Ugandan Coffee Supply Chain Risk Assessment

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Acknowledgments

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Executive Summary

Despite losing global market share over the last 20 years, Uganda remains a major coffee producer, accounting for approximately 2.5% of global coffee production.[1] In 2008–2009, coffee exports accounted for almost a quarter of Uganda's formal export earnings[2] and were estimated to generate income and employment for up to 1.3 million Ugandan households.[3] As such, the coffee industry is extremely important to both the rural population and the Ugandan economy. However, the sector exhibits significant levels of production volatility, caused in part by unmanaged risks. Despite the occurrence of numerous risks, the sector has always managed to produce significant, albeit variable, volumes of coffee for export, but the historic resilience of the sector does not automatically imply that the industry will avoid longer-term decline if it fails to proactively manage potential risks going forward.

Historically, volatile production and income for the coffee sector have been caused by a number of unmanaged risks, including changes in market structure (liberalization), international price collapse (the coffee crisis), weather events (drought), and outbreaks of pests and disease (wilt and rust). Today, the major risks facing the industry include the following:

1. Loss of Global Market Share

Although Arabica production has been rising as a share of total production, Uganda remains foremost a large-volume Robusta producer, remaining of interest to international buyers because of its ability to provide large volumes of high-quality Robusta coffee. Already, there is anecdotal evidence that some large buyers do not purchase from Uganda, or do so only irregularly, because of a lack of available volumes. A gradual and consistent reduction of Ugandan Robusta volumes may further diminish interest in Ugandan coffees and encourage buyers to secure Robusta supplies from elsewhere, or at least to reduce their investment in the Ugandan industry.

2. Price Risk

The industry is dependent upon producers receiving a price that motivates them to continue producing coffee. Any long-term reduction in the price received by producers may force them to uproot their coffee trees in favour of alternative crops.

3. Pest and Disease Outbreak(s)

In recent years, the Ugandan coffee industry has been dramatically impacted by pest and disease outbreaks. Coffee wilt disease (CWD) has been estimated to have destroyed over half of Uganda's Robusta trees and to have, in the worst years, greatly reduced Robusta production. Future outbreaks of existing (or new) pests and diseases are a certainty, and although all outbreaks will result in losses, the key risk is that badly and ineffectively managed responses to new outbreaks will significantly raise the scale and impact of the losses.

4. Foreign Exchange Rate Risk

With Uganda set to become an oil-exporting nation in the near future, there is the possibility of currency appreciation, and with coffee exports priced in U.S. dollars, a significant appreciation in the Ugandan shilling would directly reduce the price that farmers receive for their coffee. A significant reduction in producer prices could cause producers to reduce their production of coffee.

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1 International Coffee Organization (ICO) World Production Data 2000–2009; 2008 data used.
2 Bank of Uganda (BOU) Annual Report 2008–2009, page 140, Appendix 9 (22.7%).
3 Uganda Coffee Development Authority (UCDA) Annual Report 2008–2009, page 10.

Although risk transfer and risk-coping solutions may be useful for managing some risks, risk mitigation strategies, to reduce the likelihood that the risk will occur and to reduce the size of losses resulting from adverse events, are far more relevant to Uganda's coffee supply chain. Risk mitigation measures, such as improving research and extension services and increasing farmer productivity, have the greatest potential for assisting the sector in dealing with risks as and when they arise.

The government of Uganda and the Uganda Coffee Development Authority (UCDA) have already implemented a number of initiatives and programs to mitigate some of the above-mentioned risks. However, many of the existing initiatives need to be strengthened, and some new activities added, to ensure insofar as possible the comprehensive management of all key risks facing the coffee supply chain. An in-depth evaluation of individual solutions was beyond the scope of this exercise; an exhaustive listing of potential risk management solutions, and an assessment of the cost-benefit ratio of different risk management options, needs to be undertaken by the government of Uganda and UCDA.

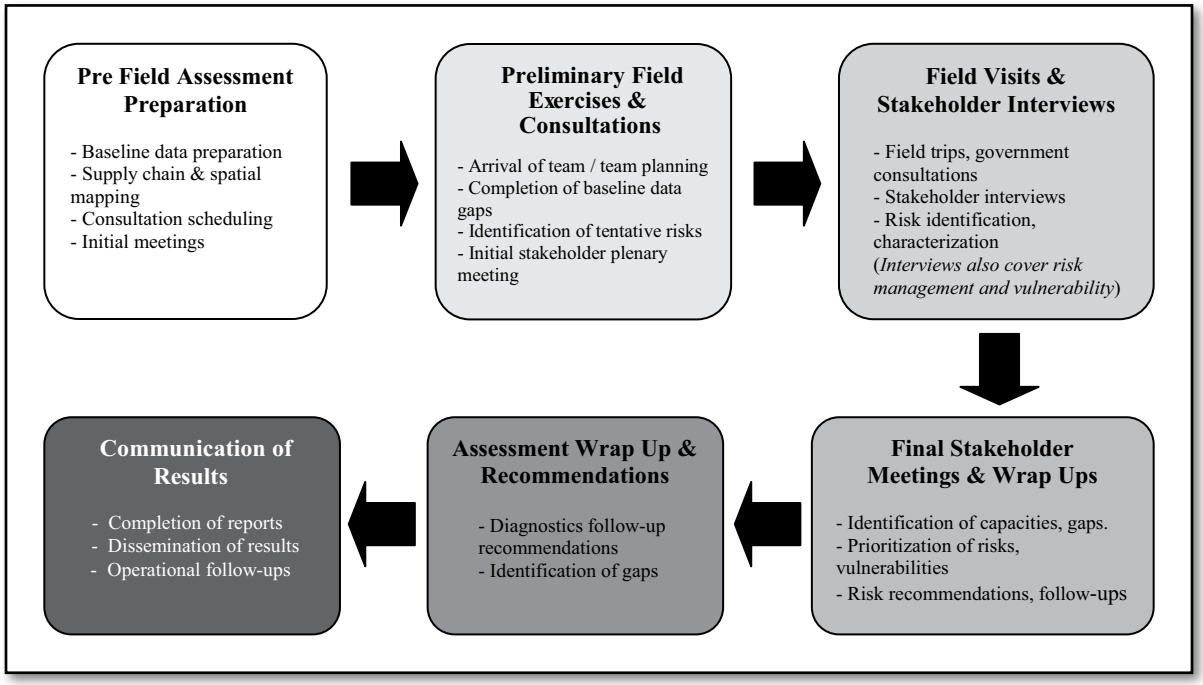
1. Background

At the request of UCDA, the World Bank conducted a coffee supply chain risk assessment in Uganda. This report is the outcome of that assessment and is intended to serve as an advisory note to the Ministry of Agriculture, Animal Industries and Fisheries (MAAIF) and UCDA to enable them to identify a strategy and potential public investments to improve current risk management practices in the coffee supply chain.

This report identifies the major risks facing the coffee supply chain, ranks them in terms of their potential impact and frequency, and offers a framework for improving current risk management practices. The recommendations and findings will provide a basis for follow-up planning by UCDA, the World Bank, and other development partners.

The findings and analysis of this initial assessment are based on a methodology designed by the Agricultural Risk Management Team (ARMT) for assessing risks in agricultural supply chains. The assessment team followed the following sequence of activities (Figure 1) while conducting the assessment.

Figure 1: Overall Sequence of Analysis and Consultative Steps



In-depth interviews were conducted with key coffee supply chain stakeholders in Kampala and throughout the country (i.e., farmers, input suppliers, traders, financial intermediaries, millers, exporters, service providers, government officials, research institutes, and others). A full list of the stakeholders interviewed is provided in Annex III.

This non-lending technical assistance is provided by the World Bank and financed by the European Union All ACP Agricultural Commodities Program for the African region. The World Bank team wishes to acknowledge the invaluable support provided by UCDA as a partner in this activity.

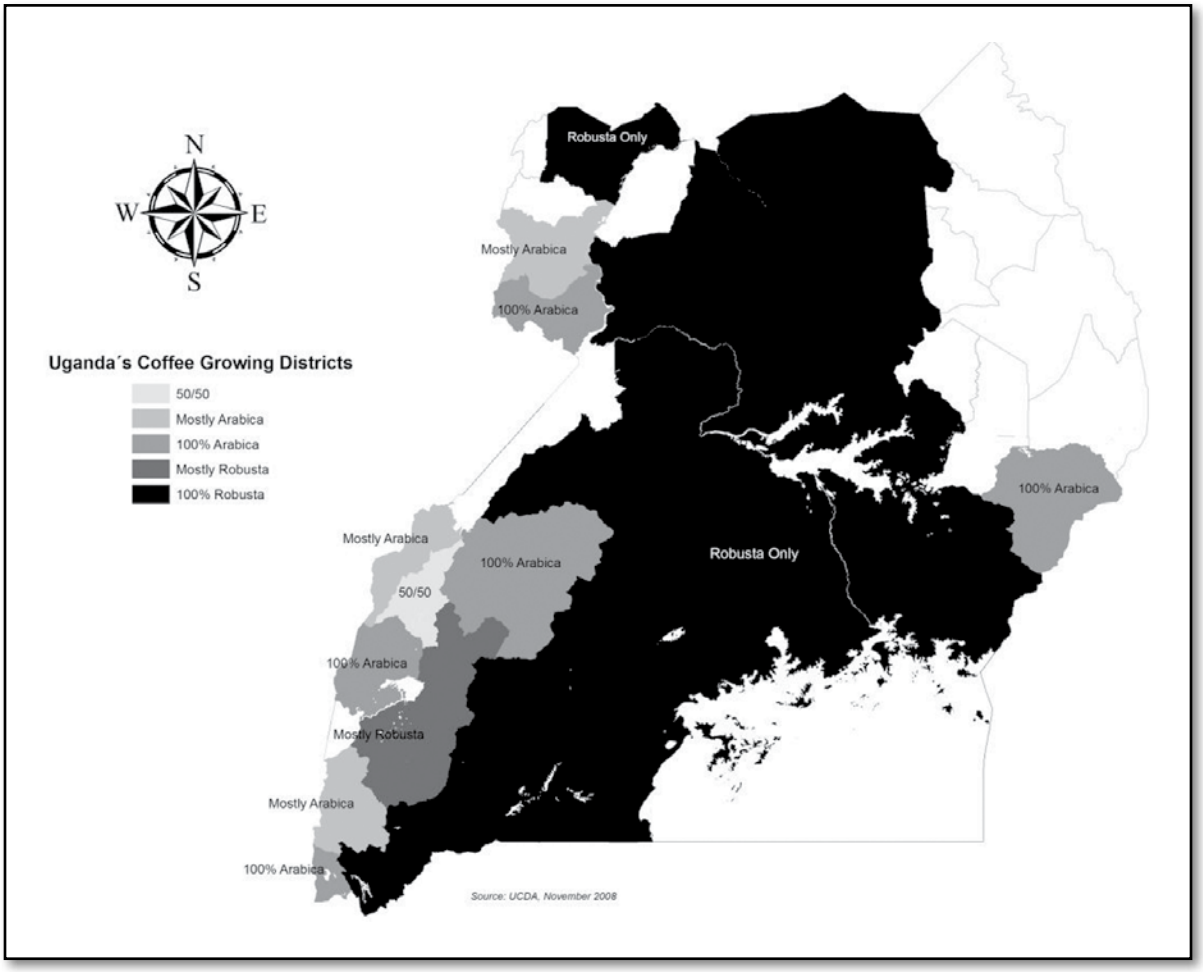
2. Overview of the Coffee Sector in Uganda

Uganda is Africa's largest producer of Robusta coffee and in 2009, coffee generated more export income than all other agricultural export commodities combined. Coffee is a source of income for approximately 1.3 million rural households who have few alternative income earning opportunities. Despite the economic, social, and political significance of coffee to Uganda, very little work has been undertaken to proactively manage risks on an ex-ante basis. This lack of preparedness is evidenced by the scale and impact of the losses caused to the sector when unmanaged risks occur, the most dramatic of these being the advent of CWD, which is estimated to have cost the Ugandan coffee sector U.S. $800 million in lost coffee exports over the past decade. With an improved focus on risk management and preparations put in place in advance of their occurrence, the Ugandan coffee industry could greatly reduce future losses, and the industry would be better protected from the harm of unmanaged risks.

