focus are:

1. Better promotion;
2. Securing buyers who will pay high prices, and outright prices, de-coupled from the NYBOT C; and
3. Securing buyers who will commit to multiple years.

Rwanda already produces significant volumes of high quality coffee product, and already has shown it is able to achieve the three marketing imperatives above to some extent. What is needed now is more. Figure 4 below illustrates how some buyers accepted higher prices for fully washed coffee early in the transition, as prices (blue line) increased nicely in 2013 and 2014. Now the more difficult work of securing less accessible buyers needs to happen, in order to maintain high export prices and still bring fully washed to 80 percent of exports with minimum unsold stocks of fully washed coffee, (see Section 2.3).

**Figure 4. Fully Washed Export Volumes (Red) and Average Prices (Blue)**



Source: NAEB, 2013 - 2017.

The first area, promotion, is an example of where the effort has been there, but more is needed. NAEB and exporters alike have been promoting Rwanda's coffee through branding, appellation strategies, and a wide variety of marketing initiatives. They have supported travel for buyers and sellers, hosted international conferences and auctions. From this baseline, both groups can now design the next layer of marketing support, which might include more *digital marketing*, building skills in country, and initiating proven digital marketing strategies especially by the exporters. Consistent presence in major social media channels like Facebook, Instagram, and Twitter are now essential. *Establishing credibility* with high quality buyers means communicating quality with data, evidence, and

<sup>22</sup> Although Kivubelt had issues with their initial cherry purchase strategy, they seem to have recovered well and they won 3<sup>rd</sup> place in Rwanda's 2018 Cup of Excellence competition.

offering transparency. Rankings, scorecards, and regular and consistent (English language) news about progress in the area of quality production could be made readily available on NAEB and exporter websites, for example. Infrastructure and events for *relationship building* is a third area that would enhance promotion of Rwanda's coffee.

The value of the second area—*buyers willing to pay high prices*—is illustrated by the Kivubelt case study. Since they have a customer they know will pay a high price and a fixed price, Kivubelt is willing to commit to paying a group of farmers a fixed price that does not go down when the NAEB floor price goes down. Recently, a handful of small roasters have even begun to publish the prices they pay. Kickapoo Coffee published \$2.75 lb./green as its minimum FOB price<sup>23</sup> and Olympia Coffee Roasting published \$3.50 lb./green as their minimum FOB price.<sup>24</sup> Other roasters regularly share the prices they have paid with the Transparently Traded Coffees project at Emory University in Atlanta, GA, which lists the data on its website, ([www.transparenttradecoffee.org](http://www.transparenttradecoffee.org)). Prices there are mostly in the \$2.80 - \$3.80/lb. range. These relatively high, outright prices are good examples of the types of prices Rwanda's exporters could continue to target and secure.

To illustrate the third prong of marketing enhancement needed, *multi-year relationships*, Kivubelt, again, is an example. A loyal customer relationship has resulted in a multi-year buying arrangement, formalized in a multi-year contract. This brings important advantages to the CWSs owned by Kivubelt and to the farmers who supply the cherry for that customer.

Each of the three factors supports the other. Negotiations to win multi-year contracts or higher prices are more successful when promotion is top notch.

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<sup>23</sup> Daily Coffee News by Roast Magazine, February 27, 2017, "Kickapoo Coffee Offering Unprecedented Minimum Price Guarantee to Farmers." <https://dailycoffeeneews.com/2017/02/27/kickapoo-coffee-offering-unprecedented-minimum-price-guarantee-to-farmers/>

<sup>24</sup> Daily Coffee News by Roast Magazine, January 12, 2018, "Olympia Coffee Launches Pioneering Direct Trade Scheme, Fair For All." <https://dailycoffeeneews.com/2018/01/12/olympia-coffee-launches-pioneering-direct-trade-scheme-fair-for-all/>

## 5. POLICY ALTERNATIVES

The government has set goals to export 80 percent specialty coffee (Gatarayiha 2016). They have made impressive progress towards this goal but progress seems to have stalled. Policy alternatives are offered in this section, which further support this direction. The suggestions address the losses quantified in Section 2 and spurring more of the innovations described in Section 3, the case studies. They focus on:

- Incentivizing more and better sorting at the farm, and
- Improving efforts to evaluate color, damage, and density at the washing station at the time of cherry purchase.

### 5.1 Cherry Floor Price Focused on Top Tier

To achieve desired levels of high quality cherry, a revised set of priorities for setting the official NAEB floor price for cherry could be considered. The *formula* could reflect the *expected quality requirement* of the intended market for fully washed coffee, which is specialty coffee. A singular focus on that quality requirement will drive interest in having the cherry price be one that covers the cost of production for farmers and incentivizes improvements in quality, innovations, and greater efficiencies at production and processing levels (AGLC 2016). This singular focus might mean reducing the importance of the NYBOT C price in the formula.

