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Informal Market and Seed Systems Analysis of the Bean and Cassava Value Chains in Eastern DRC: *A Case of North and South Kivu Provinces*



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List of Acronyms

BHA	Bureau for Humanitarian Assistance
CDF	Congolese Franc
CIAT	International Centre for Tropical Agriculture
CRS	Catholic Relief Services
DRC	Democratic Republic of Congo
GDP	Gross Domestic Product
ITTA	International Institute of Tropical Agriculture
INERA	Institut National pour l'Etude et la Recherche Agronomiques
KII	Key Informant Interview
NARS	National Agricultural Research System
NGO	Non-governmental organization
PABRA	Pan-African Bean Research Alliance
PICAGEL	Programme Integre Integre de Croissance Agricole dans la Region des Grands Lacs
RFS	Bureau of Resilience and Food Security
S34D	Supporting Seed Systems for Development
SENASA	National Seed Service
The Alliance	Alliance of Bioversity International and CIAT
USAID	United States Agency for International Development
USD	United States Dollars

EXECUTIVE SUMMARY

Beans and cassava are important food security and income crops for smallholder farmers in the Democratic Republic of Congo (DRC), with approximately 476,000 and 5 million hectares of land within the country, respectively. However, the production of these crops are challenged by a myriad of constraints that include climate variability, pests and diseases, declining soil fertility, limited access to quality seed of improved varieties, and supportive technical information (PABRA 2018b; Seed Systems Group, 2020). A number of these constraints are exacerbated by poor access to seed of appropriate farmer- and consumer-demanded varieties—thus rendering their value chains less competitive relative to those of other crops such as maize (Nyamwaro et al., 2018; PABRA 2018b; Seed Systems Group, 2020).

The Feed the Future Global Supporting Seed Systems for Development activity (S34D), funded by the Feed the Future Initiative through the Bureau of Resilience and Food Security (RFS) and by USAID through the Bureau for Humanitarian Assistance (BHA), has therefore conducted a study to address such challenges, which aims to (1) characterize the current status and identify constraints limiting development of seed systems in DRC, (2) assess the role of market pull in enhancing access to customer preferred varieties and information by value chain actors, (3) estimate gross profit margins of informal seed traders, and (4) use the results to propose appropriate business models for enhancing the capacity of the informal seed system to respond to both farmer demand and emergency seed needs. The study deploys the bean corridor framework of the Pan-Africa Bean Research Alliance (PABRA) of the Alliance of Bioversity International and International Centre for Tropical Agriculture (the Alliance). Data used in the analysis was obtained from a survey implemented in Eastern DRC from April to June 2021 under S34D in collaboration with the National Research Institute of the DRC, Institut National pour l'Etude et la Recherche Agronomiques (INERA), the International Institute of Tropical Agriculture (IITA) and Catholic Relief Services (CRS). The survey was conducted on 484 bean traders and 377 cassava traders from 10 critical markets for beans and cassava. Key informant interviews (KIIs) were also conducted with seed stakeholders in the two provinces. Of those surveyed, the majority were women (84% of bean traders and 75% of cassava traders).

The study results suggest that stakeholders' knowledge on market-demanded and farmer-preferred varieties is critical to driving better seed supply; however, there is limited flow of information and coordination amongst relevant value chain actors. Within the seed availability-access nexus, the role of the market pull is to guarantee that research products reach the market and that feedback from the market informs continued efforts to deliver quality products. One approach to bridging seed system data gaps in DRC involves the engagement of farmers, non-governmental organizations (NGOs), development partners, and other seed system actors, as fostering such engagement can increase the contributions of the formal seed sector to the informal seed sector's success. However, the process will dually require (a) a close re-examination of the challenges and coping strategies in bean and cassava trade and address information asymmetries and (b) movement that goes beyond relief seed provisioning to address the environmental challenges that threaten sustainable seed production. For example, the proposed models illustrate opportunities for involving more women and youth at the various value chain nodes (i.e., from seed/planting material and grain/cassava and its products from production to market). The traders, like farmers, would benefit from additional but reliable sources of extension information, especially in as much as they affect women in trade. This effort would go beyond usual extension information on production and post-harvest handling to improved market linkages, access to low-cost credit, and structured efficiency in operations.

The study findings also demonstrate a weak integration of output markets and seed/planting material supply systems. One way to improve integration of the two markets is through a system that links INERA and other key actors like development/relief organizations, private sector (seed, grain, planting material, cassava, and processors) with farmers and traders. National Agricultural Research System (NARS) capacity should be built to ensure that the national research concerned with variety development plays a broader role in interfacing across the formal and informal systems, supporting quality management by informal traders,

and assisting women to overcome the barriers that hinder them from accessing businesses resources and participation in the seed supply.

The study identified five business investment options: a) intensifying grain and cassava production enterprises, b) investing in informal seed and planting materials multiplication and supplies, c) growing grain and cassava enterprises for local regional markets, d) encouraging value added processing for beans and cassava, and e) supporting digital enterprise services. The five investment options are interlinked and require unified interventions to ensure success. For example, intensifying bean and cassava production enterprises require that farmers obtain better access to extension knowledge and linkages to profitable markets. Profitable market linkages might involve working with traders or processors from local and regional value chains. Results show that the most bean grain on the markets is of mixed varieties. Lessons from yellow bean study indicated that regional markets often require that each variety be well-sorted and separated from the rest. Therefore, farmers will need to be trained on post-harvest handling techniques and the associated benefits to be able to access regional market. When farmers are convinced and agree to change their practices from mixtures to single variety trade, they will need access to sufficient quantities of seed of the variety demanded on the local or regional market—which justifies investment Option B to supplement formal seed systems.

Study results provide evidence of positive gross profit margins of these models for informal seed trade in both crops (i.e., USD 50 to 233 for different bean types and between USD 73 and 94 for the different cassava products). These results and evidence need to be packaged properly in a business case and disseminated to potential seed producers to attract them to participate.

- Suggestions to enhance the capacity of the informal seed system (to respond to both farmer demand and emergency seed needs) should tap into the PABRA corridor infrastructure (e.g., as a platforms model). The platforms would bring together actors across each value chain, from business to extension to humanitarian participants, to jointly address issues that affect production, trade and supply of commodities required by different beneficiaries (e.g., producers and aid recipients), and be connected by appropriate communication tools. Survey findings suggest that this will approach will strengthen the interface between development and relief-to-resilience seed systems.
- Platform facilitators should ensure that women are included in support measures, particularly given the COVID-19 pandemic and the emerging challenges it posits to vulnerable populations. The report provides some socio-cultural norms and gender gaps that will need to be overcome to facilitate women and youth participation in these proposed investment options.
- Additionally, eliminating infrastructural and non-tariff barriers through policy while mitigating insecurity will reduce the cost of producing and trading commodities within and beyond the two provinces. The two provinces are major food production hubs in the DRC and could play a much more significant role in the country's food situation and humanitarian efforts. There is a need to support women and female youth to overcome barriers in accessing resources and growing their businesses by working closely with NGOs to address systemic challenges (limited access to information, credit, land) facing the actors beyond humanitarian aid.

1. INTRODUCTION

Country Context - The Democratic Republic of Congo

The DRC has a vast landmass, large population, and extensive natural resources. With this, the DRC still holds excellent economic potential, even with a current low GDP growth rate per capita¹. However, chronic conflict and corruption have perpetuated its characterization as a fragile state² (World Bank 2019; Grebner et al., 2020a; Geenen and Marysse 2016; Bak et al. 2019). Agriculture employs most of the population, though the mining industry remains a significant contributor to the country's GDP (World Bank 2020). The main crops grown in the DRC include cassava, plantain, maize, rice, groundnuts, and beans (FAO-GIEWS 2020; Jean-pierre et al. 2019; Kibriya et al. 2016; PABRA 2018b). The variable climate poses additional risks in agricultural production due to soil erosion, landslides, and recurrent floods. These challenges, coupled with the instability resulting from conflicts that displace smallholders from their land, reduce disposable income to purchase inputs, i.e., seed and fertilizer (USAID 2015b; USAID, 2019).