2.1 History of the Coffee Industry in Uganda

Despite past civil strife and economic upheavals, Uganda, with a population of 32 million, remains East Africa's largest coffee producer. Much of the country's surface area (241,000 square kilometres, nearly 25% of which is covered by lakes and rivers) is about 1,000 metres above sea level, so that it is able to produce both Robusta and

Figure 2: Uganda's Coffee-Growing Districts[4]



4 Source: UCDA Annual Report 2007–2008.

Arabica coffee (Figure 2). Robusta coffee is indigenous to Uganda and grown at high altitudes of between 1,000 and 1,300 metres and is known for its mild taste and usefulness for blending purposes. Provided it is correctly harvested and well processed, the coffee is also well suited for use in espresso blends.

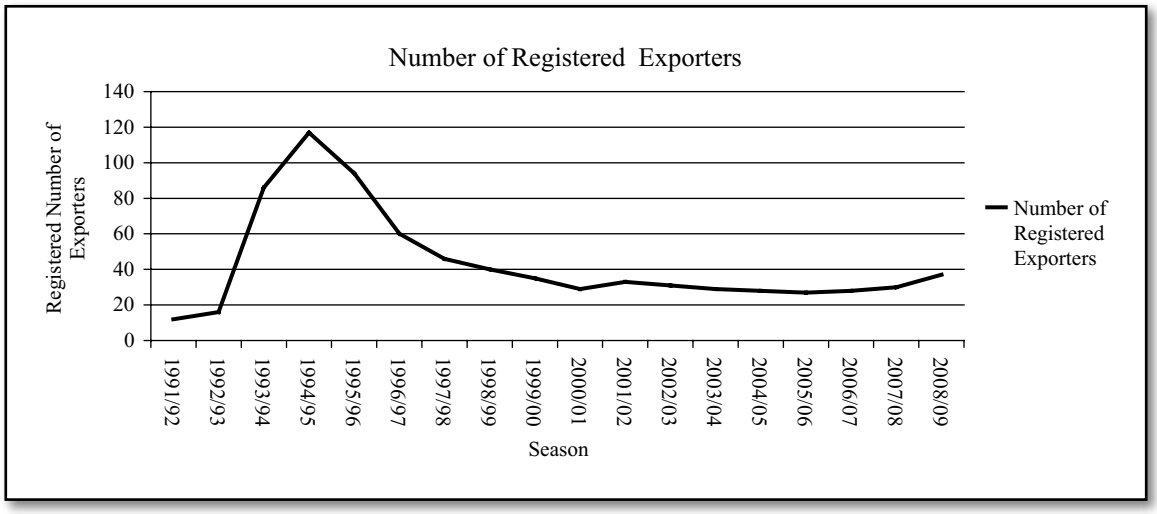
Arabica was introduced from Ethiopia and Malawi. It is grown on the slopes of Mount Elgon on the border with Kenya and on the slopes of the Rwenzori Mountains (also known as the Mountains of the Moon) on the border with the Democratic Republic of Congo.

2.2 Structure of the Industry

Prior to the liberalization of the coffee sector in 1991, the industry was controlled by the government-owned Coffee Marketing Board, which set domestic prices, controlled all coffee marketing, and had a monopoly on coffee exports. During this period, large cooperatives played a significant role in the industry and provided technical advice and extension services to farmers. The industry before 1991 was marked by very low farm gate prices (a very low percentage share of international coffee prices) accompanied by occasional non-payment to farmers for coffee produced.

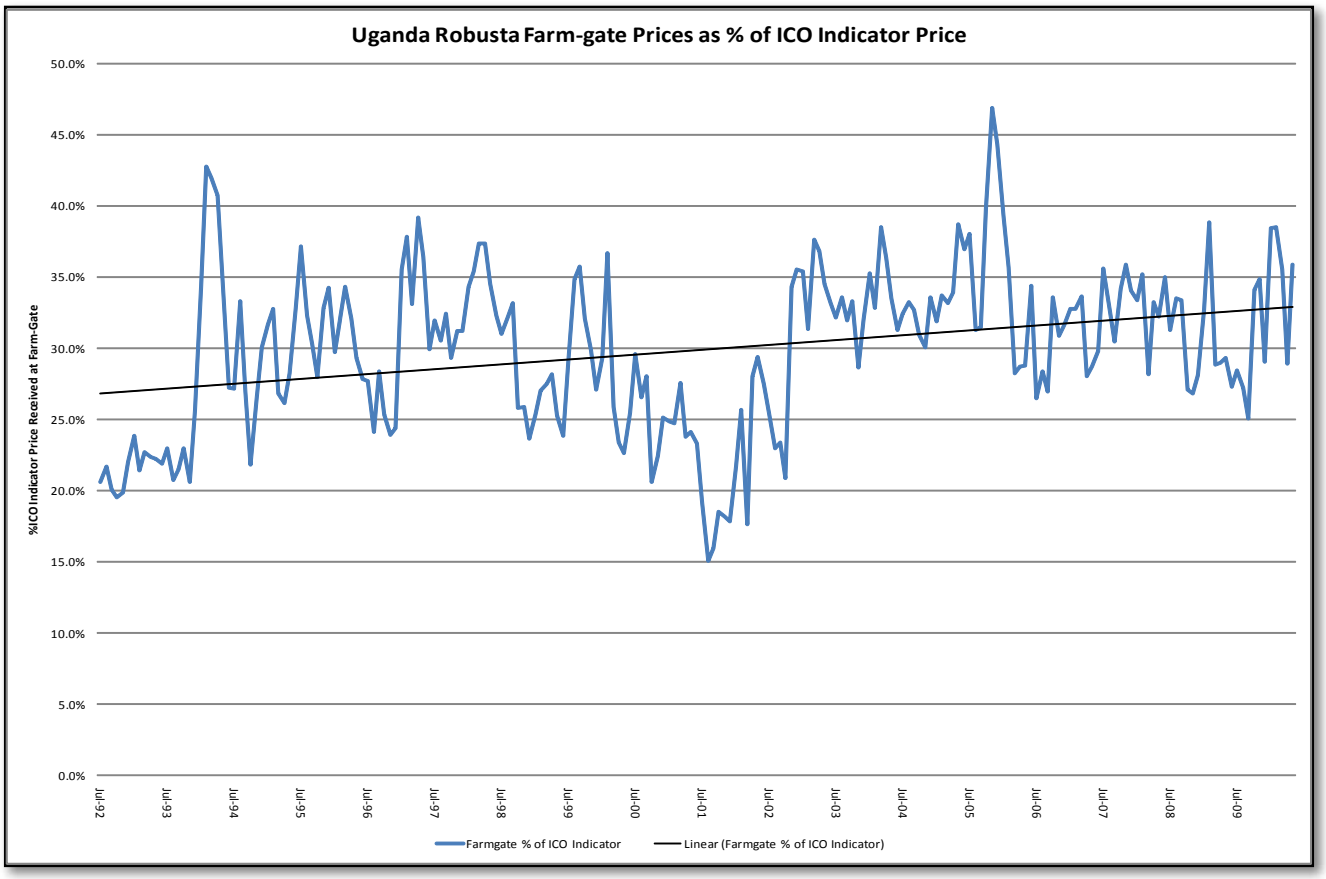
Liberalization radically changed the Ugandan coffee industry, ending government control of the industry and leading to the rapid entry of a large number of private sector enterprises at all parts of the supply chain. The existing cooperatives failed to adapt to an influx of competitors, and over time, the vast majority ran up debts and exited the business. Many of the new private sector exporters failed, with 172 of the 199 of the new entrants between 1991 and 2001 leaving the industry (Figure 3). The past decade has seen industry stabilization, with the largest exporters generally maintaining their market share positions; however, competition appears to have risen in recent years, with the market share of the top five exporters declining from 70% in 2005–2006 to 57% in 2008–2009.

Figure 3: Number of Registered Ugandan Exporters 1991–2009



The farm gate share of international market prices rose dramatically immediately following liberalization (Figure 4), and the continued competitiveness of the industry has helped to maintain this trend. The farm gate share of the International Coffee Organization (ICO) indicator price continued to trend upward between 1992 and 2010 (although there was a significant fall during the coffee crisis).

Figure 4: Farm Gate Share of International Price[5]



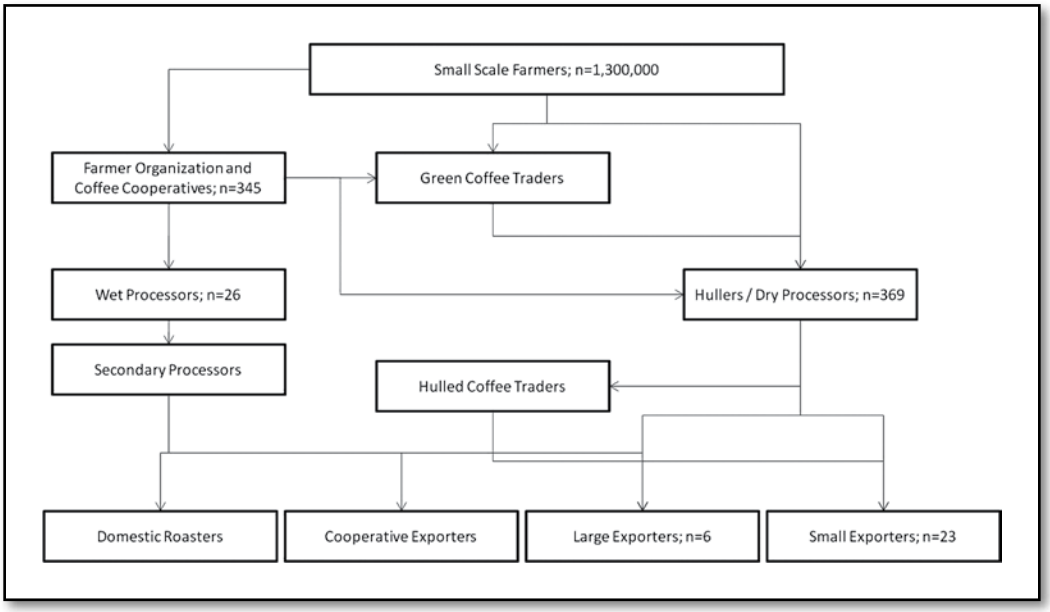
Arabica and Robusta are processed differently; Arabica coffee is mostly pulped and washed, whereas most Robusta coffee is dry-processed. Since liberalization, an estimated 345 farmer organizations remain in existence in Uganda; however, the vast majority of coffee is purchased directly from the farmers by private sector traders. Small-scale traders operate from farm to farm, or from town to town, with larger traders purchasing from these traders and processing the coffee either at private sector mills (for a fee) or at mills they own or rent for the season. The traders sell their coffee to the exporters, who are generally located in Kampala. It is estimated that there are approximately 6,000 "middlemen"/traders, ranging from very small to medium-sized, operating in the supply chain. Currently, most exporters procure their coffee from a variety of private sector traders rather than directly from the farmers. A high-level overview of the supply chain is provided in Figure 5.