Recent research shows 300 RWF/kg cherry as a viable consideration for a floor as a basic minimum (AGLC 2016). In Section 2.1, 300 RWF/kg cherry is demonstrated to allow a 41 percent margin for farmers and a 43 percent margin for exporters. The five case studies also showcase organizations paying 300 RWF/kg cherry. Importantly, these organizations also have high quality requirements for cherry deliveries that are strictly enforced. Therefore, *enforcement of measurable quality requirements* could be considered an essential part of a strategy to support a new formula that results in a higher cherry price. For example, in a separate policy brief the AGLC team recommended a policy of floating the cherry when farmers arrive at the washing station, removing the floaters and damaged cherry before it is weighed (AGLC 2017b). In other words, a cherry floor price focused on the top band of quality can enhance Rwanda's ability to separate high grades from low grades, achieving efficiencies and clearer price signals to all involved in both markets.

A floor price covering cost of production and with appropriate quality requirements becomes even more essential if the zoning policy in Rwanda is continued. Since zoning removes competitive forces from the market for cherry, the floor price becomes a critical tool for ensuring that farmers are paid fairly and sustainably.

### 5.2 Cherry Price Access for Farmers

Knowing available prices for crops is one of the most powerful tools a farmer can have. While surveys show farmers have a good understanding of the cherry floor price today, it is unclear how easily they can check an official source to verify what they learn from other sources. Lack of accessible price information will limit a farmers' ability to assess their options for maximizing profits on the day they have ripe cherry to sell. This would be especially true in areas where there are many

washing stations within a close radius. Making any differences in prices transparent to farmers, other washing stations, and NAEB would help keep all actors from utilizing unfair market knowledge. Full price transparency can also equalize variability in prices within a given region, making it harder for middlemen to cheat farmers. Farmers are less likely to accept a low farm-gate price from a trader, if they know for a fact that all washing stations in the area are paying RWF 20 more.

### **5.3 Rwanda Second Sunrise Auction**

Auctions provide a price discovery mechanism where quality is made very public and transparent. NAEB may want to consider incentivizing quality in Rwanda via new auctions to complement programs like Cup of Excellence (CoE).<sup>25</sup> The best parts of national auction systems, such as the one in Kenya or Ethiopia, or international competitions, such as Taste of Harvest sponsored by the Africa Fine Coffee Association, might also be considered.<sup>26</sup>

For example, NAEB could create a Rwanda Second Sunrise Auction and appoint a team to market this program. The recommended rules of the program can ensure modest thresholds for entry, and frequent iterations (e.g., weekly during the season) so that most producer organizations can expect to enter every year with many lots.

NAEB may want to pay special attention to designing mechanisms to pass along financial “winnings” to the producer (not just the producing organization). These should be fully traceable and highly enforced. Rwanda can be proud to invest these funds directly into its coffee producers, who will in turn ensure Rwanda’s future in the specialty coffee world. This has been a foundational principle of the CoE programs around the world. Buyers in the CoE auctions are willing to pay top prices when they know that the producers themselves will be the recipients of the prize money.

A cautionary note must also be shared here. Auction programs such as CoE can be expensive to implement. A feasibility study of the budget and human resources required to implement Rwanda’s own specialty auction is recommended before moving too far into implementation of any auction system.

### **5.4 Improved Quality-Related Data Tracking**

“What gets measured gets managed” is a popular saying in some organizations. Adhering to this bit of wisdom, NAEB might consider tracking more quality-related data and adopt new practices for publishing this data. For example, tracking A1 parchment produced by each CWS as a percent of total volume might provide a leading indicator for whether the sector as a whole will reach desired targets for high-quality grades. When targets are missed, this metric can help diagnose at least to the level of the washing station where quality is lower than average.

Surveys that assesses each washing station’s practices for controlling the incoming quality of cherry might provide helpful data points. For example, a checklist with the items in Section 5.5 could be

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<sup>25</sup> This auction is run by the Alliance for Coffee Excellence, [www.allianceforcoffeexcellence.org](http://www.allianceforcoffeexcellence.org).

<sup>26</sup> Several Africa Fine Coffee Association (AFCA) countries create and promote a Taste of Harvest competition and the finalists are featured at the annual conference.

used to score points. If these results could then be made public each year on a web site, it would provide another tool to foreign buyers who might be assessing their options for finding quality coffee in Rwanda.