Seed and planting material accessibility continues to hinder wide-scale production and productivity. The informal seed system remains dominant in the DRC, a country affected by weak governance, failing infrastructure, conflict, climate change, and related diseases and pests. The dependence of smallholder farmers on the informal seed system means there is a need to work within and innovate around the system. The development of this informal system is also important because smallholders only access seeds through the informal outlets with all the attendant risks of low quality and poor productivity of the seeds. Innovations are needed to drive farmer access to seed in the face of inexistent or poor access to agro-dealers, limited knowledge, and inadequate resources to purchase seed (ACDI/VOCA 2015; Asanzi et al. 2017; PABRA 2018a; PABRA 2018b; PABRA 2018c; World Bank 2019). Production is negatively affected, contributing to insufficiency in dietary diversity and frequency of meals among the people. Reports show that about 8% of children aged 6-23 months receive minimum acceptable diets. Child stunting remains high (Grebner et al., 2020b), while child wasting³ continues to decline significantly. According to official statistics, poverty rates remained at an all-time high at around 77% in 2012 (Ulimwengu et al., 2020; Grebner et al., 2020b).

Importance of Common Beans and Cassava

Cassava is the most important staple food crop, followed by maize and beans in the DRC and South Kivu region. Common bean is one of the primary staple foods in the DRC, accompanying most of the starchy foods eaten. Several cassava varieties are also rich in vitamin A, for which an estimated 61% of preschool-aged children and 16% of pregnant women are deficient (MOH et al. 2000; WHO 2009). Beans are among complete foods, supplying energy, proteins, and significant micronutrients such as iron and zinc. These micronutrients provide up to 80% daily iron requirements. Both North and South Kivu are considered food baskets for the DRC, constituting major production hubs for cassava and beans. North Kivu, for example, produces almost 90% of the beans in the DRC (Nyamwaro et al., 2018). Other crops grown within the region are generally starchy crops that include rice, plantains, and yam. Neighboring provinces serve as other major bean production hubs.

Beans and cassava can be stored, used in different forms, and have multiple options for value addition. Aside from their broad production within North and South Kivu, these commodities are widely marketable and easily used in aid and humanitarian interventions to support emergencies and, thus, can benefit regional

¹ The World Bank reports that in 2018, DRC's GDP per capita was just \$562 in current US dollars -- the 10th-lowest of all countries in the world with available data

² A fragile state can be defined as one in which the government remains unable to deliver the core functions (limited ability to provide social and economic services) to its people including the poor. Weak institutions by far remain the central driver of state fragility but accompanied by violent conflict, external shocks, natural resources and international system pressure.

³ Reports indicate that South Kivu has the lowest child-wasting rate of any province, at 2.6 percent. The North Kivu's also enjoys a relatively low rate at 4.6 percent (INS, USAID, and UNICEF 2019).

conflict and other relief efforts without having to be sourced from distant locations. The two Kivus are also strategically positioned in the region, linking the DRC to the countries of Uganda, Tanzania, Rwanda, Burundi, and South Sudan. These countries have integrated commodity trade and seed supply systems such that interventions within the Kivus and neighboring states tend to have impacts that reach the broader East African region.

Beans and cassava are important crops for smallholder farmers in the DRC that account for approximately 476,000 and 5 million hectares of land within the state, respectively. In 2019, 260,000 tons of beans and 40 million tons of cassava were produced. While they primarily serve as a means of food security, they also provide incomes to many women, men, and young farmers (FAO-GIEWS 2020; PABRA 2018b; USAID, 2019). However, several constraints hamper their production and productivity, including climate variability, pests and diseases, declining soil fertility, limited access to improved seeds, and accompanying technical information (PABRA 2018b; Seed Systems Group, 2020). In addition to these, there are also challenges that lead to significant post-harvest losses. The absence of farmer-preferred and market-demanded varieties magnifies these complexities and renders bean and cassava value-chains less competitive than other crops such as maize (Nyamwaro et al., 2018; PABRA 2018b; Seed Systems Group, 2020). Although women in the DRC play a vital role in the country's food security, they are constrained by inequalities in access to productive resources and extension services (SeedClir 2019). Women have limited participation in groups and cooperatives as it requires them to leave their home for longer periods of time and this is frowned upon by the community. Increased participation of men is witnessed when production takes place in cooperatives, which allows for larger incomes to be earned by men and women's inequitable access to expanded incomes (Kasindi et al., 2017)⁴. Young people in South Kivu face limited access to land and other productive assets, as well as a lack of financing or credit needed to purchase inputs or rent land (Kasindi et al., 2017)⁵.

Bean and Cassava Corridors

PABRA developed the commodity corridors⁶ concept to intensify bean production, distribution and marketing, and consumption activities (Eliud et al., 2017). The corridor model aims to unclog production bottlenecks, including access to quality seed of consumer demanded varieties and ultimately to satisfy the consumer demand. This model defines three hubs⁷ in the bean value chain—production, distribution, and consumption. PABRA has designated nine bean corridors across Africa based on major driving bean types. Some of the bean types include red mottled and yellow bean that drive the respective bean corridors, which is the focus of this study. Other bean corridors are illustrated in Eliud et al. (2017) and **Figure 1**. The current study focuses on the informal trade flows for common bean and cassava varieties in Eastern DRC provinces of North and South Kivu, which fall in the East Africa Red Mottled bean corridor. It attempts to indicate possible consumption, distribution, and production hubs for the cassava crop.

⁴ In South Kivu, women and girls are mostly responsible for bean cultivation and marketing and make many of the decisions on input use, their qualities and quantity. Men and youth support land clearing, planting, harvesting, storage, and beating beans.

⁵ For women in South Kivu, some barriers to full participation in cooperatives include (1) the low overall number of women participating in cooperatives as compared to men, (2) a lack of literacy in Swahili and French language skills, (3) a low level of skills to lead or manage groups (4) and requirements for women to have their husbands or partners permission to participate in groups. Furthermore, time burdens related to household tasks and agricultural work, the timing of cooperative meetings, and the distance to travel to such meetings also serve as key challenges to female participation.

⁶ The corridors are based on PABRA's assessment of the bean trade in Africa, which has revealed major flows of the crop between areas of production and consumption, connected by distribution networks.

⁷ **Production hubs** comprise the major bean production areas within the corridor, characterized by marketable volumes of produce. **Distribution hubs** connect production and consumption hubs. They are comprised of product distribution centers, aggregation centers, warehouses and storage points, commodity exchanges and transportation. **Consumption hubs** comprise major market outlets and/or processing units. They include open markets, supermarkets, and bean processors that source from the relevant production hubs, all of which are linked to large pools of consumers both within and out of a given country.