2.3 Scale and Importance of the Ugandan Coffee Sector

Commercial coffee production in Uganda dates back to the early 1920s. Exports for the 2008–2009 coffee season (September–October) were just over 3 million bags, or 180,000 tons. The total area planted under coffee is approximately 230,000 hectares as estimated by UCDA in 2009, with coffee providing an estimated 500,000 households with their main source of income.[6] While the economy as a whole has expanded and improved in recent years, coffee remains of vital importance in terms of employment, income generation, and exports.

5 ICO and UCDA data.
6 Baffes J. Restructuring Uganda's Coffee Industry: Why Going Back to the Basics Matters. 2006.

Figure 5: Ugandan Coffee Supply Chain[7]



Despite the inevitable upheavals wrought by the liberalization process, exports reached their highest-ever levels of just over 4 million bags (240,000 tons) during the years 1995–1997 as the consequence of a combination of higher international prices and a much greater farm gate share of export prices.[8] Since then, however, volumes have fallen, primarily because of both the occurrence of CWD (first identified in 1993) and the 2000–2005 coffee crisis, when international coffee prices reached all-time lows. During the past decade, Uganda's annual coffee exports have averaged just below 2.8 million bags, with a high of 3.2 million and a low of 2 million bags.

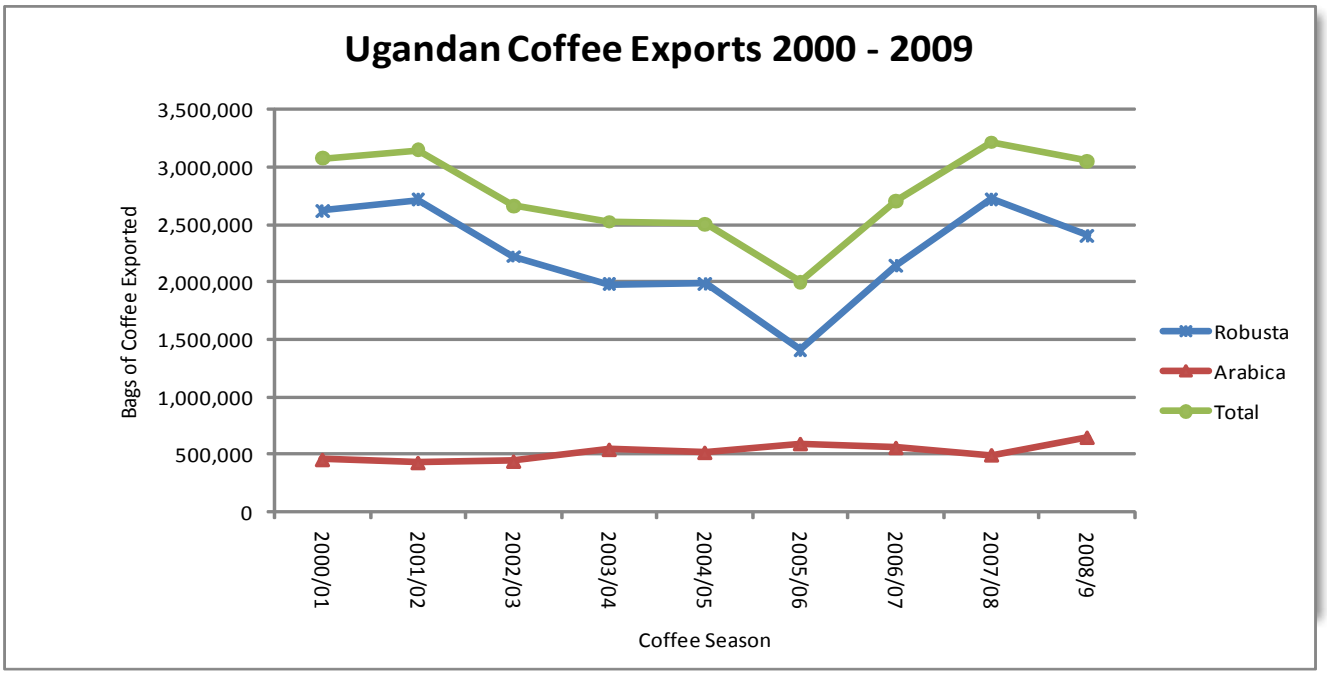
As Table 1 and Figure 6 detail, annual export volumes (a good proxy for annual production) often fluctuate significantly between seasons. Over the past decade, the Arabica subsector has shown good signs of growth, with steadily increasing volumes of production, whereas the Robusta subsector has stagnated somewhat, with gradually declining volumes.

Table 1: Coffee Exports 2000–2010 (60 kg bags by Coffee Year/Season)[9]

Season	2000–2001	2001–2002	2002–2003	2003–2004	2004–2005	2005–2006	2006–2007	2007–2008	2008–2009
Total	3,074,773	3,146,381	2,663,888	2,523,042	2,504,890	2,002,324	2,704,236	3,210,603	3,053,688
Robusta	2,617,777	2,715,955	2,221,440	1,979,353	1,986,890	1,408,314	2,144,482	2,713,498	2,405,857
Arabica	456,996	430,426	442,448	543,689	518,000	594,010	559,754	497,105	647,831

7 Source: Adapted from R. Nsibirwa. Uganda Coffee Supply Value Chain Analysis. May 2010.
8 M. Bussolo, O. Godart, J. Lay, R. Thiele. The impact of coffee price changes on rural households in Uganda. *Agricultural Economics* 2007;37(2–3):293–303, 309.
9 Source: UCDA

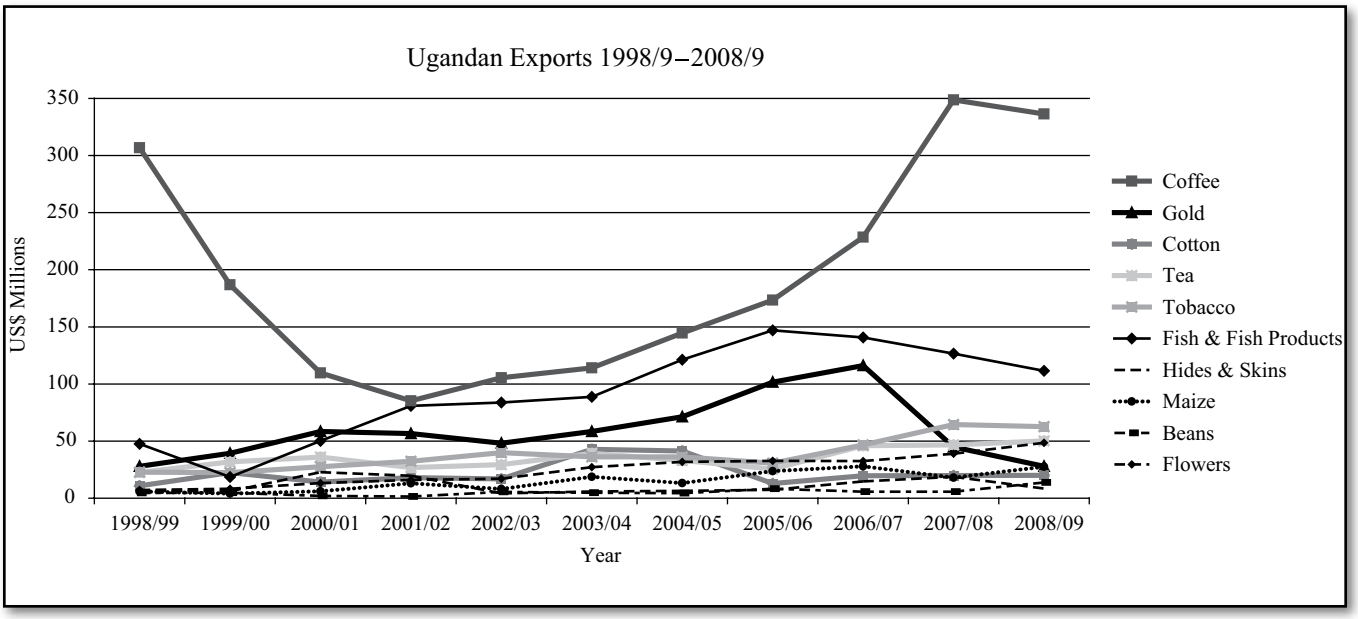
Figure 6: Coffee exports 2000–2009[10]



2.4 Importance of Coffee to Uganda—Exports

Coffee is Uganda's principal export, accounting for over 20% (on average) of the country's total export earnings and often accounting for over half of total agricultural exports. The total value of coffee exports for 2007–2008 was $348 million, an increase of $175 million from 2005–2006 (Figure 7). Coffee export earnings vary annually depending upon production volumes and international coffee prices.

Figure 7: Ugandan Exports 1998/1999–2008/2009[11]



10 Source: UCDA
11 Bank of Uganda Annual Report 2008–2009.

Despite the significant growth in exports of other commodities over the past decade, Uganda is still heavily reliant on coffee export earnings.

2.5 Importance of Coffee to Uganda—Employment and Rural Incomes

Coffee is Uganda's most important cash crop, in both economic and cultural terms. The 2005–2006 Uganda National Household Survey estimated that some 1.3 million households farm coffee, with about half having more than 50 coffee trees. Coffee is grown primarily by smallholders, with an average farm size of 0.5 hectares.[12] Coffee is traditionally intercropped with staple food crops: bananas, beans, ground nuts, and shade trees. With 8 million to 9 million tons produced annually, Uganda is the world's largest producer of plantains, which are Uganda's staple food product, known as matoke. Intercropping of coffee with food crops enables households both to meet their basic food requirements and generate cash income from their coffee. However, to be truly successful, intercropping requires good extension services, as poorly managed intercropping can cause coffee yields to decline.

Rural poverty levels in Uganda, at almost 35%, are high,[13] and it is a common assumption that low coffee yields, combined with small farm sizes, are a significant factor in the high rural poverty levels. Uganda's coffee yields are as low as 550 kg per hectare, compared with up to 2.5 tons per hectare in Vietnam,[14] another large-scale Robusta-producing country. Low yields obviously reduce the potential income for coffee-producing households. Additionally, because Uganda is a landlocked country, export costs are relatively high, which also impacts the farm gate price received, although export costs are partially kept in check by the large numbers of trucks requiring return cargo following delivery of imports to Uganda and surrounding countries.

Rural poverty, combined with a lack of regular income and a severe shortage of rural credit, causes some growers to sell their coffee harvest prematurely at far below its potential value when they require funds prior to harvest (e.g., to pay school fees). As shown in Annex I, the quality of Robusta coffee generally appears to be declining, further eroding farmers' incomes.[15] Conversely, the Arabica subsector appears to be progressing relatively well.

Uganda's economy may undergo considerable change as a result of the future exploitation of substantial oil finds in the Lake Albert region.[16] If this were to result in a notable appreciation of the Ugandan shilling against the U.S. dollar (in which coffee is traded), then many growers might abandon the crop altogether, even though for most, there are few alternative cash crop options, given the long distances to market and the lack of adequate support structures.

3. Major Risks to Ugandan Coffee Supply Chain and the Capacity to Manage Those Risks

Coffee production and export in Uganda have seen an overall decline over the past 10 years and a general weakening of the sector. This decline relates to the majority Robusta subsector, for which 2009–2010 exports are expected to be around only 2 million bags.[17] Arabica exports, on the other hand, are currently showing encouraging signs of growth. Further decline of the sector may occur should the risks detailed in this section fail to be adequately addressed. Although the Arabica subsector is currently performing well, many of the risks detailed in this section relate to both the Arabica and Robusta subsectors.

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12 UCDA Web site.
13 World Bank 2006 Rural Poverty Rate. World Development Indicators (WDI) and Global Development Finance (GDF) 2010.
14 Food and Agriculture Organization (FAO).
15 It is not clear whether informal cross-border imports from neighbouring countries contribute to the general decline in quality.
16 Source: Bloomberg. Tullow may spend more than forecast 990 million pounds. September 29, 2010. http://tinyurl.com/2vxyb9b.
17 Source: Reuters. Uganda Robusta coffee exports fall over October–July. August 23, 2010.