Finally, NAEB might consider revising the names and number of categories used to track coffee production. Today, three categories are used: fully washed, semi-washed and triage. Other countries, like Ethiopia, have nine or ten grades of coffee and all of these are tracked. In addition, NAEB’s definition of the term fully washed is ambiguous, because it is not clear what quality criteria defines coffee as fully washed or high quality. If fully washed applies to the physical process of washing coffee at a washing station, then it does not always represent high quality. If low grades are sorted from high grades within the fully washed channel, then unfortunately, the low-grade, fully washed volume is not being measured and reported. It is combined with semi-washed coffee. It seems as if creating at least one new category between semi-washed and fully washed would enable more confidence in the definition of fully washed and allow better management of quality in the sector. Diagram 2 shows an overview of how NAEB’s terms fit into the quality terminology framework suggested here.

**Diagram 2. Terminology for Quality Sub-categories in Rwanda**

	Low-grade Quality (NY C price, +/- a few cents)			High-grade Quality (well-above NY C price)	
New Exporter/ CWS terms	Triage	Ordinary	Low-grade, Fully-washed	Fully-washed	Fully-washed Excellence
NAEB terms	Triage	Semi-washed		Fully-washed	

### 5.5 Quality Control as an Essential Component of Farmer Education

Almost every interested stakeholder in Rwanda’s coffee sector brings attention to the importance of farmer training when quality is discussed. However, at some point after the basics of coffee farming have been taught, the missing component in an agronomy program is *not* the training, but the reinforcement of what has been taught. Programs could motivate better practices by impacting the farmer’s pocket – at the point of cherry purchase. Too often cherry reception at the washing station is simply considered a place where cherry is passively received. A re-framing of reception as a *critical point in Rwanda’s farmer education* system could achieve benefits for the farmers, improve the washing station’s profitability, and accelerate several NAEB goals. The case studies in Section 3 include washing stations that embody this concept and the positive effect on quality is clear.

The case studies uncovered a large number of quality-enhancing methods that other washing stations can employ.

- Quality control staff – trained and present every day/night cherry is received. Their job during reception is to coach farmers on how they can improve their income. This will help

avoid the alienation of farmers that many WS managers say is the reason they are not stricter and not rejecting poor quality cherry.<sup>27</sup>

- Non-mechanical floating – pre-floating cherry in a basin or tank. At remote cherry collection sites, basin floating is preferred. Often one or two jerry cans of water are all that is needed. The value in this is the immediacy for the farmer to see and understand his/her quality result. Farmers should take the rejected cherry home with them.
- Mechanical floating/sorting – the cyclone and a Pinhalense mechanical cherry sorter are two options shared in the case studies. These both have the *dis*advantage of operating after the point where cherry has been weighed and purchased from the farmer, so there is little educational value with these mechanical options. The benefit of these systems lies in their ability to sort out low-grade cherry in large volumes with speed.<sup>28</sup>
- Defect selection on raised mesh tables before the cherry is purchased. In many countries, this is a standard at high quality washing stations unless the farmer is given a pass by a quality control manager.
- Weigh defects – inform the farmer and track these data at the farmer level, summing up to the collection site and washing station levels.
- Send defects home with farmers with no payment.<sup>29</sup> No payment for defects is a clear signal about which product the CWS is seeking. The case studies demonstrated how farmers learn quickly to not bring defective cherry to the CWS when they know they will have to carry it home.
- Invest in the infrastructure of the reception area at the wet mill. For example, add signage, install a solid floor, lights, well-manufactured tables, and durable floatation tanks for *farmers* to use before the cherry is weighed. Arrange items and employ staff to enable flow when many farmers arrive at once.
- Post signs in the reception-quality control area to communicate clearly the washing station’s current cherry price and quality policy, and the arrival and exit process the farmer should follow.

The above points are all practices that have been observed with at least one washing station in either Rwanda or Burundi. No single washing station currently takes all of these steps. However, to motivate quality in the sector, NAEB could begin a program to encourage much stricter quality control and farmer education in the reception area than exists today. NAEB could publish this or a similar list of cherry reception best practices and reward those with the highest scores. This might be of interest to green buyers, who out of self-interest might then, support NAEB in the effort to encourage those with low scores to improve.

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<sup>27</sup> AGLC Key Informant Interviews included several such comments.

<sup>28</sup> A research recommendation would be to credibly assess these mechanical options and non-mechanical options for sorting available to washing stations. The objective could be to provide un-biased data so that washing stations can more easily assess the cost-benefit of machine purchases and behavioral approaches.

<sup>29</sup> TWIN Trading’s “Wet Processing” guide presented in Kigali on July 20, 2016 includes floating cherry before weighing and requiring the farmer to take the rejected cherry home, (TWIN 2016).



## **5.6 Operations Management Skill Improvement – Quality and Process Control**

In this author's work with wet mills in Rwanda, inefficiencies in production, inadequate emphasis on quality control during cherry purchasing and weak marketing systems have been observed. These weaknesses at the point in the value chain where cherry is purchased from farmers create a serious disadvantage vs. other countries in the global specialty coffee market. To address this weakness, a government matching-funds program to incentivize improvements in the business functions of coffee washing stations, both cooperatives and private groups, could be considered.