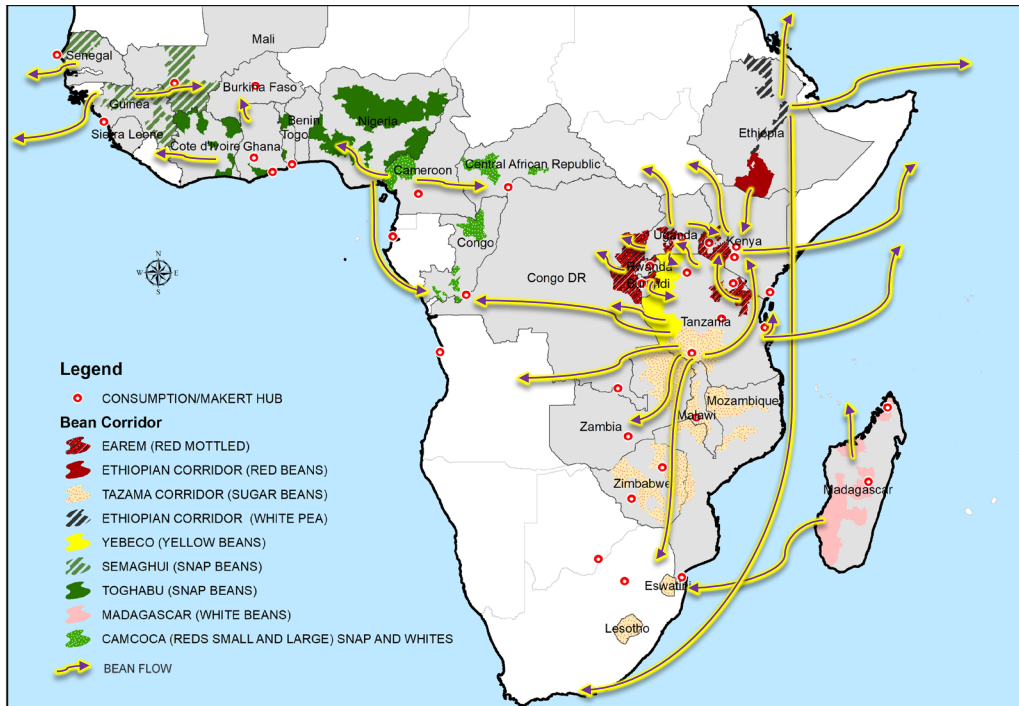


Figure 1: Bean corridors across Africa (PABRA, 2017)

Figure 2 shows the major bean and cassava production hubs in the DRC. In the framework of commodity corridors, North Kivu serves as the primary bean production hub, while South Kivu is a key bean consumption hub. Concerning cassava, South Kivu functions as the major production hub. However, for both commodities, consumption hubs extend to other provinces within the country.



Figure 2: Map of major bean and cassava producing areas in the DRC, by province

The study documents how markets and resilience efforts, along with local stakeholders, influence the seed and planting material supply system and how new approaches and investments can be made to strengthen these markets sustainably. The study further provides data and evidence on the movements and flows of various common beans and cassava varieties traded locally within and outside of the Eastern DRC region. The study also reveals where the different value-chain nodes' efforts are needed to drive access to seed and better business experiences. These findings illustrate the need to invest in knowledge and stakeholder platforms for rejuvenating markets and seed systems in fragile state. Overall, the study establishes the contribution of informal seed systems to the bean and cassava corridors in the DRC.

The report is organized as follows. **Section one** provides an introduction to the geographic and thematic contexts of the report. **Section two** discusses the survey methodology, including survey design and sampling descriptions. **Section three** presents the findings of the bean and cassava survey in North and South Kivu. **Section four** summarizes conclusions across four focus areas. **Section five** offers recommendations for improving bean and cassava seed supplies in Eastern DRC.

2. STUDY METHODOLOGY

Study Design

This study aimed to:

- a. Characterize the bean and cassava corridor in the Kivu region;
- b. Explore the seed/planting materials to commodity market opportunities in the Kivu region;
- c. Gather data on the role of the major informal traders and local seed/planting material suppliers;
- d. Gather data on the volumes of commodity and seed and planting material traded;
- e. Explore linkages between traders, seed/planting material suppliers, and other sector stakeholders; and
- f. Assess demand for and access to quality seed/planting material.

The study was implemented in a partnership between the Alliance through PABRA, INERA, and IITA. PABRA has a long-standing agreement to work with and support INERA in bean research and development. PABRA is an alliance that comprises membership from national research institutions from 31 countries in Africa and the private sector partners and development and donor organizations that support PABRA. INERA is a member of PABRA and was responsible for implementing the survey on the ground, contributing to report writing and dissemination, and ownership of the survey results. The collaboration with IITA's cassava program was vital in exploring cassava trade and supplies issues in the two target provinces and disseminating the survey results. CRS supported the study through funding from USAID.

The study deployed primary surveys targeting informal grain and seed/planting material traders purposively sampled from 14 major markets in the two provinces. Preference was given to relatively large traders to get deeper insights into their operations and challenges. Key informant interviews of major stakeholders – including international NGOs and development partners, government officials, and research and extension agencies – complemented the survey in the two provinces. The purpose of the KIIs was to gain deeper insights into the constraints and opportunities underlying the seed supply system. Information from crucial players was received about the status of the seed system in the DRC. It focused on beans and cassava and had been generated earlier before the survey.

Description of Sample

Varieties identified by INERA research as promoted in the provinces are listed under **Annex 1**. The major cassava and bean markets in the target provinces are shown in **Figure 3**.

The key markets surveyed in the North Kivu province include Goma, Kiwanja, Sake, Shasha, Butembo, Beni, and Masisi-Kichanga. Those in the South Kivu province include Bukavu, Mugogo, Uvira, Mudaka, Katana, Kamanyola, and Minova. The local market of Kasindi, a cross-border market and that of Walikale, was not visited due to security issues in the region during the data collection period. The traders interviewed were identified using a list generated in each market, assisted by market administrators and based on the kind of product they traded in (both seed/planting material and grain or cassava and its products). A gender, youth, and people with disability lens was integrated into the seed system assessment, with an aim to include a balanced respondent pool comprised of a minimum of 30% women and youth.

Trained enumerators administered questionnaires from INERA Mulungu to collect data on different aspects of seed systems. Focus group discussions were not conducted due to the prevailing COVID-19 situation. However, KIIs were conducted to draw specific insights from the humanitarian actors and government staff (see **Annex 2** for list).