The major risk elements (Table 2) are grouped into three main categories: production, market, and enabling environment. Because of the scarcity of data regarding coffee production, acreage, weather phenomena, and other factors at the national, regional, and local levels, exact quantification of these risks and their associated potential losses is problematic. As such, most of this exercise has been of a qualitative rather than a quantitative nature.

Table 2: Major Risks in the Coffee Supply Chain in Uganda

Identified Risks
Production risks
Pest and disease outbreaks (coffee wilt, coffee borer, leaf rust, others)
Climate/weather (irregular rains, drought, and excess sunshine)
Market risks
Price
Foreign exchange risk
Loss of global market share
Enabling environment risks
Transport-related risks
Theft, fraud, and adulteration

It is also necessary to contrast identified risks in terms of their potential to cause losses to the industry, as well as in terms of the frequency of such events. The combination of both variables (intensity and frequency) is captured in Table 3.

Table 3: Summary of Risks: Severity versus Probability

		Potential Severity of Impact				
		Negligible	Moderate	Considerable	Critical	Catastrophic
Probability of Event	Highly probable				Pest & Disease Outbreaks	
	Probable			Climate/Weather	Foreign Exchange Risk	
	Occasional		Theft, Fraud and Adulteration		Price Loss of Global Market Share	
	Remote		Transport Related Risks			
	Improbable					

The risks located in the darkest shaded boxes (upper right corner) are those that require the most urgent attention because they can cause the greatest losses and are more likely to occur than other risks. Risks of the second level of importance appear in the lighter shaded boxes, and risks that have a low financial impact when they arise and/or occur very infrequently appear in the unshaded boxes.

3.1 Production Risks

3.1.1 *Pest and Disease Outbreaks*

Potential Severity of Impact: Critical
Probability of Event: Highly Probable

A number of pests and diseases are dramatically affecting the sector, the most prominent of which is CWD, which alone has caused the destruction of over 50% of Robusta trees in the country since 1993.[18] Currently, CWD is no longer seen as a major threat, as it is now viewed as controlled, and regular replanting with clonal varieties has rejuvenated the tree park and maintained production volumes. However, there remains the risk that the disease will begin to spread again because CWD-tolerant varieties are not yet available for large-scale release.[19]

Stakeholders, including the Coffee Research Centre (COREC), argue that changes in weather patterns (drought, unpredictable and varied rains, temperature changes) are causing alterations in the appearance and severity of newer pests (e.g., black twig borer[20]), while existing diseases are migrating to ecological zones where they previously did not exist (e.g., coffee leaf rust, traditionally limited to higher elevations, is now appearing at all elevations, whereas stem and bean borers are moving up to higher altitudes). Although credible data on the levels and spread of these diseases and pests is not available, the potential risk should be noted. Similar observations have been made in other coffee-producing regions, including Latin America (see http://dev.ico.org/documents/icc-103-6-r1e-climate-change.pdf).

The limited resources of the Ugandan coffee sector affecting research and extension (e.g., the inability to identify and monitor infestations in a timely manner, insufficient research capacity to evaluate and respond to problems, insufficient extension services to promote good agricultural control practices, and limited access to inputs) suggest that the sector is presently not sufficiently prepared to address pest and disease risks in an effective manner that would adequately mitigate potential losses. CWD alone has reportedly already caused reductions in Ugandan coffee exports in excess of U.S. $800 million. The possibility of renewed outbreaks of CWD and the unchecked spread of other pests and diseases could potentially devastate the entire coffee sector, causing greater losses than those from CWD to date or even causing farmers to abandon coffee production en masse, with the subsequent loss of Uganda's share of the global market. An already high prevalence of disease and pest outbreaks, together with the historic failure of the sector to adequately manage such outbreaks in a timely manner, suggests that future losses from pests and disease are highly probable and likely to generate high industry losses.

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18 Phiri N., Baker P., CABI. Coffee Wilt Disease Final Report 2009.
19 CWD has reached epidemic proportions in Africa twice in the 20th century (1930s and 1940s). It was thought to have been reduced to a minor problem through sanitation methods (uprooting and burning) and breeding (similar to Uganda's current control methods), but CWD then re-emerged in Robusta in the 1970s in Central Africa, becoming an epidemic again in the 1980s and 1990s (CABI, 2009).
20 CREC scientists have stated that if unchecked, the twig borer could become endemic and result in a production decline of 30% or more.

3.1.2 *Climate/Weather*

Potential Severity of Impact: Considerable
Probability of Event: Probable

Most stakeholders suggest that weather patterns are becoming increasingly volatile and unpredictable, with episodes of drought and erratic rainfall perceived to be occurring with increasing frequency. The meteorological department of Uganda recorded an increase in the frequency of drought, identifying seven notable droughts between 1991 and 2000—almost four times the number logged between 1981 and 1990 and more than double the number of the previous decade, with the highest number of drought events (1971–1980).[21] However, the rise in the frequency of drought in Uganda does not appear to be reflected in national coffee export volumes, and although it is likely that weather is playing a part in impacting production, the exact correlation is not clear.

Shorter rainfall periods damage coffee production by preventing coffee trees from reaching full floration, impacting both quality and volume. Coffee production is highly dependent on specific rainfall distribution patterns (which vary by agro-ecological zone and coffee variety). Rainfall distribution directly controls effective floration and cherry maturation, which in turn determine bean size (i.e., coffee quality). Rainfall distribution also determines the prevalence of diseases (in particular fungal diseases) and the susceptibility of coffee trees to diseases and pests. Quality control measures (e.g., producers' ability to properly dry coffee) also become more problematic as rainfall variability increases. Erratic and shifting weather patterns pose a serious risk to the sector, with the potential for severe adverse financial impact, as also observed in other coffee-producing countries and projected by ICO. However, it must be noted that robust time-series weather data for Uganda is not available, making it impossible to validate anecdotal data regarding shifting weather patterns in coffee-producing areas.

3.2 Market Risks

3.2.1 *Price Risk*

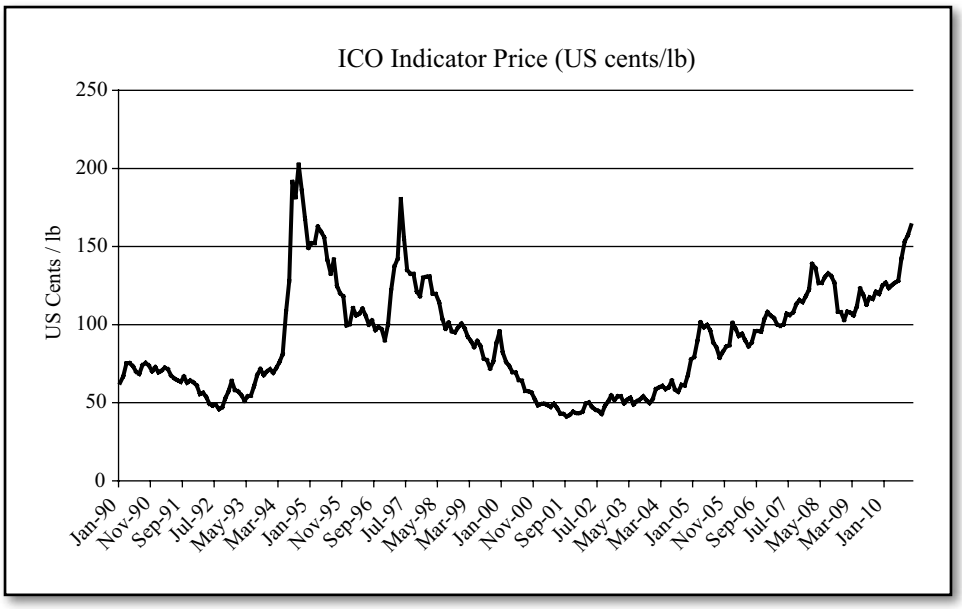
Frequency: Occasional
Impact: Critical

There is a risk of international coffee prices falling to low levels and remaining at such low levels for a significant period of time. In early 2000, the ICO Robusta Indicator fell below 50 cts/lb and did not regain that level until late 2005. In 2001–2002, the average price FOT for Uganda Robusta was just below 18 cts/lb. It currently stands at over 60 cts/lb. The ICO Other Milds Arabica Indicator fell equally sharply, from 111 cts/lb in early 2000 to 56.40 cts/lb, also in October 2001 (Figure 8).

The risk is that other than improving productivity and raising yields, there is no practicable protection against this kind of price fall. Recurrence of such an event in the foreseeable future cannot be foretold but is considered relatively unlikely. However, should the event recur, then, depending on the duration, the potential impact would be critical, if not catastrophic. Export revenues would plummet, as would farm gate prices, and many, if not most, farmers would lose interest in coffee, thereby severely threatening Uganda's position as a recognized Robusta producing country.

21 Oxfam. Climate Change and Poverty Impacts in Uganda 2008.

Figure 8: ICO Indicator price 1990–2010



Source: ICO

In addition to a period of prolonged low prices, Ugandan coffee stakeholders face an ongoing risk from coffee prices fluctuating on a daily basis and modern communications ensuring that price information is easily available to all. Ugandan farm gate prices are more or less directly linked to what takes place on the international coffee markets, admittedly with price falls perhaps being transmitted more enthusiastically than price rises. As such, Ugandan domestic and export prices are prone to the same intraday and intraseasonal price volatility as coffee traders in other parts of the world. The risk facing Ugandan coffee market intermediaries is that they may generate losses due to such price volatility, specifically when they are not able to manage price risk via either financial instruments or physical contracts.

Generally, only the larger exporters, often those with overseas parent companies with access to derivative markets, have adequate risk management strategies in place. Therefore, the risk of losses remains primarily with the small and medium-sized coffee-trading enterprises, many of which will at various times find themselves either short or long[22] (although in Uganda the medium-sized traders have tended to adopt back-to-back trading strategies to minimize their exposure, even if this reduces their opportunities for maximizing profits). The potential impact of this unmanaged risk is that some operators may leave the trade altogether if they generate price risk losses, or they may no longer be willing to accept the levels of risk that they are exposed to, thereby lessening competition and eroding farm gate prices.

3.2.2 *Loss of Global Market Share*

Potential Severity of Impact: Critical
Probability of Event: Occasional

Robusta exports during the five years from 2005 to 2010 averaged around 2.1 million bags, with a high of 2.7 million (2007–2008) and a low of 1.4 million (2005–2006), the lowest in the last 20 years. This compares

22 Long–buying coffee ahead of a potential sale. Short–selling coffee ahead of a potential purchase.

with average exports of 2.3 million bags over the previous five years (2000–2004) and 3.2 million bags in the five years prior to that (1995–2000). Not only have Robusta exports been declining, but annual availability has been increasingly difficult to forecast. Declining Ugandan exports and increasingly uncertain export forecasts need to be seen against steadily increasing exports by Vietnam of 11 million bags in 2000, which rose steadily to 17 million bags in 2009.

Historically, Uganda has been perceived by major coffee roasters as a reliable source of large volumes of Robusta coffee. This perception resulted in Ugandan Robusta being used by major roasters as a component of their core blends. However, as Uganda's production volumes declined, and as uncertainty regarding annual production has grown, this position has eroded, with some roasters no longer relying on Ugandan Robusta as a core blend component. Although Robusta coffees are more exchangeable than Arabica coffees, roasters still desire stability and prefer to source core blend components from reliable and consistent suppliers. Given the already problematic situation with Ugandan Robusta production, there is a risk that any further marked reductions in Robusta production will further erode Uganda's stature as a major (and reliable) Robusta-exporting country and further reduce the premium that is placed on sourcing significant volumes from Uganda. A number of underlying causal risks create the risk of declining global market share; these include quality issues, producer diversification, and reputational issues.