Especially small and cooperatively owned washing stations could benefit from a program to support management improvements. An important aspect of such a program might be that only those motivated to perform better in quality markets qualify for funds. If the government assistance is not enough to help them turn-around, the government could facilitate an orderly closure or a sale. (See detail in Appendix 5.)

## 6. CONCLUSION

Together, these policy recommendations support the goal in Rwanda to reach 80 percent high quality coffee exports to the specialty market. All stakeholders will have to be committed to the long-term where the benefits are significant for all actors. The opportunity for benefits for three segments of the supply chain—producer, exporter, and government—was quantified in Section 2. With examples from five organizations (the case studies in Section 3), potential solutions to the problem of mixed quality and inadequate prices were presented. Section 4 outlined new options for attracting buyers of high quality coffee. A sustained and strengthened marketing effort is vital. In the final section, six policy recommendations were presented as options to support more farmer motivation and quality improvement.

The inertia of doing things “the way they’ve always been done” and business risk associated with change and the uncertainty of PTD are all significant factors as Rwanda considers its options for growing its specialty coffee market. The policy recommendations presented in this report, if implemented, could help move the country past that inertia and enable more winners than losers in the value chain as Rwanda transitions into a second sunrise.

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## APPENDIX 1. COST OF PRODUCTION AND NYBOT C HISTORICAL

### AGLC Cost of Production (CoP) Estimation Methodology

#### Sample Frame

The CoP estimate is based on data from a survey conducted 2015 - 2016 including 1,024 coffee farming households in Rwanda. The sampling frame used in the survey is as follows:

- 1,024 farmers were interviewed in four of Rwanda's districts with large coffee production.
  - 256 in Gakenke (North)
  - 256 in Huye (South)
  - 256 in Rutsiro (West)
  - 256 in Kirehe (East)
    - 4 washing stations were selected in each of these districts
      - 64 farmers were randomly selected from the list of farmers delivering to each washing station.

Although the sample is not representative of the entire population of Rwanda's coffee farmers, it is large enough and diverse enough to give reliable indications of metrics like cost of production for farmers actively engaged in the production of cherry for fully washed coffee.

The methodology used to calculate CoP has four major components:

- Household labor (by task)
- Wage labor (by task)
- Equipment (e.g., pruning shears, sprayers, masks)
- Purchased inputs (fertilizer, pesticide, mulch, etc.)

These components are built up from the variables included in the baseline survey. A breakdown of each major component into these variables follows.

#### Value of household labor by task

A crucial but tricky part of any CoP calculation for coffee farmers is estimating the household labor hours invested in cultivation tasks and then valuing those hours. With the baseline survey the AGLC, project compiled farmers' own estimates, to calculate the time they spend on these tasks. Of course, farmer recall is not 100 percent. However, the large number (1,024) in the sample helps avoid bias from this issue. Statistically, as the sample grows, the mean of a single variable more reliably estimates the population mean.

The labor categories included in the survey questions were seven cultivation tasks, plus harvest tasks (lumped together), and sorting tasks (lumped as one).

- Cultivation tasks
  1. Weeding
  2. Mulching
  3. Fertilizing

4. Pesticide
  5. Pruning
  6. Stumping
  7. Plant seedlings
- Harvest tasks
  - Sorting tasks

To convert these labor days to values (in RWF), we multiplied by 700 RWF (\$.89) as that was the median wage per day paid by the sampled farmers to hire labor for all tasks (excluding sorting, which was significantly lower). The mean value of labor provided by the households in the baseline is RWF 35,868 (\$45.40).<sup>30</sup>

### **Value of wage labor by task**

In the AGLC baseline survey, farmers were asked about wages paid, and for how many days, to workers for the same seven cultivation tasks listed above for household labor. Then researchers calculated a *total wages paid* variable. The mean value for total wages paid is RWF 44,313 (\$56.09) for the 2015 season.

### **Value of Purchased Equipment**

Equipment used on the farm is an important component of CoP. The method used by AGLC started by asking the farmers whether they own seven different types of equipment and the interviewer also asked them to name any other equipment they own. In the end, five tools were indicated as the most common tools owned by farmers in the sample:

- Sacks
- Baskets
- Pruning shears
- Drying mats
- Ropes (for bending trees for harvest and pruning)

For each equipment item that they said they owned, we also estimated an annual cost for each tool.

By creating a total of the annual cost of each piece of equipment owned, an estimate of the value of the farmer's equipment for a single season was created, and the mean for all farmers in the sample was RWF 7,506 (\$9.50). This amount includes only purchased equipment and excludes the value of any equipment the farmers received at no cost.