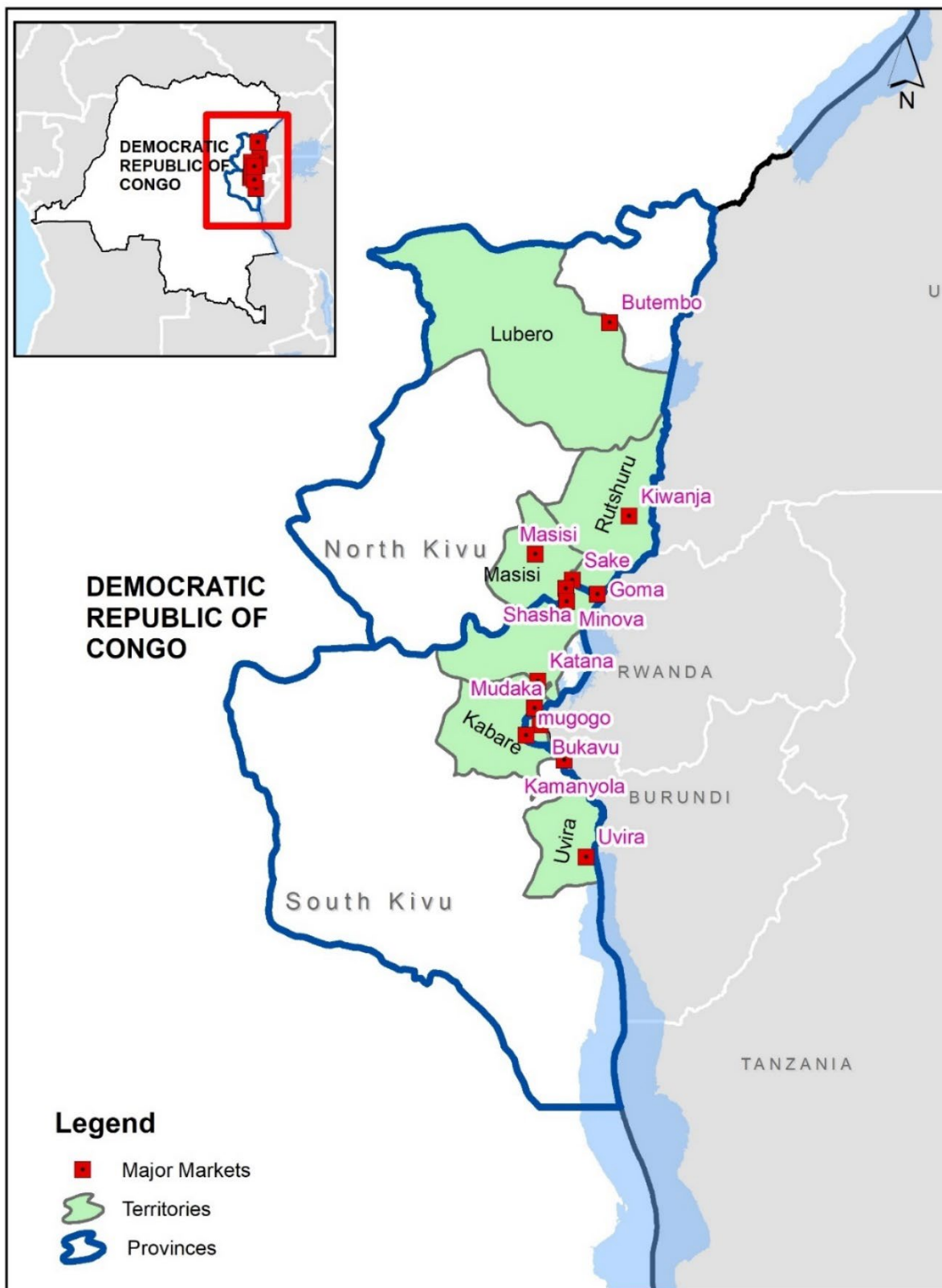


Figure 3: Key bean and Cassava markets surveyed in North and South Kivu provinces

3. FINDINGS

Locations of the Surveyed Bean and Cassava Corridor Hubs

The survey was conducted in the North and South Kivu Provinces of the DRC. The sample comprised of 484 bean and 377 cassava traders. The samples were proportionally distributed between the two provinces. North Kivu had a larger share since it also accounts for more traded bean and cassava commodities (Table 1). The survey was conducted across five territories of south Kivu and five territories of North Kivu Province.

Table 1: Distribution of surveyed traders, by province and commodity

Province	Beans	Cassava	Total (n)	Total (%)
North Kivu	291	208	474	57.25
South Kivu	193	169	354	42.75
Total	484	377	828*	100

*25 traders in North Kivu and 8 in South Kivu sold both bean and cassava

More traders were in North Kivu for beans and cassava in both cases. There were variations in the number of traders by territory.



Figure 4: Map of the study area

Demographic and socioeconomic characteristics of traders

Table 2 shows the distribution of traders who took part in the survey by age and sex. Across the two commodities, more than half of the traders were between 30 and 45 years. Most of the surveyed traders were female – 84% for beans and 75% for cassava.

Table 2: Age of bean and cassava traders

Age	% of bean traders			% of cassava traders		
	Female	Male	Total	Female	Male	Total
15 to 29	20.39	11.69	19.01	26.22	23.08	25.46
30 to 45	50.86	62.34	52.69	51.05	49.45	50.66
46 to 65	27.52	24.68	27.07	19.93	26.37	21.49
66 and above	1.23	1.3	1.24	2.8	1.1	2.39

Education level and business experience of traders

Female traders had relatively lower education levels across both bean and cassava traders. Nearly 28% of female traders received no formal education, as compared to only 6% of their male counterparts. Only 32% of female traders have attained post-primary education, as compared to 62% of their male counterparts. Across the commodities, bean traders tended to have higher rates of post-primary education than cassava traders (**Table 3**).

Table 3: Education level of bean and cassava traders

Education	% of bean traders			% of cassava traders			Combined trader data		
	Female	Male	Total	Female	Male	Total	Female	Male	Total
No formal	24.32	1.3	20.66	31.47	9.89	26.26	27.57	6.37	23.55
Primary	41.52	28.57	39.46	39.16	29.67	36.87	40.54	31.21	38.77
High school	33.66	50.65	36.36	28.32	51.65	33.95	31.15	49.68	34.66
Tertiary	0.49	19.48	3.51	1.05	8.79	2.92	0.75	12.74	3.02

Experience in business

Bean traders were relatively more experienced in their businesses than cassava traders, with a majority having experience with at least five years in business (approximately 87% compared to 69% for cassava traders). Conversely, cassava traders had far more traders with under 5 years of business experience (31%, as compared to 23% of their bean trading counterparts). There was no significant difference between the business experience of male and female traders (**Table 4**).

Table 4: Number of years in bean and cassava business

Age	% of bean traders			% of cassava traders		
	Female	Male	Total	Female	Male	Total
1 - 4 years	23.34	20.78	22.93	31.12	29.67	30.77
5- 9 years	30.96	38.96	32.23	27.27	31.87	28.38
10 - 14 years	17.94	14.29	17.36	18.88	18.68	18.83
15 and over	27.76	25.97	27.48	22.73	19.78	22.02

Pearson chi2 (3) = 0.8345 Pr = 0.841

Bean purchasers primarily used the commodity for food purposes (87%), followed by re-sale (37%) and planting (34%) (**Table 5**). Other uses indicated were mainly wholesaling and a combination of these uses (e.g., both food and planting).

Table 5: Use of bean grains bought by customers

Use	% of traders			Total (responses)	Chi2/p*
	Female	Male	Total		
Food	91.65	62.34	86.98	421	49.124***
Planting	33.42	37.66	34.09	165	0.52
Re-selling	35.38	42.86	36.57	177	1.56
Others	1.23	0	1.03	5	0.956

*** Significant at 0.01 level

Most bean traders were retailers (73%), followed by collectors (33%) and wholesalers (7%). Female retailers dominated retail trade (78%), while male traders dominated aggregation level and export trade (53%). The differences in business types by female and male traders were significant (Table 6).

Table 6: Type of bean business, by sex of trader

Trader	% of traders [^]			Chi2/p*
	Female	Male	Total	
Retailer	77.89	48.05	73.14	29.338***
Collector/aggregator/broker	29.24	53.25	33.06	16.865***
Wholesaler	7.86	5.19	7.44	0.669
Processor	0.49	1.3	0.62	0.685
Producer-trader	0	3.9	0.62	15.956***
Exporter	2.21	14.29	4.13	23.829***
Others	0.25	2.6	0.62	5.813**

***, ** Significant at 1% and 5% levels, respectively; [^]Multiple responses were allowed

This observation may be attributable to older traders' capital accumulation, enabling them to operate other businesses requiring greater capital. Other business types did not significantly differ between the young and older (>45 years) traders. An analysis of the traders by province also highlights the prevalence of retailers in both provinces, with North Kivu having a significantly higher proportion than South Kivu. However, there were more collectors, aggregators, and/or brokers in South Kivu than North Kivu (38% and 30%, respectively). Many aggregators in South Kivu serve many small informal markets with strong demand and are isolated from major urban areas due to their remote locations. The production of both bean and cassava is also lower in the vicinities of these markets. More exporters are in North Kivu than South Kivu Province (Table 7), implying that larger commodity volumes are produced in nearby production hubs.

Table 7: Type of bean trader, by province

Trader type	% of traders [^]			Chi2/p*
	North Kivu	South Kivu	Total	
Retailer	78.01	65.8	73.14	8.797***
Collector/aggregator/broker	29.55	38.34	33.06	4.05**
Wholesaler	6.53	8.81	7.44	0.875
Processor	1.03	0	0.62	2.002
Producer-trader	1.03	0	0.62	2.002
Exporter	5.84	1.55	4.13	5.385**
Others	1.03	0	0.62	2.002

***, ** significant at 1% and 5% levels respectively; [^]Multiple responses were allowed

Types of business activities

Bean businesses

The main types of business activities undertaken by bean traders were grain trading (96%), with much higher female engagement than that of males (99% and 84%, respectively). Approximately 30% of bean traders engaged in informal/local seed sales, but there was no significant difference between female and male traders. On the other hand, a far greater percentage of males (18%) were engaged in formal certified seed sales as compared to a negligible 2% of females (Table 8).