Data in Annex I of this document demonstrates that the composition of the Robusta harvest has been deteriorating over time, with a greater proportion of smaller beans and undergrades being produced today than was the case in 2000–2005. The cost of this declining quality runs into the millions of dollars annually. In addition to declining quality based on bean size, there also appears to be a decline in the wider perception of quality (i.e., the perception of quality to buyers, which is unrelated to bean size and grade). This wider quality decline is demonstrated by deteriorating differentials vis-à-vis the ICO Robusta Indicator for screen 15 coffee, which constitutes the bulk of Uganda's Robusta exports. The cost of this is more difficult to estimate than the cost from smaller beans but is clearly substantial.

Declining quality, if unchecked, in the end will cause certain buyers to cease purchasing Uganda Robusta, thereby lessening competition, which would in all probability impact negatively on export prices and hence on farm gate prices. The severity of declining prices will depend on how far this quality decline is allowed to continue. In this respect, the reported informal cross-border importation of not just export-quality coffee but also of undergrades (rejects), subsequently exported as Ugandan coffee, is of major concern. The informal trade not only distorts the statistical picture but also brings the risk that ochratoxin A (OTA)–contaminated rejects, as well as pests, will be brought into the country.[23]

However, the seemingly growing incidence of wet coffee being permitted access to the Ugandan coffee supply chain is of major concern, even though much wet coffee is mechanically dried to export standards. Moist coffee, or drying coffee on bare soil, can lead to the formation of mould that in turn may contain OTA. Mould is difficult to sample for as only in very extreme cases is it spread throughout a parcel of green coffee. To date, major importing countries have only set maximum permitted levels for roasted/soluble coffee but this does not necessarily mean that spot checks may not be carried out on green coffee arrivals. A potentially significant risk is that should a shipment of Ugandan coffee be found to contain OTA, not only will the country be placed on a watch list but the information will be shared among food-regulating agencies internationally, impacting Ugandan coffee imports in all of its key export markets. The impact of this on Ugandan coffee exports as a whole would in all probability be extremely severe.

23 The extent and therefore impact of this is unknown.

In addition, it is generally acknowledged that large numbers of fake agricultural inputs circulate in Uganda. To date, the impact on coffee appears to have been limited, with farmers mostly identifying the main problems as relating to diluted weed killers and fake (non-active) fertilizers. The most significant risk is that fake inputs may contain prohibited substances. It is possible that the use of pesticides and fungicides will increase in future to help mitigate some of the effects of climate change. Should any importing country detect residues of prohibited chemicals in Ugandan green coffee, then the impact would be nothing short of catastrophic, possibly with imports prohibited entirely until the problem was rectified. An additional risk, but of lesser impact, is that of farmers being discouraged from accepting technical advice regarding the use of pesticides and fertilizers, having seen limited results due to poor-quality/fake inputs.

A final underlying potential cause of lost global market share is the risk of increasing numbers of producers shifting from coffee to alternative agricultural commodities, thereby reducing the national production of coffee. Examples of producer diversification in Uganda include coffee producers uprooting their trees in favour of sugar, cotton, and palm oil production. Although diversification can benefit producers, it may also present a risk to them when misleading or incorrect market information influences farmers to migrate to alternative crop production. In Uganda, the case of vanilla, in which a rapid increase in supply caused the export price to crash, serves as an interesting example. Vanilla bean prices peaked in 2003 in response to production disruptions in Madagascar, causing many coffee farmers to invest in the (laborious) process of vanilla production (with production increasing from 303 to 845 tons between 2000 and 2004).[24] In 2009, prices collapsed by almost 90% as Madagascar's industry recovered and Costa Rica, India, Papua New Guinea, and Colombia significantly increased their production.[25] In addition to the risk of reducing coffee production because of diversification, an additional risk is environmental, as coffee is a permanent crop that helps soil protection, supports a balanced ecosystem, and, given the low use of synthetic chemicals in countries like Uganda, causes limited environmental contamination. If producers find other crops to be more profitable or better supported, their shift from coffee could significantly increase environmental contamination and have a critical impact on the economic, environmental, and social benefits currently generated by the sector.

3.2.3 *Foreign Exchange Risk*

Potential Severity of Impact: Critical
Probability of Event: Probable

Ugandan coffee exporters sell in US dollars and purchase coffee in Ugandan shillings; as such they face the risk of currency movements impacting their business. Uganda is likely to soon commence oil production and exporting, and this is likely to result in the appreciation of the Ugandan shilling. Currency appreciation will directly impact farmers' incomes as they will receive fewer shillings for their coffee.[24] Reduced farm gate prices due to currency appreciation have the potential to have a substantial adverse impact on the sector, as lower farm gate prices may encourage coffee producers to migrate to production of other agricultural commodities, reducing the total volume of coffee produced by Uganda and worsening the ongoing decline in Ugandan coffee production.

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24 The phenomenon of natural resource exploitation causing currency appreciation and actually reducing local incomes is known as the Dutch disease, or paradox of plenty. See "Dutch Disease: Too Much Wealth Managed Unwisely." *International Monetary Fund Finance and Development Journal* 2003;40(1).).

Currency appreciation will impact all parts of the Ugandan supply chain; however, the greatest impact will be felt at the farm level, where falls in the price paid for coffee will be highly damaging. Mitigating actions are somewhat limited, with only substantial production increases (raising coffee yields) able to offset income reductions (i.e., the increased income from higher yields effectively offsetting the appreciation of the shilling).

3.3 Enabling Environment Risk

3.3.1 *Theft, Fraud, and Adulteration*

Potential Severity of Impact: Moderate
Probability of Event: Occasional

Theft and fraud are present at all levels of the sector and are impacting all actors. Stakeholders list numerous incidences, including the following: theft of coffee cherries from the trees; coffee theft during transport; inaccurate weighing; addition of foreign objects to increase the weight of coffee bags; blending of lower-quality grades (adulteration); and bribes demanded at border crossings. Although the occurrence of these incidences is only occasional, they are raising transaction costs (by forcing actors to employ mitigating actions) and adversely impacting the earnings of all supply chain actors. Additionally, this situation creates an unstable environment that prevents the sector from functioning smoothly, which in turn affects the supply chain's ability to optimally manage the production and delivery of coffee. The risk here is that fear of and/or actual occurrences of theft, fraud, and adulteration will rise substantially, leading to raised costs of mitigation, reducing the profitability of stakeholders, reducing the incomes of supply chain participants, encouraging actors to leave the market, and in extreme cases damaging Uganda's reputation with importers.

3.3.2 *Transport-Related Risk*

Potential Severity of Impact: Moderate
Probability of Event: Remote

As a landlocked country, Uganda's coffee export trade is almost completely dependent on road transport to Mombasa Port in Kenya. Rail traffic does exist but is reported to be uncompetitive and impractical, with most coffee exporters lacking direct access to railway sidings. Multiple risks related to coffee transportation exist, including the following: security problems during transit to ports; long delays at border crossings; inefficiencies and delays at Mombasa Port (although important recent improvements were cited); increasing fuel costs (which reduce FOT prices); theft and corruption; and new regulations limiting axle weight, reducing truck availability and raising costs.

Major logistic risks relate primarily to Uganda's reliance on having in practice just one practical export channel, namely Mombasa Port. When post-election violence occurred in Kenya in 2008, transport to Mombasa from Uganda was almost completely paralyzed, at a highly significant cost to the industry both financially and reputationally with buyers (only a few larger operations were able to continue transporting, but at a significant financial cost in terms of increased security and monitoring systems). Transportation problems also raise concerns from international buyers regarding the dependability of Ugandan coffee exports.

The risk that these logistical occurrences will completely paralyze the sector for long periods of time are remote, yet the risk that they will suddenly increase because of a number of regional, social, and economic factors (e.g., political unrest, labour disturbances, etc) are real and could have a moderate impact on the sector.

4. Vulnerability to Risks

Based on the risk assessment and capacity to manage risks described in the previous sections, this section offers an additional step to classify the risks according to different levels of vulnerability. For the purpose of this exercise, we can define vulnerability as a function of the expected losses from an adverse event and the capacity to respond to this risk. This last step in the analysis of risks not only allows a more comprehensive assessment of the level of risk, but also helps *to identify priorities to improve current risk management approaches*. At this stage, the analysis seeks to pinpoint clear gaps in the prevailing approach(es) to risk management and/or circumstances in which prevailing practices are unlikely to be sufficient, given the potential severity of loss.

Even though at this stage the analysis is more qualitative than quantitative, the results shown here are useful for contrasting these findings with current risk management practices by stakeholders in the supply chain. Based on the information that was collected during the mission and other background information, the effectiveness and current capacity for managing pertinent risks has been reviewed and rated on a scale from 1 to 5 (Table 4).

Table 4: Vulnerability to Risky Events Based on Expected Loss Plus Capacity to Manage Risk

	(-) ----------Capacity to Manage Risk ---------- (+)				
Expected Losses	1	2	3	4	5
High	Loss of global market share	Price risk Foreign exchange risk	Pest and disease outbreak		
Medium		Climate/weather			
Low			Theft, fraud, and adulteration	Transport-related risks	

The resulting matrix classifies levels of vulnerability to the identified risks into three groups ranging from the highest in the boxes with the darkest shade (tier 1) in the upper left corner to the lowest in the unshaded boxes in the right bottom corner (tier 5). In between are three additional intermediate levels of vulnerability, indicated in a lighter shade. The importance of this matrix is that through a process of prioritization, it is possible to identify those risks in tier 1 and tier 2 that are mainly responsible for causing volatility of earnings for the various stakeholders. Managing these risks will, to a large extent, reduce the vulnerability of the coffee industry.

5. Priority Measures for Risk Management

Although it is beyond the scope of this risk assessment exercise to come up with a comprehensive framework with detailed measures on how to manage the identified risks, *how this next step can be approached* is shown in Table 5.

Table 5: Measures for a Risk Management Framework

Identified Risk	Current Mitigation	Potential Mitigation(s)
Loss of global market share (production)	• Development of tissue culture • Limited replanting • National coffee production campaign	• Monitor success rates of coffee tree replanting and adapt replanting program accordingly • Ensure optimal exploitation of tissue culture potential • Promotion of mass coffee tree replanting • Increase and improve on-farm extension delivery and improve associated research to significantly increase yields • Support rehabilitation of old coffee trees • Improve access to appropriate inputs and provide technical advice on application (control fake inputs) • Enhance coordination and cooperation among coffee stakeholders (development partners, NGOs)
Pests and diseases	• Limited research and extension capacity • Some partnerships with external experts (e.g., CABI, CIRAD) • Limited coordination between research and extension • Some communication to farmers (e.g., radio, press)	• Establish early warning system and sanitation response plan • Strengthen the structure, staffing, and funding of research and extension • Promote information exchange • Expand access to international expertise (e.g., CABI, CIRAD, ASIC, TACRI, CRF, CATIE, and others) • Expand information dissemination (e.g., regular radio programs)
Climate and weather	Limited GAPs and agro-forestry practices	• Promote sustainable farming practices based on recommended mitigation and adaptation measures • Promote monitoring, adaptive research, and information exchange (investigate the possibility of irrigation) • Investigate appropriateness and feasibility of crop insurance; introduce crop insurance where appropriate
Price risk (revenue risk) prolonged global period of low prices)	National coffee production campaign (focused on increasing yields)	• Improve coffee yields • Reduce costs/improve efficiency • Strengthen and promote sustainable coffee production and trade (e.g., increase certified coffee exports) • Create long-term commercial relationships
Exchange rate risk (significant appreciation)	Current monetary policy interventions	• Develop appropriate response mechanisms based on effective agro-sector monitoring systems • Improve coffee yields and productivity
Loss of global market share (quality)	• UCDA export quality control • Training of quality controllers • International promotion of Uganda's coffee via participation in trade fairs	• Institute and enforce proactive quality management and promote quality awareness along the entire value chain • Extend regulatory regime as appropriate (e.g., wet coffee, informal cross-border trade, fake inputs)

Table 5 lists an illustrative, not an exhaustive, set of potential activities that could be undertaken for managing the major risks facing the Ugandan coffee supply chain. In-depth evaluation of the individual solutions was beyond the scope of this exercise; however, an exhaustive listing of activities and an assessment of the costs and benefits of the different options to manage these risks need to be undertaken by UCDA, MAAIF, and other private and public stakeholders in the sector.