### **Value of Purchased Consumable Inputs**

The key consumable inputs for coffee are fertilizer and pesticide. In the AGLC baseline survey, we also asked whether they purchased mulch, manure, coffee plant seedlings, or shade trees. For fertilizer and pesticide, we ask the farmers whether they used any last season, and then, how much they actually purchased and how much was given to them by the government or others.

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<sup>30</sup> Using \$US1 = 790 RWF.

For this CoP calculation, we only include the inputs *paid for* by the farmers. We leave out inputs that are given to them (even though we know these have a high value) because we are interested in estimating the actual costs incurred (investments made) by farmers.

The purchased input most commonly identified by farmers in 2015 is mulch (53 percent), followed by manure (14 percent). Interestingly, fertilizer and pesticide purchases by farmers are small – almost insignificant, presumably due to the free distributions from the government. The mean value of all purchased inputs reported by farmers was RWF 19,838 (\$25).

### **Total CoP for costs through harvest and sorting**

The sums of the means of the four categories above come to RWF 107,527, (\$136).

Mean value of household labor:	RWF 35,868	\$45.40
Mean value of wage labor:	RWF 44,313	\$56.09
Mean value of equipment used:	RWF 7,506	\$9.50
Mean value of purchased inputs:	RWF 19,838	\$25.00
Total: for the 2015 season	RWF 107,527	\$136.00

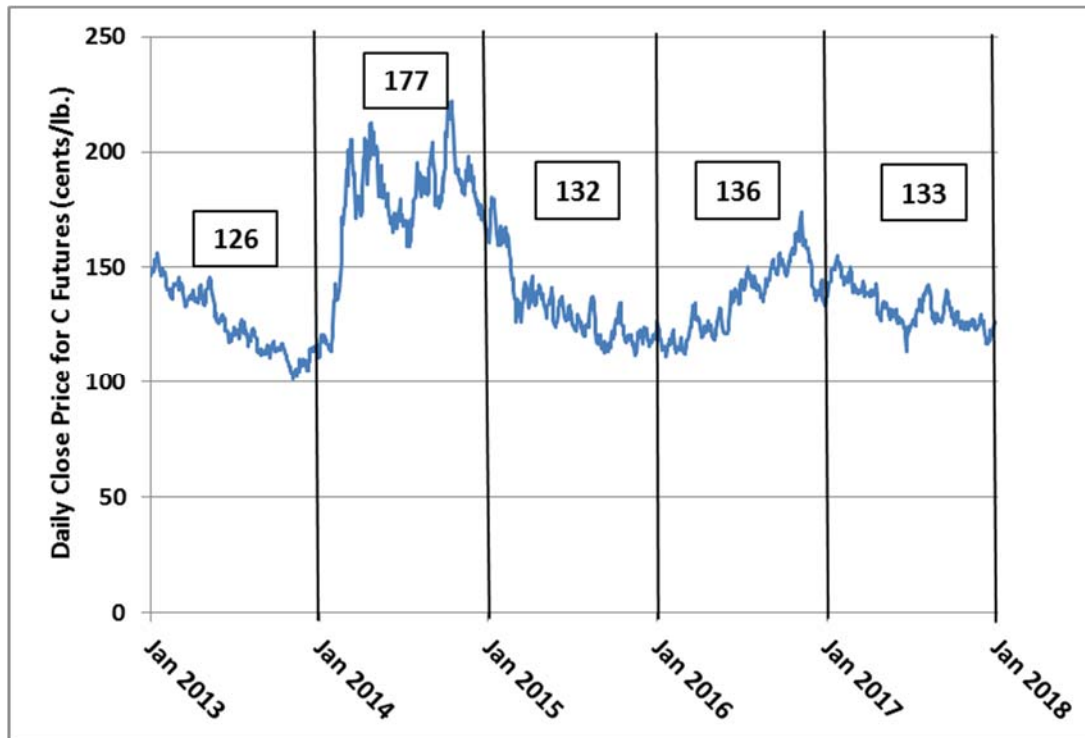
### **Costs per KG of cherry produced**

Our interest is to compare the CoP of different farmer groups, for example, those with many trees vs those with few trees, or female-headed households vs. male-headed households. To do this we create a *household level* total cost of production, divide by the kg produced by each household, and then take the mean of all 1,024 costs of production per kg of coffee cherry produced. The result is 177.32 RWF/kg, which is \$.22/kg, or \$.10/lb.

It is also helpful to look at the median CoP/kg, as the median is less affected by the extremes of the distribution, and thus, better characterizes the typical farmer. The median is a lower figure at RWF 122/kg, which is expected given that a small number of high-CoP farmers at the upper extreme skew the distribution and yield a mean that is higher than the median.

## Appendix 1b. Historical NYBOT C Price

### Illustration for Section 2.3 Historical C Futures



Source: Intercontinental Exchange Report Center. Accessed, August 30, 2018.