Table 8: Business activities are undertaken by bean traders

Business activity	% of traders			Chi2/p*
	Female	Male	Total	
Grain trading/selling	98.53	84.42	96.28	36.003***
Informal sector seeds/local seeds	30.71	27.27	30.17	0.364
Formal Certified seed	1.72	18.18	4.34	42.276***
Bean product processing	0.25	0	0.21	0.19
Other crops	0.49	1.3	0.62	0.685
^Others	0.74	1.3	0.83	0.249

***Significant at 1% level of significance ^Multiple response question

There was a significant difference in informal seed sales, which were significantly higher in South Kivu than in North Kivu. Approximately 73% of respondents were bean traders, followed by collectors (33%) and wholesalers (7%). Significantly more female respondents were engaged in retail trade, while significantly more male traders were involved in aggregation and export trade.

Bean Products and Transactions

The average number of varieties or types⁸ of beans sold by a trader was two. Male traders sold, on average, a more significant number of varieties/types than female traders. Approximately 55% of female traders sold only one variety or type of bean, while only 23% of males sold just one. The majority of male traders (40%, as compared to female's 29%) sold two varieties or types, while 26% sold three varieties or types. About 10% of male traders sold more than four types, while the proportion of female traders selling more than four types was only 3% (Table 9).

Table 9: Number of common bean varieties/types traded, April 2020-April 2021

# of varieties	% of traders					N
	Female	Male	North Kivu	South Kivu	Total	
1	54.79	23.38	42.61	60.62	49.79	241
2	29.48	40.26	49.79	29.53	31.2	151
3	12.29	25.97	31.2	7.77	14.46	70
4	2.95	6.49	14.46	2.07	3.51	17
5	0.25	2.6	3.51	0	0.62	3
6	0.25	1.3	0.62	0	0.41	2

Pearson chi2 (5) for sex = 33.4640 Pr = 0.000; Pearson chi2 (5) for province= 22.9910 Pr = 0.000

Across the provinces, traders in South Kivu sold fewer varieties or types, about 61% sold only one as compared to 43% in North Kivu. This observation can further be translated into 1.5 varieties or types for South Kivu compared to 1.91 varieties or types for North Kivu. Wholesalers and other traders supplied the bean grain sold and comprised about 52% of traded beans. Direct supplies from farmers were 22%. Female traders mainly sourced the beans from wholesalers and traders (60%), followed by farmers (20%). Male traders tended to obtain their supplies from three sources – farmers, collectors, and/or aggregators. They

⁸ In this respect, varieties and types are used interchangeably (type includes mixes as one type, not variety)

thus diversified their bean supplies. Overall, female traders largely sought their supplies from wholesalers that had limited capacities for the variety(s) they stocked. Across the provinces, 64% of the bean supplies in South Kivu came from wholesalers and other traders. In South Kivu, this source represented 45%. In South Kivu, owning production and sourcing directly from farmers was more critical than in North Kivu (Table 10).

Table 10: Proportional contribution of different sources of beans sold

Source	Sex of trader		Province		Total
	Female	Male	North Kivu	South Kivu	
Own production	5.80	21.59	11.78	3.78	9.05
Direct from farmers	20.65	28.39	25.95	15.10	22.25
Wholesale and other traders	60.31	18.91	45.23	64.43	51.79
Collectors or aggregators	12.13	22.30	14.16	14.35	14.22
Importers	1.05	1.96	0.67	2.31	1.23
Other sources	0.07	6.85	2.21	0.02	1.46

Mixed beans were the most dominant bean type traded, representing 32% of the 855 bean transactions, and typically included more than two bean types. The red mottled market class led the single bean type trade, representing about 14% of types traded, followed by khaki (9%), black (7%), small reds (7%), and dark red kidney (6%). Yellow and white beans constituted 5% each. Differences in the varieties traded were also observed between male and female traders. More female traders sold small reds and mixed beans than male traders, while more males sold yellow beans than their female counterparts. Across the provinces, more white beans, khaki, yellow, and black beans were sold in North Kivu than South Kivu. On the other hand, more red mottled, small reds, and mixed beans were sold in South Kivu than North Kivu. The results show a higher diversity of bean types in North Kivu than in South Kivu (Table 11).

Table 11: Number of observations for traded bean types, by sex of trader and province

Bean type	Sex of trader		Province		Total	
	Female	Male	North Kivu	South Kivu	N	%
Red mottled	13.6	14.2	11.9	17.1	117	13.7
Sugar type	0.6	2.8	1.2	0.7	9	1.1
White beans	5.3	5.7	7.3	1.7	46	5.4
Purple	3.0	2.3	3.6	1.4	24	2.8
Dark red kidney	6.0	6.8	5.3	7.9	53	6.2
Small reds	8.4	1.7	2.5	15.8	60	7.0
Khaki	8.4	9.1	11.7	2.4	73	8.5
Mixed	33.1	26.7	29.0	37.3	272	31.8
Yellow	3.7	11.9	6.6	3.1	46	5.4
Black	7.5	6.3	10.1	1.7	62	7.3
Grey	3.5	5.1	4.8	2.1	33	3.9
Others	6.9	7.4	6.0	8.9	60	7.0
N	679	176	563	292	855	100

Each trader, on average, sold just under 60 MT for the year ending April 2021. The “other” category of bean types had a higher mean of 86 MT for one year, followed by yellow beans (76 MT), mixed beans (74 MT), and white beans (73 MT). The amount of “other” beans sold ranged between 20 and 54 MT. Despite these relatively large tonnages, the range of means provided in Table 12 attests to the high variability in volumes handled by the traders. For example, after white beans, the next highest mean jumps down to 55

MT for red mottled beans, with four additional bean types falling between the 40-55 MT range. Khaki beans, small reds, and sugar beans were, by far, the least sold (28 MT, 20 MT, and 7 MT, respectively).

Table 12: Volume of beans sold (MT), April 2020-April 2021

Bean type	Obs.	Mean	Std. Dev.	Median	Min.	Max.
Red mottled	112	54.92	116.01	8.1	0.12	720
Sugar type	9	6.72	2.98	6.0	1.8	12
White beans	46	73.10	270.11	3.6	0.24	1440
Purple	23	52.30	113.88	17.0	0.12	525
Dark red kidney	52	49.14	105.17	16.2	0.1	648
Small reds	60	19.51	28.53	8.68	0.24	122.4
Khaki	71	28.00	69.94	7.2	0.12	500
Mixed	263	74.48	218.59	9.0	0.105	1728
Yellow	43	75.85	185.62	7.5	0.12	900
Black	60	47.32	160.06	6.0	0.1	1200
Grey	32	46.70	110.04	13.2	0.4	518.4
Others	55	86.01	167.43	16.0	1	754.2
Total	826	58.60	169.55	8.52	0.1	1728

When looking at trends across provinces, average a greater volume of beans overall were sold in North Kivu (62 MT) than South Kivu (52 MT). Comparing the average volumes of the varieties traded for each province reveals significant differences in white beans, small reds, and mixed beans (**Table 13**). White beans were more often sold in South Kivu (524 MT) than in North Kivu (18 MT). Conversely, more significant amounts of mixed beans were sold in North Kivu (99 MT) than South Kivu (39 MT), as were small reds (34 MT and 15 MT, respectively). There were relatively fewer variety observations in South Kivu, while the North Kivu showed a more extensive diversity. For example, the major varieties traded in South Kivu include white beans, “other” types, red mottled, mixed, and small reds. In the North Kivu province, the major types sold were mixed, yellow, dark red kidney, purple, and red mottled.