6. Final Remarks

The Ugandan coffee supply chain has proved to be highly resilient to shocks despite a very limited utilization of ex-ante risk management strategies. Despite price shocks, extreme occurrences of pests and diseases, civil unrest, the coffee crisis, liberalization, and major weather events, Uganda has continued to occupy a position as a major global Robusta coffee producer. However, the historical resilience of the sector should not be considered a justification for future inaction. Had effective ex-ante risk management been in place for previous shocks, the industry today would be in a much healthier state, both domestically and internationally, than it currently is. Furthermore, the significant losses to the sector that arose because of these unmanaged shocks would have been greatly reduced.

The historical robustness of the supply chain is due to the almost complete lack of inputs and the lack of intensive farm management among the smallholder coffee farmers. Also, the indigenous Robusta trees continue to thrive even when neglected. This low-input, low-effort model, aligned with very limited alternative income-earning opportunities for farmers, has enabled coffee production to continue even when farmers have paid little or no attention to their trees. However this model has a significant cost as it fails to maximize farmer incomes and leaves farmers generating far lower incomes than they would with improved management practices and better yields.

Although it is tempting to focus primarily on declining quality as the major risk facing the sector, the reality is that other risks, if they occur, will result in major reductions in production, threatening Uganda's global market position. Chief among these risks are (uncontrolled) pest and disease, which Uganda is currently failing to adequately manage. In addition, a continued failure to raise coffee yields risks smallholder farmers migrating to other economic activities, further reducing Ugandan coffee production. Failure to manage the risks that threaten large-scale Ugandan coffee production threatens the long-term health and viability of the sector.

Despite the significance of the coffee sector to the Ugandan economy, very little investment has been made with regard to mitigation of coffee sector risks. More effective risk management and mitigation, although incurring up-front costs, will potentially reap much greater rewards by reducing future losses and protecting the longevity of the sector. Such risk management will occur only with coordinated government and private sector action, and this ultimately requires a realistic, achievable, and clear national coffee sector plan that all key stakeholders can buy into.

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Annex I. Coffee Quality

Is the Quality of Uganda Robusta Generally Declining?

Quality is a combination of screen or bean size and taste or cup quality, with larger bean sizes realizing better prices, as shown in Table 6.[25]

Composition of the Crop by Bean Size/Grade

Table 6: Robusta Exports by Grade as a Percentage of Total Exports

Grade	1988–1992	1996–1997	1997–1998	2000–2001	2001–2005	2005–2009	2009–2010*	2009–2010*
	4 y	1 y	1 y	1 y	4 y	4 y		$/KG FOT
Washed/ organic				0.27	0.18	0.76	1.42	**1.60**
Screen 18	11.25	13.61	11.74	9.04	8.42	10.01	9.16	**1.49**
Screen 15 (including 16 and 17)	62.42	64.53	63.03	62.30	61.12	56.70	54.59	**1.41**
Screen 12 (including 13 and 14)	21.40	19.05	19.96	22.71	23.44	21.30	23.48	**1.32**
BHP 1199	4.35	1.99	2.17	2.00	3.54	4.30	6.68	**1.01**
Other	0.58	0.80	3.10	3.66	3.30	6.93	4.67	**1.14**
BHP and "Others" combined	4.93	2.79	5.27	5.66	6.84	11.23	11.35	**1.06**

* Ten months.
Source: ICO and UCDA annual and monthly reports by coffee year (October–September).

Compared with those of the late 1980s and 1990s (as well as the period 2001–2005), current exports show smaller bean size and a (much) larger proportion of BHP 1199 and "Others" (hereinafter called undergrades).[26]

The reduction in screens 18 and 15 is somewhat surprising, given the substantial numbers of clonal trees that were planted over the last decade. In theory, this should have led to an increase in bean size, but it must be

25 Accurate data prior to 2000 are not that easily available; those for 1988–1992 are based on information provided to the ICO.
26 Undergrades usually are beans that have been removed from the main export grades (too small, damaged, defectives, broken, shriveled, ears, black beans, etc.).

remembered that the already old Nganda tree park of course continued to age. Old trees usually do not produce beans of good size. At the same time, clonal trees require higher levels of care and inputs than do the traditional Nganda variety trees, but they do not necessarily receive this proper care. As a result, many clonal trees probably do not produce optimally, especially when drought conditions prevail.[27]

The increase in the percentage of undergrades is less surprising, given the reportedly widespread incidences of inadequate tree care, poor harvesting, and post-harvest handling. But, given the considerable price discount for these coffees, it is of serious concern. However, generalized export statistics as presented above do not assist in terms of pinpointing the origin of this problem—this requires the recording of quality (out-turn) data of coffee on leaving certain producing areas or on arrival in Kampala (moisture content, bean size, insect-damaged beans, diseased beans, foreign matter, general aspect, etc.).[28]

The combination of seemingly decreasing bean size and an increasing proportion of undergrades results in lower sales values. To demonstrate: if the grade composition of the 2009–2010 exports had been similar to that for the period 2001–2005, then, based on the values achieved in the first 10 months of 2009–2010 and assuming total natural Robusta[29] exports of 2 million bags for all of 2009–2010, the total sales revenue for just this one year would have been higher by approximately U.S. $2 million. However, without knowing the magnitude of informal cross-border coffee imports, particularly of undergrades, it is difficult to make a definitive pronouncement on this.

Robusta Quality

UCDA verifies the export quality of all Uganda coffee, including the cup quality, in a consistent and adequate manner; it may be assumed, therefore, that the cup quality of all main grades exported is acceptable. However, acceptability does not necessarily mean that the cup quality is optimal!

Mission observations suggest that poor harvesting and post-harvest processes, including the mixing and processing of wet and unripe coffee, impact negatively on the quality of a considerable proportion of Uganda's Robusta coffee. The financial impact is difficult to estimate but is likely to be considerable. Additionally, less-than-optimal quality allows competitors—India at present, Vietnam increasingly so, and possibly in the future Cameroon (and even Angola!)—to gain market share at the upper end of the Robusta market at Uganda's expense.

Table 7 indicates that, expressed in cents per pound, the price differential for all Uganda's Robusta exports vis-à-vis the ICO Robusta Indicator has worsened in recent years. It does not matter here that the Indicator is basis ex dock, whereas the Ugandan prices are FOT Kampala—it is the trend that is of interest. Ignoring the potential impact of changes both in the ICO Indicator's composition and in the costs of bringing Uganda Robusta to ex dock, the deteriorating trend appears to link up with the increase in the volume of undergrades.

27 Of course it is also possible that because of poor post-harvest processes, the grade called "Others" is partly composed of whole but nevertheless rejected beans ex the larger screen sizes.
28 Coffee, including undergrades, is also brought in from neighboring countries by informal cross-border traders and marketed as Ugandan coffee. The impact of this on quality (and quantity) is difficult to estimate.
29 That is, excluding washed and organic.

Table 7: Robusta Differentials

Coffee Year	2000–2001	2001–2002	2002–2003	2003–2004	2004–2005	2005–2006	2006–2007	2007–2008	2008–2009	2009–2010*
ICO Robusta Indicator*	29.88	26.84	37.23	36.37	46.05	61.45	82.73	106.36	78.68	72.24
Robusta price per pound FOT	23.04	17.95	27.85	31.55	40.29	55.76	68.08	88.06	66.88	61.94
Differential	**–6.84**	**–8.89**	**–9.38**	**–4.82**	**–5.76**	**–5.69**	**–14.65**	**–18.30**	**–11.80**	**–10.30**
Price as a percentage of ICO Indicator	*77%*	*67%*	*75%*	*87%*	*87%*	*91%*	*82%*	*83%*	*85%*	*86%*

* Ten months.
Source: UCDA and ICO data.

But This Still Does Not Answer the Question of Whether Quality in General Is Declining…

Screen 15 (including the small exports of screen 17 coffee; Table 8) constitutes the bulk of Uganda's Robusta exports, and the differential for this coffee shows a similar development. This indicates that in recent years (when prices were higher!), the market did not pay the same differential in cents per pound for Uganda Robusta as it did when prices were low earlier in the decade. Admittedly, differentials at times change when prices fluctuate, but the suspicion has to be that quality generally also plays a part here.

Table 8: Robusta Screen 15 Differentials

Coffee Year	2000–2001	2001–2002	2002–2003	2003–2004	2004–2005	2005–2006	2006–2007	2007–2008	2008–2009	2009–2010*
ICO Robusta Indicator*	29.88	26.84	37.23	36.37	46.05	61.45	82.73	106.36	78.68	72.24
Robusta screen 15 (including screen 17) lb/FOT	23.60	18.69	29.36	32.93	42.71	58.32	70.99	91.29	68.29	64.14
Differential	**–6.28**	**–8.15**	**–7.87**	**–3.44**	**–3.34**	**–3.13**	**–11.74**	**–15.07**	**–10.39**	**–8.10**
Price as a percentage of ICO Indicator	*79%*	*70%*	*79%*	*91%*	*93%*	*95%*	*86%*	*86%*	*87%*	*89%*

* Ten months.
Source: UCDA and ICO data.

Arabica Coffee

The Arabica sector appears to be progressing relatively well in terms of quality diversification into organic and specialty coffees. Uganda exports three distinctive types: Washed Bugisu Arabica, Washed Uganda Arabica (WUGAR), and sundried or natural Uganda Arabica (DRUGAR).

Composition of the Crop by Bean Size/Grade

Bugisu Arabica: The percentage of AA grade would appear to be declining, but this is at least partly offset by the increased percentage of premium coffees (Bugisu and Mount Elgon) being exported, as these are likely to contain a good percentage of AA grade.

WUGAR/DRUGAR: Production and exports have been erratic over the last 12 years or so, but certainly the production of DRUGAR appears to be rising.

Table 9: Arabica Exports by Type and Grade in 60-Kilogram Bags

Type	2000–2001	2001–2002	2002–2003	2003–2004	2004–2005	2005–2006	2006–2007	2007–2008	2008–2009	2009–2010*
All Arabica	456.996	430.426	442.448	543.689	518,000	594.010	559.754	497.105	647.831	618,947
Organic	1.065	4.180	4.380	5.104	10.185	19,955	15.350	24.554	14.780	13.135
Bugisu										
All main grades**	125.544	198.174	140.190	210.892	176.353	217.626	167.512	142.602	259.120	216.800
AA grade	45.90%	56.57%	47.81%	46.39%	52.20%	44.84%	46.48%	44.58%	41.69%	35.40%
Premium***									0.54%	8.47%
WUGAR	70.758	61.020	47.090	46.536	35.032	40.500	52.680	53.902	54.539	42.548
DRUGAR	241.746	134.542	225.921	243.527	238.899	264.505	253.741	223.125	254.762	286.431
Subtotal	*312.504*	*195.562*	*273.011*	*290.063*	*273.931*	*305,005*	*306.421*	*277.027*	*309.301*	*328.979*
Others	17.883	32.510	24.867	37.630	57.531	51.424	70.471	52.922	64.630	60.033
Is %	3.91%	7.55%	5.62%	6.92%	11.11%	8.66%	12.59%	10.65%	9.98%	9.70%

* Ten months.
** Including Bugisu Organic.
*** Bugisu Premium and Mount Elgon.
Source: UCDA annual and monthly reports by coffee year (October–September).