<https://www.theice.com/FuturesUSReportCenter.shtml?productName=Coffee>

Note: Data shows Coffee 'C' Contract price, cents per pound; trading unit: 37,500 lbs. Boxes show average daily close for that year.



## APPENDIX 2. CASE STUDY DETAIL

### Kivubelt – Background

Kivubelt is owned by Teuscher Invest, which was established by a Rwandan and Swiss couple. A.B., the Rwandan partner was the one who had the vision to create a business in Rwanda that would allow her to use her economics and business training, and be productively engaged in the development of her homeland. At first, she thought she would just own and operate a washing station. However, as A.B. toured around the country looking at the options, she started asking questions about the cherry supply and soon realized the cherry supply was the key to having high-quality green coffee that would fetch top prices. Therefore, she decided to invest in planting 80,000 coffee trees. In 2012, Kivubelt planted those seedlings and A.B. became one of Rwanda's largest coffee farmers!

While Kivubelt was growing 80,000 coffee trees, they also purchased from neighboring farmers their washing station in the Gihombo sector, Nyamasheke District. Even after the Kivubelt plantations began producing in 2016, the company has continued to buy from farmers. Further detail on Tiers 2 and 3 of Kivubelt's 3-Tier pricing system introduced in Section 5:

The *second tier* of pricing was expected to be a market rate for the area, and that market rate was expected to be close to the national floor price, which was 249 RWF/kg cherry over the season. Kivubelt enforced quality control on these farmers also, albeit not quite as strict, since they could only be as strict as their nearest competitors.

The third tier, which is the lowest grade cherry sorted out by the farmer on the tables, is also weighed. A price of only 150 – 160/kg cherry is paid, and these cherries wait on the side for processing after the good cherry is complete. It is important to note Kivubelt is fully washing these low-grade cherries. They find it more lucrative to sell low-grade green at the local market, rather than low-grade cherry or parchment.<sup>31</sup> This coffee becomes part of the low-grade, fully washed green category, which is not well documented. The rationale for Kivubelt to purchase this third tier of cherry is not fully clear to this author. Other processors turn away these low-grade cherries completely, thus eliminating the time and effort it takes to manage a product that does not fit their business model or brand image.

### Sustainable Harvest – Background

Sustainable harvest is a US-based coffee importer that has been working in East Africa for about 15 years. They opened an office in Kigali in 2014 as they were launching a program called Relationship Coffee Institute (RCI). With this program, they started two new coffee cooperatives, one in Nyaruguru, and one in Kayonza district. The cooperative members had to be female coffee farmers and they had to be some of the very poorest women in these communities.

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<sup>31</sup> Executives at Kivubelt explained that the local market for these lowest grade coffees in green form is at the NAEB campus in Kigali. Kivubelt arranges the hulling of the parchment then sells the green to traders who convene at the NAEB facility and the coffee is eventually sold for export.

RCI created a unique and innovative scorecard system for incentivizing best practices. The card has four categories of rewards, the fourth being higher value items like a mattress or a goat. Leaders of RCI explained to the women that the agronomist would be checking their fields each time he/she visited to see if they were implementing the best practices being taught.

Those who got full points for all practices could choose a reward from the fourth category at the end of the season, those who lost some points would be able to choose prizes from the other categories. These rewards are bestowed annually at an impressive community celebration, with local dignitaries and leadership from the company making the presentation and congratulating the women.

### **RCI Rewards for Farmer's Card**



### **Dukunde Kawa Musasa Cooperative**

Dukunde Kawa is the only washing station in Rwanda with the large, 11 mt mechanical cherry sorting machine. See detail in Appendix 4.

The new mechanical dryer will be installed and running by the 2018 season. The cooperative director did not know of any other washing station in Rwanda with mechanical drying capacity.

### **Long Miles Coffee Project – Details**

The philosophy of the company is one of empowering employees, treating farmers fairly and improving the communities where they work. They have unwavering focus on quality. Referring to Section 3.1, LMCP has been able to determine the critical difference for their market. Thus, even though they lost many farmers the first year, they continued to pay higher prices than all other washing stations in their area, and now they seem to have created a separate market of high quality cherry.

The first year that LMCP implemented the policy of rejecting low quality, about 400 of the 800 farmers who had delivered the year prior to LMCP took their cherry to other nearby washing stations where they would receive the floor price for their mixed quality cherry. However, other farmers heard about the higher prices being paid by LMCP and were interested. That same season, *1,000 new farmers showed up* and went through the strict quality control procedures that LMCP implements. LMCP continues to implement higher sorting standards than all other processors in their area, and to pay higher prices. Their buyers love this, and even average coffee consumers notice the higher quality in the cup, according to anecdotal stories.