Table 13: Volume of beans sold (Mean MT), April 2020-April 2021, by sex of trader and province

Bean type	North Kivu		South Kivu		p>t
	Mean MT	n	Mean MT	n	
Red mottled	50.77	62	60.07	50	0.6750
Sugar type	7.02	7	5.70	2	0.6154
White beans	18.02	41	524.72	5	0.0000***
Purple	57.20	20	19.63	3	0.6058
Dark red kidney	61.47	29	33.59	23	0.3474
Small reds	33.91	14	15.13	46	0.0298**
Khaki	30.16	64	8.24	7	0.4349
Mixed	99.09	155	39.15	108	0.0284**
Yellow	89.54	35	15.99	8	0.3177
Black	47.09	55	49.86	5	0.9708
Grey	52.76	27	13.99	5	0.4784
Others	57.02	30	120.80	25	0.1615
Total	62.13	539	51.98	287	0.4133

***, ** significant at 1% and 5% levels, respectively

The prices of traded varieties differed amongst male and female traders. Male traders received significantly higher prices for dark red kidney, small red, grey, and red mottled varieties relative to their female

counterparts (**Table 14**). Among the female traders, beans that fetched the highest prices include the yellow, “other” types, and white. Dark red kidney and small reds were amongst the highest priced beans for male traders. Price differences amongst male and female traders stem in part from their differences in market access. Whereas men are often able to access more distant markets where higher prices can be obtained, women tend to be limited to local markets close to production areas.

Across the provinces, differential costs reflect various supply and demand factors. North Kivu is the larger production hub but also represents a more productive economy that can pay higher prices as compared to South Kivu. The traders' differences in the highest prices are also noted across the two provinces for certain bean types (e.g., dark red kidney and grey beans), though, for most, the differential cost is not significant. This is perhaps attributable to the fact that there are fewer overall transactions for these specific products. On the lower side of the prices, there were differences in the red mottled, dark red kidney, small red, and grey varieties. Across the provinces, differences in the lowest prices received were noted for small red types, where North Kivu traders received relatively higher prices than traders in South Kivu.

Table 14: Highest bean price (Mean CDF/KG), April 2020-April 2021, by sex of trader

Bean type	Sex of trader		p>t	North Kivu	South Kivu	Average	p>t
	Female	Male					
Red mottled	1,931	2,331	0.009***	2,036	1,985	2,014	0.6908
Sugar type	1,871	2,100	0.4461	2,057	1,792	1,998	0.4608
White beans	2,063	1,879	0.3481	1,991	2,280	2,023	0.2639
Purple	1,778	1,363	0.1392	1,617	2,167	1,708	0.0454**
Dark red kidney	1,788	3,261	0.000***	2,353	1,820	2,121	0.0221**
Small reds	1,912	3,233	0.0002***	2,211	1,908	1,978	0.1106
Khaki	1,780	1,933	0.2966	1,833	1,633	1,813	0.3349
Mixed	1,774	1,712	0.4593	1,795	1,714	1,763	0.213
Yellow	2,285	2,197	0.6624	2,279	2,107	2,245	0.4991
Black	1,708	1,695	0.9063	1,703	1,737	1,705	0.8103
Grey	1,624	2,383	0.004***	1,961	1,244	1,831	0.0216**
Others	2,089	2,333	0.2294	1,979	2,366	2,143	0.0209**

***, ** significant at 1% and 5% levels, respectively; 1 USD=1982 Congolese Franc

Most bean buyers were individual consumers accounting for 74% of the observations. Comparing buyers by province indicates that significantly more traders in North Kivu (77%) sold to individual consumers than South Kivu (69%). Traders from North Kivu also sold more to institutional bean buyers than their counterparts in South Kivu (**Table 15**). Most of the traders' bean customers were women (69%). Female traders had far more female customers (71%) than did male traders (57%).

Table 15: Type of buyers for bean grain

Type of buyers		North Kivu	South Kivu	Total	chi2/p*
Individual consumers	n	432	201	633	6.236**
	% of traders	76.73	68.84	74.04	0.013
Institutional buyers	n	31	9	40	2.533
	% of traders	5.51	3.08	4.68	0.111
Traders	n	227	199	426	59.573***
	% of traders	40.32	68.15	49.82	0
N (traders)		563	292	855	

***, ** significant at 1% and 5% levels respectively

Trade in the Bean Varieties

Traders sold mixed beans, single bean types, or both mixtures and pure varieties. More female traders sold only mixed beans than male traders, while more male traders sold mixed and pure types than female traders.

In addition, a slightly higher number of female traders sold single varieties than male traders. These differences were statistically significant. However, there were no significant differences between the age of traders and the province of trader (Table 16).

Table 16: Percentage of traders selling mixed or pure varieties, by sex of trader, age of trader, and province

	Percent of traders selling			Chi/*
	Mixed beans only	Pure varieties only	Both mixed and pure	
Female	25.8	51.11	23.1	7.4357**
Male	15.58	48.05	36.36	
45 & below	24.78	49.57	25.65	0.5519
Over 45	22.63	53.28	24.09	
North Kivu	21.99	51.89	26.12	1.9077
South Kivu	27.46	48.7	23.83	
Total	24.17	50.62	25.21	

** significant at 5% level

Mixed beans earned the highest total value (USD 15.5 million), followed by the red mottled (USD 5.5 million), yellow beans (USD 3.3 million), and white beans (USD 3.0 million). Other beans with at least USD 1 million in trade include “other” types, dark red kidney, black, khaki, and grey. The total value of the traded grain was USD 41 million, derived from the sale of 48,000 MT of grain. While yellow, dark red kidney, “other” types, and white beans fetched relatively higher prices (>USD 900/MT), black, purple, mixed, and grey beans fetched relatively lower prices in the markets (<USD 800/MT) (Table 17).

Table 17: Value of beans traded

Bean type	Total volume traded MT	Total value USD	Average price USD/MT	Average price CDF/KG
Red mottled	6,151.05	5,525,903	898.4	1,796.74
Sugar type	60.52	53,459	883.3	1,766.67
White beans	3,362.57	3,063,411	911.0	1,822.07
Purple	1,202.88	908,529	755.3	1,510.59
Dark red kidney	2,555.34	2,405,294	941.3	1,882.56
Small reds	1,170.89	979,734	836.7	1,673.49
Khaki	1,988.22	1,606,045	807.9	1,615.56
Mixed	19,587.91	15,469,970	789.8	1,579.54
Yellow	3,261.72	3,301,475	1012.2	2,024.38
Black	2,839.36	2,136,332	752.4	1,504.80
Grey	1,494.49	1,182,000	791.0	1,581.81
Others	4,730.66	4,450,645	941.0	1,881.62
Total	48,405.61	41,082,799		

Export of Beans

A very small percentage of traders were engaged in the export trade of beans. While there was no difference between males and females, significant differences for exports are observed between the two provinces. Most of the export trade was via North Kivu (3%) compared to only 1% in South Kivu. Primary export recipient countries include Burundi, Uganda, and Rwanda. The tonnage of the beans exported was about 1068 MT. Mixed beans served as a key commodity on the export market both in terms of the number of exporters and as well as the value of exports (Table 18).

Table 18: Volume of beans exported (MT)

Bean type	Mean MT	n	Total MT
White beans	345.60	1	345.60
Dark red kidney	43.43	2	86.85
Khaki	56.88	1	56.88
Mixed	38.79	13	504.22
Black	33.66	2	67.32
Grey	3.48	2	6.96
Total	50.85	21	1,067.83

Bean flow maps

Based on the interviews conducted with bean traders, **Figure 5** visualizes sources and destinations/selling locations for grains, illustrating that beans from North Kivu are typically sent to other markets or provinces – thus confirming the province as a central production hub – while South Kivu receives beans from different sources, including from North Kivu. **Figure 5** also shows the rest of the production hubs for the beans traded in the two provinces. The interview data also indicated that significant markets or consumption hubs receive beans from multiple sources, leading to the observed diversity of bean types on the market.