Undergrades: There has also been a steady increase in the percentage of Arabica undergrades exported—the current average is considerably higher than that recorded in the years prior to 2004–2005. For the first 10 months of 2009–2010, the discount for "Others" was about 93 cts/kg (roughly 42 cts/lb), and so the financial

impact is again considerable. But again, without knowing the magnitude of informal cross-border imports of undergrades, it is difficult to make a definitive pronouncement on this.

It is also not clear from which Arabica subsector the increase originates because from 2005–2006 onward, the UCDA statistics available to the mission no longer show the breakdown between undergrades ex Bugisu and ex WUGAR/DRUGAR. This is why they have been combined into one total for the previous years, and it is also the reason why the percentage of Bugisu AA exported can be shown only as a percentage of all Bugisu main grades (i.e., excluding undergrades). Normally, one would show this as a percentage of the whole.

Knowing from which subsectors undergrades originate would of course assist research and extension to pinpoint potential problem areas.

Arabica Prices and Differentials

Bugisu and WUGAR are compared against the ICO Other Milds Indicator and DRUGAR against the Indicator for Brazilian and Other Natural Arabicas.

Table 10: Arabica Differentials

Coffee Year	2000–2001	2001–2002	2002–2003	2003–2004	2004–2005	2005–2006	2006–2007	2007–2008	2008–2009	2009–2010
ICO Other Milds Indicator	61.74	59.21	64.89	73.50	111.22	110.84	120.08	142.98	135.47	189.44
Bugisu AA per lb FOB*	51.25	42.24	50.43	54.88	87.89	98.65	102.42	122.52	102.02	126.63
Differential	–10.49	–16.97	–14.46	–18.62	–23.33	–12.19	–17.66	–20.46	–33.45	–62.81
Price as a percentage of ICO Indicator	*83%*	*71%*	*78%*	*75%*	*79%*	*89%*	*85%*	*86%*	*75%*	*67%*
ICO Other Milds Indicator	61.74	59.21	64.89	73.50	111.22	110.84	120.08	142.98	135.47	189.44
WUGAR price per lb/FOB	40.21	34.52	46.92	53.56	99.57	100.40	101.68	122.75	100.23	124.13
Differential	–21.53	–24.69	–17.97	–19.94	–11.65	–10.44	–18.40	–20.23	–35.24	–65.31
Price as a percentage of ICO Indicator	*65%*	*58%*	*72%*	*73%*	*90%*	*91%*	*85%*	*86%*	*74%*	*66%*
ICO Brazilian and Other Naturals	57.53	43.72	48.94	62.07	98.22	100.86	108.35	130.44	110.16	148.24
DRUGAR price per lb/FOB	38.12	28.81	32.87	39.75	82.56	78.30	81.37	106.62	86.27	100.06
Differential	–19.41	–14.91	–16.07	–22.32	–15.66	–22.56	–26.98	–23.82	–23.89	–48.18
Price as a percentage of ICO Indicator	*66%*	*66%*	*67%*	*64%*	*84%*	*78%*	*75%*	*82%*	*78%*	*67%*

* Including specialty/Mount Elgon but no organic.
Source: UCDA and ICO data 2009–2010, ten months only.

Not knowing the percentage of Bugisu undergrades makes it impossible to make a straight comparison of Bugisu export prices versus the ICO Other Mild Indicator, but it is interesting to at least compare Bugisu AA grades with WUGAR, Uganda's other washed Arabica.

Compared with other East African producers (Kenya, Tanzania) offering AA grades, the pricing picture for Bugisu AA generally is somewhat disappointing. However, there is a remarkable improvement in the valuation of WUGAR from 2004–2005 onward, as indeed there is for DRUGAR.

NB: Arabica differential data for the first 10 months of 2009–2010 are best disregarded, given the extremely strong and very sudden price rise for these coffees that took place from the middle of that coffee year. This would have caused the average of many differentials, including those for Uganda, to fall behind and so distort the picture.

Annex II. Constraints in the Coffee Supply Chain

Although this report focuses upon the major risks facing the coffee supply chain, it is also important to acknowledge the significant constraints that affect the day-to-day operations of the supply chain. These constraints reduce the efficiency of the sector and may themselves exacerbate supply chain risks. Certain constraints impact the entire supply chain (national-level constraints), whereas others impact primarily specific participants only.

National-Level Constraints

Weak Sector Coordination

As Uganda's leading export commodity, coffee has a strategic importance and scale that necessitates a well-coordinated and consistent sector strategy, but this is currently not in place. A strong national strategy would assist the coffee sector in identifying and responding to critical problems (either ex-post or ex-ante). For example, in Colombia, the National Federation of Coffee Growers (FNC) sets coffee sector policy, enabling sector-wide action to be taken to manage risks and other issues as they arise. Although the team's consultation process, coupled with a review of the existing literature, revealed multiple attempts being made to coordinate the coffee sector in Uganda, there is limited clarity as to who is, or who should be, leading the process.

The most prominent attempt at implementing a national strategy appears to be the Uganda Coffee Production Campaign,[30] with participation from leading actors in the sector, including UCDA, MAAIF, private sector representatives, producers, and nongovernmental organizations (NGOs). However, although the campaign has fostered multi-stakeholder collaboration around one clearly identified goal (i.e., an increase in Ugandan coffee production), stakeholders appear to question its effectiveness, with some suggesting it has been constrained by a lack of funding to implement the prioritized activities. Additionally, there is weak institutional coordination and linkages to implement a national coffee strategy.

Limited Coffee Research and Extension Capacity and Resources

Limited resources and scope of research and extension services are a critical constraint for the Ugandan coffee sector. There is clear evidence of a failure of research being implemented/applied on the ground via the Ugandan agricultural extension services. Insufficient coordination and lack of strategic planning between research and extension adversely impact the industry, hampering national coffee production targets from being achieved. There is an inability to sufficiently monitor and respond to disease and pest infestations and insufficient technical assistance is reaching producers. This in turn has led to past major disease outbreaks and inadequate farm management, with resultant low yields and poor quality control practices.

Research: Only five full-time scientific researchers are stationed at CREC; yet CREC is also responsible for research in tea, cocoa, and palm oil. Although CREC is making efforts to address ever-increasing demands related to coffee pest and disease infestations, it lacks the necessary funding and long-term research strategy to manage and operate a fully comprehensive program that adequately meets the need of the coffee industry. As Table 11 shows, expenditure on Ugandan coffee research is far below that in other regional coffee-producing countries.

30 The campaign's stated objective is to increase the annual production of exportable coffee to 4.5 million bags by 2015, a 50% increase over current export levels.

Uganda produces four times the volume of coffee of either Kenya or Tanzania but has less than a fifth of their research staff.

Table 11: Coffee Research Investment in Four East African Countries

Key Area/Country	Kenya	Tanzania	Ethiopia	Uganda
Number of technical staff	31	27	68	5
Annual budget in U.S. dollars	3,000,000	4,000,000	3,500,000	200,000
Annual coffee production in metric tons	47,000	50,0000	280,000	200,000
Export revenue share	5%	20%	70%	25%

Source: Africa Coffee Academy 2008.

The lack of sufficient resources for coffee research impacts the sector greatly, both by limiting the means for dealing with pest and disease outbreaks and by reducing investment in establishing higher-yielding trees and improved farm management techniques. CREC's response to CWD illustrates its capacity limitations. CWD killed over half of Uganda's Robusta coffee trees since its initial detection in 1993.[31] CREC, and the wider coffee sector, responded to CWD by establishing an interim replanting program with the use of clonal varietals to replace infected trees. The tree replanting program has been successful insomuch as it has prevented Uganda's Robusta production from collapsing by replacing many of the trees infected with CWD. However, training in proper management practices (e.g., disinfecting maintenance tools; preventing scarring of coffee trees, which precipitates infection; building soil fertility to strengthen tree resistance; and proper removal and burning of infected trees) has not been sufficiently disseminated because of limited extension and communication mechanisms. This failure to educate producers has arguably contributed to the very high percentage of Robusta trees infected with CWD. The shortage of resources for research has limited and slowed the response to disease outbreaks and the production and mass distribution of resistant trees. Limited resources also mean that while efforts are focused on dealing with one main disease, focus is removed from monitoring and controlling other diseases that also have a high potential to impact the sector (e.g., black coffee borer, coffee leaf rust). Additionally, the lack of a comprehensive and continuous data collection system is severely constraining the ability of the industry to monitor problems affecting the sector, develop appropriate responses, evaluate the effectiveness of responses, and implement remedial actions accordingly.

Extension Services: Agricultural extension services are the main way that governments of developing countries assist producers in maximizing yields and ensuring quality. Uganda has some good examples of excellent coffee extension services, including several model farms, washing stations organized by exporters, and extension linked to sustainable certification programs. However, there are cases in which some coffee producers receive no technical support at all. Even where positive examples of extension services exist, such as on model farms, it is not always evident how the information is subsequently transferred from the model producer to other producers in the area. Limited extension is compounded by a seemingly pervasive view of that "coffee, particularly Robusta, can take care of itself," resulting in a lack of interest on the part of producers in learning how to properly maintain their coffee trees, disinterest in using inputs, and an unwillingness to invest time and effort.

NAADS is the primary agency for delivering agricultural extension services to Ugandan coffee farmers, although a number of other organizations also provide technical assistance to coffee farmers, including UCDA, MAAIF, National

31 UCDA Annual Report 2008–2009 (55% of Robusta trees killed by CWD).

Union of Coffee Agribusinesses and Farm Enterprises (NUCAFE), private sector exporters, and various NGOs, yet it is unclear how these groups collaborate. The demand-driven approach to agricultural extension in Uganda has generally been seen to be effective; however, this occasionally results in coffee being deprioritized, even in coffee-producing areas. In addition, NAADS extension staff are generalists, leading some stakeholders to complain that they lack specific expertise in coffee and others to question whether resources are targeted at larger farmers rather than smaller farmers, which is significant because the vast majority of Ugandan coffee is grown on small farms.

Insufficient Incentives for Ensuring Quality

There is industry-wide concern relating to perceptions of progressively declining Robusta quality. This perception is reinforced by supply chain stakeholders, who often report that they have no incentive to focus on quality, explaining that the high levels of competition for coffee at all levels of the supply chain lead traders (and some exporters) to buy coffee without adequate consideration of quality.

At the producer level, farmers who understand how to manage quality (e.g., harvesting only ripe beans and properly drying coffee) report that they are mostly not rewarded adequately or not at all for higher quality and are able to sell their coffee almost irrespective of quality. Traders who sit between farmers and exporters in the supply chain state that there is either little or no financial incentive to focus on coffee quality. Some exporters stated that demand for Ugandan coffee was such that it could always be sold.

It is important to note that the ability to sell coffee does not necessarily mean that the quality (and therefore price realization) is optimal. Observation suggests that poor harvesting and post-harvest processes, including the processing of wet and unripe coffee, must impact negatively the end quality of a considerable proportion of Uganda's Robusta coffee. Simple analysis suggests that if the proportion of bean sizes in the 2009–2010 Robusta exports had been comparable to that recorded for the years 2001–2005, then approximately U.S. $2 million in extra earnings would have been realized at current prices in export sales. In this context, *quality* is a combination of screen or bean size and taste or cup characteristics, with larger bean sizes usually realizing better prices.[33] A detailed analysis of Ugandan coffee quality trends is provided in Annex I of this document.