*Teaching quality at the washing station:* It was observed that two unique tools for teaching farmers were practiced at LMCP. The first is the Brix meter to measure sugar content. This relatively simple tool allows a technician to squeeze some cherry juice onto a small, flat screen. Then this small screen is enclosed and the technician holds the tool up to the eye like a telescope. In about 30 seconds, it shows the level of sugars on a graduated scale. The second tool was even simpler and was an effective test. The agronomist or scout would sometimes ask the farmer to bite one of the green cherries enough to taste the bitter flavor. Then he would ask the farmer to bite a red cherry and taste its sweetness. “Now you can imagine why LMCP customers want only the red cherries,” is one comment Epaphras, the lead agronomist, would make.

### **METAD Hambela Estate**

METAD Hambela Estate is a relatively new private estate in the Oromia region of Ethiopia, situated at about 2,200 meters and in the center of this region known for producing high-quality Arabica coffee. The founders and owners are two brothers who were influential in the launch of Ethiopia’s ECX coffee exchange in the capital, Addis Ababa. They established the Hambela estate by planting 400,000 coffee trees in 2014, also establishing a large coffee nursery with 300,000 seedlings. They built two washing stations with Penagos depulpers from Colombia. Their objective is to grow and sell organic, forest-grown, and shaded coffee. In traditional Ethiopian style, they offer both natural and fully washed coffees, both of which are high quality and highly sought-after by specialty buyers. However, like other new estates, METAD must buy large volumes of coffee cherry from local farmers while its own coffee trees come into maturity. Even after their estate trees have matured, METAD intends to continue a robust community-buying program, which they call their out-grower program.

Farmers are required to sort their cherries on arrival using the raised tables built on a concrete floor next to the receiving shed. Up to five quality control attendants supervise this process. As described in the main body of this paper, the price policy at METAD is effective in controlling quality. Low quality cherry is sent home and large volume deliveries are incentivized. This motivates optimal investments at the farm level, including investments in more coffee trees. This creates benefits for the farmer, efficiencies for the washing station and each of the other links in the value chain.

### APPENDIX 3. CYCLONE MECHANICAL FLOATING TANK

The Cyclone floating tank was a new technology being introduced to wet mill processors, primarily by Starbucks Farmer Support Center, starting in 2015. The Cyclone is a large metal cylinder manufactured in Rwanda. The technology significantly and positively impacted coffee quality and cost of production at KOAKAKA Karambi and Muganza, where it was tested. KOAKAKA won high marks at Cup of Excellence Rwanda 2015, with lots placing 6<sup>th</sup> and 14<sup>th</sup>. Starbucks facilitated installation of the machines in several locations, including Kivubelt in Nymasheke, in January 2017.

#### Cyclone Installed at Kivubelt Washing Station



Sources: Starbucks Farmer Support Center. Photo credit: Artisan Coffee Imports, 2017.

#### APPENDIX 4. PINHALENSE MECHANICAL CHERRY SORTER

In 2015, Dukunde Kawa Musasa installed a Pinhalense mechanical cherry sorter in front of the depulping machines at its Musasa washing station. With 11mt/hour capacity, it can easily keep up with the 9 mt/ hour of cherry per hour that their two depulping machines at Musasa can process. However, since 2016 they have only been operating the three-disc depulper with 3 mt/hour capacity. This is due to the new zoning policy implemented in 2015. Due to zoning, they do not get enough farmers delivering cherry to this location, so the six-disc MacKinnon depulping machine sits idle and the Pinhalense sorting machine has 8 mt of over-capacity.

Dukunde Kawa is the only washing station in Rwanda with the large, 11 mt mechanical cherry sorting machine. Dukunde Kawa also has three smaller Pinhalense sorting machines, each processing only 3 mt/hour. At least one other washing station in Rwanda has one of these 3 mt sorting machines at the time of this report.



Above left: February 2016, new Pinhalense. Above right: By June 2017, roof was built over the sorter. Bottom: Front view of the beds where cherries come out. Left side are low grades, right side are denser, high grades. The cherries flow out of the machine with water, much like the grading channels that come after depulping. Photo credit: Artisan Coffee Imports.

## APPENDIX 5. POLICY ALTERNATIVES – DETAILS

### Appendix 5.1 Detail - Cherry Price Access for Farmers

One effect of zoning, a new policy restricting coffee farmers' sales in Rwanda, reduces the need to know prices elsewhere if there is only one washing station in the farmer's zone. However, there are some areas, e.g., Huye District, where many CWSs are densely placed and farmers have some choice as to where to bring their cherry within their own zones. For such zones, telephone or online systems might first gather cherry prices, and then post them on a daily basis. Capability for CWSs to update pricing themselves could be also considered, providing them another tool by which they can compete for cherry. In addition, there would have to be a regulation that whichever price is on an official site or SMS system is the price that must be paid, i.e., no false advertising. Auditing via telephone surveys to farmers may help avoid unethical practices.