Figure 6 shows the bean volumes traded in each territory and the markets therein. Red and red mottled beans dominate South Kivu markets, interspersed with white beans. In North Kivu, yellow and black beans are dominant though there are also some red beans. The volumes traded include locally produced beans but primarily reflect the status of the consumption hubs.

Income distributions among the bean traders

Incomes from bean business significantly differed between most of the female and male traders. Female traders were more likely to earn the lower bracket of less than USD 25 per month (35%) as compared to male traders (13%). The same is true of the next income bracket of USD 25 to 75. The percentage of male traders was greater for the higher income brackets exceeding USD 75 per month. For example, only 9% of females earned beyond USD 125 per month, while 45% of male traders earned more than this figure. There were, thus, significant disparities in incomes from bean trade between male and female traders.

The study found there to be significant differences in bean trader income levels by province. While a significant portion of South Kivu traders fell within the income band of USD 50 to 75, traders in North Kivu tended to fall into the higher income bands. Thus, significantly higher incomes are earned from bean businesses in North Kivu than in South Kivu.

Younger traders (15-29 years of age) generally earned much less income, comprising 52% of the traders in the lowest income bracket of USD 25 per month (**Table 19**). Revenues tended to increase significantly with the age of the traders. This may be attributable to the fact that, as traders earn income from their business, they progressively have higher capital that can then be re-invested into the business to further increase profitability.

Results from the analyses of the effects of age and gender illustrate the more significant challenges faced by younger female traders relative to younger male traders. Younger female traders are prevalent within the low-income band, with more than 56% earning USD 25 compared to 11% younger male traders. The results also show that many women much older than 65 years also earn incomes. Though men and women are affected differently, both age and sex are critical factors to examine when considering empowerment in business.



Figure 5: Source and sale areas (production hubs) for beans grain

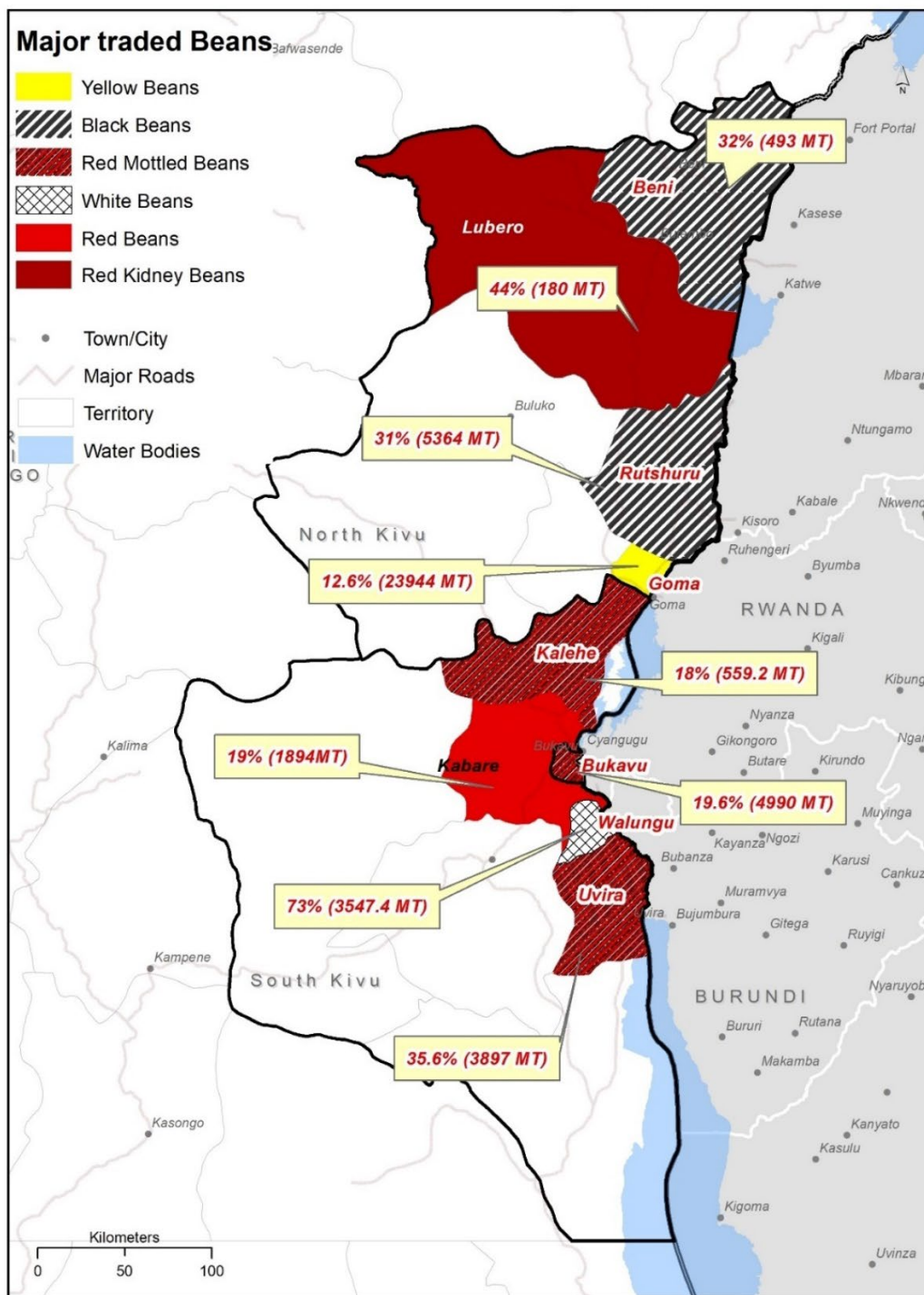


Figure 6: Major traded beans and their quantities (MT) in key consumption hubs

Table 19: Income level from bean business per month (2000 CDF = 1\$), by age of trader

Income level	15 to 29	30 to 45	46 to 65	66+	Total
Below CDF 50000	52.17	28.24	24.43	33.33	31.82
CDF 51000 – 150000	34.78	36.86	35.11	16.67	35.74
CDF 151000 – 250000	7.61	19.22	22.14	33.33	17.98
CDF 251000 – 500000	5.43	9.8	10.69	0	9.09
Above CDF 500000	0	5.88	7.63	16.67	5.37

Cassava Products and Transactions

Cassava businesses

Most cassava businesses tended to sell dried cassava root (58%). Dried cassava roots are used to mill into cassava flour as an intermediate product. There were significant gender differences in the sale of certified planting materials, with males selling more than their female counterparts. Such planting materials were sold mainly to development partners. This reflects that a larger share of men were able to search and negotiate with such partners, while this advantage was not available to women, who tend to have more localized businesses. Additionally, male traders dominated fresh cassava root/leaves sales, and female traders dominated the cassava flour trade (**Table 20**). Cassava varieties under formally certified planting materials include those mainly released under INERA, with support from FAO, IITA, and other partners (e.g., Sawa Sawa, Mapendo, Naro-Cas1, among others). Results indicate that certified planting materials were primarily sold to NGOs and other development organizations and were mainly used for aid work in the provinces.

Table 20: Type of cassava businesses conducted, by sex of trader

Business line	% of traders			Chi2/p*
	Female	Male	Total	
Dried cassava trade/sale	55.24	64.84	57.56	2.599
Informal sector/local seed	5.24	5.49	5.31	0.009
Fresh cassava root and leaves sale	22.38	13.19	20.16	3.623*
Formal certified planting material	1.05	13.19	3.98	26.622***
Cassava Flour	21.68	8.79	18.57	7.583***
Other	0.7	0	0.53	0.64
N	286	91	377	

***, * significant at 1% and 10% levels, respectively

Results also indicate significant differences between younger and older cassava traders (**Table 21**). This observation was mainly in the informal planting materials trade, where younger traders participated more than older traders. On the other hand, older (45+) traders were more engaged in formal, certified planting materials than were their younger counterparts.