Mistrust Among Supply Chain Actors

The competitiveness of the supply chain also appears to have generated levels of mistrust among many supply chain actors. Complaints from supply chain actors included issues relating to weighing practices at points of sale, adulteration of coffee to increase its weight or volume, and general distrust about prices paid for coffee. Such mistrust appears to inhibit supply chain actors from working together to effectively benefit from economies of scale, sharing of information, and collective lobbying for support or needed changes. For example, at the producer level, producers are often unwilling to associate and reluctant to share information on production practices or marketing opportunities.

Limited Access and High Cost of Finance

All actors along the supply chain, except those exporters linked to large international trade houses, mentioned difficulties in accessing affordable finance. While agriculture accounted for approximately 22.7% of GDP[34] (2008) only 4.5% of Ugandan commercial bank lending was to the agricultural sector.[35]

33 The export quality control process works well but could be termed passive in that it simply records the end result. Active quality control, on the other hand, would monitor and report on the quality delivered by the different districts/regions, thereby assisting both research and extension to attend to particular problems.
34 World Bank World Development Indicators 2008.
35 Bank of Uganda Annual Report 2008–2009, Table 2, page 37.

Finance for producers is almost non-existent with banks reluctant to lend to small-scale farmers who cannot provide collateral. An extreme, but apparently frequent result (although data is not available to validate this assertion), is that producers often resort to "selling flowers" i.e. the practice of selling the coffee harvest to traders when the trees are still flowering or in the pinhead stage, often for as little as 25% of the potential value. Without access to affordable finance it is very difficult for many producers to avoid selling their coffee prematurely when faced with economic problems, let alone to invest properly in production and processing.

Domestic traders (those placed within the supply chain between producers and exporters) often lack the required collateral to secure finance and, even when collateral is available, interest rates are perceived to be high (ranging between 18 and 29%). This has resulted in two main situations: 1. Traders lack sufficient capital to scale up their operations and therefore purchase small volumes of coffee which they quickly turnover. 2. Some traders become dependent on exporters who advance them capital, limiting their ability to sell to other buyers.

Smaller exporters can generally access bank finance but only under strict collateral requirements (against warehouse receipts and/or FOT contracts only). However the FOT net price is usually less than if the sale had been Free on Board Mombasa (FOB), thereby reducing opportunities for traders to earn greater profits from selling FOB (although FOT back-to-back trading reduces price risk arguably protecting both exporter and financier). In addition there are currently limited numbers of value addition initiatives leading to low domestic coffee consumption, which prevents traders benefitting from local market opportunities.

Farmer-Level Constraints

Small Farms and Low Levels of Farm Organization (Atomized Production)

In Uganda, it is a common custom for families to divide land among children, and this results in progressively smaller farms; the average farm holding sizes in Uganda now range from 0.5 to 2.5 hectares, with coffee intercropped within that area (UCDA, Web page). With over half of Uganda's population younger than 15 years of age and with an average of 6 to 10 dependents per household,[36] this problem has the potential to progressively worsen. In addition, small farmers are believed to receive less extension service than larger farms.[37] Small farmers may benefit from joining farmer organizations to gain access to extension services, agricultural inputs, and marketing services. However, most farmers are not linked to collective organizations or associations, and many appear to distrust them (as a result of negative experiences with the larger cooperatives prior to, and following, liberalization). Some initiatives promoting producer organizations, such as NUCAFE, exist but represent only a small proportion of the total number of coffee farmers. This lack of producer organization is significant because by organizing, producers can achieve economies of scale in purchasing inputs, accessing credit (or creating internal microfinancing structures), accessing technical assistance, sharing experiences on production and marketing, and collectively marketing their coffee. Increasingly, the demands of international markets related to the quality, production and processing standards, delivery, and traceability of foodstuffs such as coffee necessitate that producers be sufficiently organized to meet these requirements.

Low Yields at Farm Level

Yields in Uganda are low, significantly impacting producer incomes. UCDA estimates that under medium management conditions, Robusta and Arabica crops yield an average of 500 kg/ha of clean coffee and 750 kg/ha of parchment coffee respectively. A combination of issues is causing this situation: aging trees (a good number are estimated to be over 40 years old [UCDA 2009]); aging farmers (the baseline study found that 35% of producers were between the ages of 51 and 70 years, and another 9% older than 70 [UCDA

36 Uganda Bureau of Statistics Web site document, September 10. TP4: projected mid year population for 5 year age groups, 2009–2011.
37 Betz M. The effectiveness of agricultural extension with respect to farm size: the case of Uganda.

2008]); high cost and very limited use of farm inputs; very limited access to on-farm extension services; and poor management of coffee farms. The atomized nature of coffee production, with hundreds of thousands of small farmers producing coffee, make it exceptionally difficult to raise yields.

Annex III. Stakeholders Met during Risk Assessment Exercise

Table 12: Stakeholders Interviewed during Risk Assessment Exercise

Name of Organization	Nature	Location
UCDA	Industry regulator	Coffee house, Kampala
Kyagalanyi Coffee Ltd.	Coffee exporter	Bugolobi, Kampala
UGACOF	Coffee exporter	Bweyogerere, Kilira, Kampala
Ibero (U) Ltd.	Coffee exporter	Industrial area, Kampala
Nakana Coffee Factory	Coffee exporter	Bugolobi, Kampala
Savannah Commodities	Coffee exporter	Bugolobi, Kampala
Kawacom (U) Ltd.	Coffee exporter	Kyambogo, Kampala
Kampala Domestic Store	Coffee exporter	Bugolobi, Kampala
Uganda Coffee Roasters' Association	Association for roasters and café operators	Coffee house, Kampala
National Union of Coffee Agribusinesses and Farm Enterprises (NUCAFE)	Coffee farmers' association	Coffee house, Kampala
Uganda Coffee Trade Federation (UCTF)	Industry association	Coffee house, Kampala
Union Export Services (UNEX)	Cooperative	Ntinda industrial area, Kampala
Agro Eco	Organic promoter	Ggaba Road, Kampala
Uganda Bureau of Statistics (UBOS):	Government	Colville Street, Kampala
-	Big trader/merchant	Industrial area, Kampala
-	Big trader/merchant	Industrial area, Kampala
Penform Trading Co.	Big trader/merchant	Industrial area, Kampala
Zigoti Coffee Works	Roaster	Industrial area, Kampala
Department of Meteorology	Government	NRM building, Kampala
National Agricultural Advisory Services (NAADS)	Government	Lumumba Avenue

(Continued)

Table 12: Stakeholders Interviewed during Risk Assessment Exercise *(Continued)*

Name of Organization	Nature	Location
Bank of Uganda Department of Statistics	Financial regulator	Kampala
MAAIF Department of Agricultural Planning	Government	Entebbe
Uganda Export Promotion Board (UEPB)	Government	Kampala
Uganda National Agro-inputs Dealers' Association (UNADA)	NGO	Namuwongo, Kampala
National Organic Movement in Uganda (NOGAMU)	NGO	Muyenga, Kampala
Orient Bank	Bank	Kampala
Kaweri Farmers' Alliance	Farmers' group	Mityana District
HRN Stiftung	Projects/NGO	Mityana District
Uganda Coffee Alliance	Projects/NGO	National
Musebe Depot Committee (DC)	Projects/NGO	Mityana District
Private nursery owner	Farmer	Mityana District
Coffee Research Centre (CREC)	Research	Mukono District
Seventeen traders in Buwenge District	Traders	Buwenge Trading Centre, Jinja District
Farmers in the UGACOF farmers' scheme	Farmers	Iganga District
Gumutindo Cooperative Union	Exporter (fair trade)	Mbale District
Busamaga Growers Cooperative Society (under Gumutindo)	Farmer cooperative	Buwalasi Subcounty, Sironko District
Bukonzo change agents: executive	Farmer cooperative	Kasese District
Kasese extension workers	Government	Kasese District
Bukonzo Organic	NGO	Kasese District
Kasese Agro-inputs dealers	Agro-inputs	Kasese District
Good Coffee Traders' Association	FAQ Traders' Association	Kasese District
Good African Coffee (wet coffee promoters)	Farmer organization	Kasese District

(Continued)

Table 12: Stakeholders Interviewed during Risk Assessment Exercise *(Continued)*

Name of Organization	Nature	Location
Mbale extension workers	Government (NAADS)	Mbale Town
Mbale traders (five traders)	Small middlemen	Mbale Town
Regional coffee coordinator, eastern	Regulator	Mbale Town
One individual farmer	Farmer	Nyabubare Subcounty, Bushenyi District
Focus group discussion with 20 farmers in Kyabitara Village	Farmers	Nyabubare Subcounty, Bushenyi District
Ankole Coffee Cooperative Producers	Cooperative	Ishaka Trading Centre, Bushenyi
New Ishaka Coffee Factory	Exporter/trader	Ishaka Bushenyi
Ishaka traders	Traders	Ishaka Town, Bushenyi District
Ankole Coffee Factory	Processor/trader	Ishaka Town, Bushenyi District
Mount View Farm	Wet mill	Kyangyenyi Subcounty, Bushenyi District
Female clonal coffee farmer	Farmer	Kyangyenyi Subcounty, Bushenyi District
Bugisu Cooperative Union (BCU)	Exporter	Mbale Town
Mbale Importers and Exporters	Exporter	Mbale Town
Kyagalanyi Coffee Ltd. (wet mill)	Wet mill	Nyondo Subcounty, Sironko District
Focus group discussion with 25 KCL members, Busaano	Farmers (out-grower scheme)	Busaano Subcounty, Mbale District
El-Shaddai inputs dealer	Agro-inputs	Mbale Town
Group discussion with two farmer groups—Tweyambe and Sekadikuwe Women's Groups—with 12 women and five men: model farmer	Farmer group	Bugabwe Village, Kaliro Town Council, Kaliro District
One coffee processor, Luzinga Holdings	Processor	Luzinga Trading Centre, near Buwenge
NAADS District Extension Coordinator	Government	Masaka District
Kibinge Coffee Farmers' Association	Farmers	Kibinge Subcounty, Masaka District
Focus group discussion with eight farmers in Nzizi village	Farmers	Kkingo Subcounty, Masaka District

(Continued)

Table 12: Stakeholders Interviewed during Risk Assessment Exercise *(Continued)*

Name of Organization	Nature	Location
Focus group discussion with Masaka Coffee Campaign Platform Secretariat	Farmer platform	Masaka District
Group discussion with 18 farmers	Farmers	Buwagi Village, Budondo Subcounty, Kaliro District
Group discussion with 17 male traders and one female trader	FAQ traders	Kamuli Town
Subregional Coffee Coordinator, Jinja, Kaliro, and Kamuli Districts	Extension	Jinja District
Subcounty NAADS Coordinator	Extension	Jinja District
Farmer	Farmer	Wakitaka Village, Mafubira Subcounty, Jinja District
Group discussion with 18 FAQ traders	Traders/processors	Kamuli Town
Focus group discussion with three traders	Traders	Masaka District
Four Ways Group of Companies	Wet/dry coffee trader	Kalungu District
Two farmers with both traditional and clonal trees	Farmers	Matanga Village, Mukungwe Subcounty, Masaka District
Two farmers with both traditional and clonal trees	Farmers	Naguzi Village, Kammengo Subcounty, Mpigi District
Farmer	Farmer	Bukyondo Village, Nawanago Subcounty, Jinja District
Farmer	Farmer	Kiyunja Subcounty, Jinja District
Farmer	Farmer	Mafubira Subcounty, Jinja District
Nsanvu Agro-farmers' Centre, Jinja	Agro-inputs	Jinja Town
Café Africa	NGO	Kampala
Interfreight	Freight forwarders	Kampala
Stanbic Bank	Commercial bank	Kampala