This policy might begin with public posting of the NAEB current floor price at district offices and NAEB's suggested quality criteria to receive that price. Next, NAEB could pursue an on-line or radio cherry price broadcasting system covering the entire country, including also actual prices paid. Regardless of whether farmers use a national system for his/her day-to-day decisions, government and business could capitalize on such market knowledge. For example, fertilizer suppliers might monitor trends and plan for more supplies to go to districts where coffee prices are high. NAEB would also have better data to monitor effects of policy change, such as the year zoning was implemented.

### Appendix 5.2 Detail – Rwanda Second Sunrise Auction

Auctions provide a price discovery mechanism where quality is made very public and transparent. The Nairobi auction for most Kenyan coffee gives producer organizations of all sizes an equal opportunity to have their coffee offered to international buyers. Samples (9 kg each) of any coffee to be auctioned are gathered using a secure process. The ability for buyers to sample coffee before bidding is an important difference between Kenya's auction and the Ethiopian ECX auction. Kenya's is believed to be the more efficient price-discovery design, because of the ability for buyers to sample any lot. The result in Nairobi is that nearly all of Kenya's coffee is sold at outright prices, detached from the NYBOT C price, and to buyers who are paying for the quality in the cup. However, the Nairobi auction to this day is criticized for lack of mechanisms to ensure a fair share of the price gets back to farmers.<sup>32</sup>

The CoE program offers an attribute beyond the price discovery attribute of an auction. It is marketed as a competition among producers first and an auction second, and this drives astonishing interest and motivation among producers. The CoE has had many years of successful competitions and auctions in Rwanda. This success is one reason to believe that Rwanda could consider a complementary program run by Rwanda's own organizations.

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<sup>32</sup> <https://www.capitalfm.co.ke/business/2018/09/embu-county-plans-to-process-and-package-tea-coffee-and-macadamia-nuts/>

### **Appendix 5.3 Detail – Operations Management Skill Improvement**

An alternative to consider is a government funded Washing Station Adjustment Assistance fund that might be part of the Rwandan government's current Turnaround Program for washing stations, but would be distinctly separate. Through the Adjustment Assistance program, struggling washing stations could first qualify as struggling, then receive a limited amount of matching funds (e.g., if the government pays \$5,000, the producer organization also pays \$5,000) for services, not infrastructure. The possible needs and relevant solutions at the washing stations are infinite. This type of assistance program would emphasize the need to improve management at washing stations, utilizing existing capacity well, and growing the confidence of farmers and coffee buyers.

## APPENDIX 6. FURTHER RESEARCH RECOMMENDATIONS

Political will and carefully constructed policies are necessary to support Rwanda's coffee sector. Policy formation requires further research. Key areas where better statistical evidence can help are:

More data points to better understand exporter costs is strongly recommended (in Section 2.1)

Further study is recommended (in Section 3) to document whether the first tier, the 300 RWF farmers, have higher average yields than those in lower tiers and in a control group.

A research recommendation would be to credibly assess the mechanical options and non-mechanical, behavioral approaches for sorting cherry to improve quality and minimize the risk of PTD. The objective could be to provide un-biased data so that washing stations can more easily assess the cost-benefit of the associated machine purchases and new staff positions.

In Section 5, recommended studies include comparing the effectiveness of sorting only, vs. adding controls of multi-tier pricing, i.e., paying farmers higher rates for more well-sorted cherry. Understanding which quality control solutions have the best results (highest profits) at different washing stations could be a valuable resource to the coffee sector. Studies could segment CWSs based on volume, ownership type (cooperative or private) and customer base (e.g., percent specialty buyers).

**Cost of production:** Research should continue to track the cost of production of growers who produce high quality cherry; those costs plus an adequate margin to cover their risks and make their livelihood sustainable should be reflected in the cherry price.<sup>33</sup> Resources must be made available from public and private sources for estimating the value of CoP and updating that estimate on a regular basis. An annual update would be ideal. Other coffee producing countries monitor cost of production carefully and by region even though they do not have government-regulated floor prices (ICO 2016).

### **Green buyer – customer research:**

- Basic roaster-customer satisfaction survey structured to Rwanda's target market.
- Visiting roaster impressions survey – gap analysis to Rwanda's desired image.
- Official tracking of potato taste defects. Ideally, this would be a NAEB system for capturing feedback from green coffee buyers who experience the defect, and would categorize PTD incidents in terms of severity, both in terms of volume and money.
- Surveys of green coffee buyers to assess their quality interests. These could be done with convenience samples at an event like SCA, with on-line surveys, and other sampling techniques that more credibly represent the buyer population.

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<sup>33</sup> AGLC 2016 conservatively estimated 177 RWF/kg cherry as the average in Rwanda. This estimate does not include cherry transport or any value for inputs received from the government.