Table 21: Cassava products traded, by age of trader

Product	% of traders			Chi2/p*
	45 & younger	Over 45	Total	
Dried cassava trade/sale	55.4	64.44	57.56	2.294
Informal sector/local seed	6.62	1.11	5.31	4.139**
Fresh cassava and leaves sale	12.54	6.67	11.14	2.39
Formal certified planting	2.79	7.78	3.98	4.466**
Cassava flour	10.1	8.89	9.81	0.114
Other	18.82	17.78	18.57	0.049
N	287	90	377	

** significant at 5% level

Across the provinces, significant differences are also observed in the cassava businesses (**Table 22**), as dried cassava root trade was significantly higher in North Kivu (66%) relative to South Kivu (47%). Similarly, informal seed sales were considerably higher in North Kivu than in South Kivu. On the other hand, fresh cassava root and cassava flour were much higher in South Kivu (27%) than North Kivu (14%). The results point to South Kivu being a significant consumer of cassava products (flour, fresh, and leaves), whereas North Kivu primarily focuses on production (dried cassava and planting materials) for consumption in South Kivu.

Table 22: Type of cassava businesses conducted, by province

Business line	% of traders			Chi2/p*
	North Kivu	South Kivu	Total	
Dried cassava root trade/sale	66.35	46.75	57.56	14.664***
Informal sector/local planting material	8.65	1.18	5.31	10.358***
Fresh cassava root and leaves sale	14.42	27.22	20.16	9.485***
Formal certified planting	3.37	4.73	3.98	0.457
Cassava flour	11.54	27.22	18.57	15.163***
Others	0.48	0.59	0.53	0.022
N	208	169	377	

*** significant at 1% level

Retailers were the primary type of trader, the majority of which were female. Male traders, on the other hand, dominated aggregation and export level cassava businesses (**Table 23**). Thus, the trend was similar to that of bean businesses. Results on business types by the age of trader did not show significant differences between the traders.

Table 23: Cassava business types, by sex of traders

Business type	% of traders			Chi2/p*
	Female	Male	Total	
Retailer	67.13	51.65	63.4	7.133***
Collector/aggregator/broker	32.87	46.15	36.07	5.285**
Wholesaler	9.79	5.49	8.75	1.595
Producer-trader	0.35	2.2	0.8	2.987*
Exporter	3.5	10.99	5.31	7.714***
Depositary	0.35	0	0.27	0.319
Others	0.35	1.1	0.53	0.734
N	286	91	377	

***, **, * significant at 1%, 5% and 10% levels, respectively

Cassava Products

Dry cassava root was the main cassava product sold, constituting 60% of the traders' businesses (**Table 24**). Fresh root cassava comprised 14%, while cassava leaves used for vegetables was 12%. Cassava cuttings [for planting materials] were sold by 9% of the traders. Significant differences were observed between male and female traders, especially in the sale of fresh root cassava and cassava leaves, which were dominated by female traders and cuttings dominated by male traders.

Table 24: Main cassava products sold, by sex of trader

Product	Female		Male		Total	
	n	%	n	%	n	%
Fresh root cassava	47	16.43	7	7.69	54	14.32
Dry cassava root	169	59.09	56	61.54	225	59.68
Cassava leaves	38	13.29	7	7.69	45	11.94
Cuttings for planting	19	6.64	16	17.58	35	9.28
Cassava flour	13	4.55	5	5.49	18	4.77
Total	286	100	91	100	377	100

Pearson chi2 (4) =14.5904 Pr=0.006

Provincial comparisons show significant differences between North and South Kivu; whereas South Kivu dominated raw cassava root sales, North Kivu dominated sales of dry cassava root, cassava cuttings, and cassava flour product (**Table 25**).

Table 25: Main cassava product sold, by province

Products	North Kivu		South Kivu		Total	
	n	%	n	%	n	%
Fresh/raw cassava	16	7.69	38	22.49	54	14.32
Dry cassava root	131	62.98	94	55.62	225	59.68
Cassava leaves	22	10.58	23	13.61	45	11.94
Cuttings for planting	23	11.06	12	7.1	35	9.28
Cassava flour	16	7.69	2	1.18	18	4.77
Total	208	100	169	100	377	100

Pearson chi2 (4) = 25.6557 Pr = 0.000

The cassava sold was sourced from four major suppliers: own farm production, farmers, traders, and collectors. Importers represented a minimal fraction of overall suppliers. Fresh cassava roots mainly came from own farm production, farmers, or traders, while dry cassava mainly came from traders and farmers. Cassava leaves mainly came from farmers, while cuttings came from own production and farmers. Thus, the supply of the products was highly diversified from a number of different sources for each product (Table 26). Traders in cassava flour could only trace their products to other traders.

Table 26: Source of cassava products sold

Source	% from the source - average					
	Fresh cassava	Dry cassava roots	Cassava leaves	Planting material	Cassava flour	All combined
Own production	34.13	11.55	19.70	39.64	0.00	19.12
Farmers	23.93	31.95	47.27	36.91	5.00	33.32
Traders	25.33	35.50	18.94	3.18	83.33	28.22
Collectors	11.00	14.01	13.79	3.27	6.11	12.34
Importers	5.53	7.00	0.30	0.64	5.56	5.19
Other	0.07	0.00	0.00	16.36	0.00	1.81

Both male and female traders were primarily involved in dry cassava. Women were also more involved in the raw cassava root trade, while men had higher involvement with cassava cuttings (Table 27).

Table 27: Cassava products, by sex of trader

Product	Female		Male		Total	
	n	%	n	%	n	%
Fresh/raw cassava	64	17.07	11	8.87	75	15.03
Dry cassava roots	215	57.33	70	56.45	285	57.11
Cassava leaves	58	15.47	8	6.45	66	13.23
Cuttings for seed	25	6.67	30	24.19	55	11.02
Cassava flour	13	3.47	5	4.03	18	3.61
Total	375	100	124	100	499	100

The number of cassava products sold varied among female and male traders, though not significantly. Females handled larger volumes of fresh cassava than males while males dealt with larger volumes of dry cassava and cassava leaves. However, raw cassava's weight differences are not synonymous with higher sales values (Table 28).

Table 28: Quantity of cassava products sold (mean MT), by sex of trader

Product	Female	Male	Total	p>t
Fresh cassava roots	217.43	107.38	200.14	0.488
Dry cassava	73.71	119.77	84.51	0.175
Cassava leaves	90.39	308.43	111.84	0.206
Cassava flour	19.41	40.44	25.25	0.349

Across the provinces, there were significant volume differences for fresh cassava between North and South Kivu, with South Kivu commanding a substantial portion of the product, particularly for fresh cassava. North Kivu had a higher proportion of cassava leaves, but this did not show any significance, possibly due to limited observations of this product in South Kivu (Table 29). In addition to differences in the quantity of cassava sold across the provinces, there were also significant differences in prices for fresh cassava roots and cassava leaves, as North Kivu trader fetched higher prices for both products.

Table 29: Quantity of cassava products sold (Mean MT), by province

Product	North Kivu	South Kivu	Average	p>t
Fresh cassava	12.95	275.01	200.14	0.038**
Dry cassava	84.75	84.15	84.51	0.984
Cassava leaves	181.69	29.51	111.84	0.138
Cassava flour	25.08	26.60	25.25	0.963

** significant at 5% level

The cassava prices differed between male and female traders for dry cassava, with male traders receiving higher prices than female traders. There was no significant difference in prices received by male and female traders for other products (Table 30). The price differences stem from relatively higher negotiation power of males and female's lack of access to access more distant markets, which tend to fetch better prices than the localized markets where women traders dominate.

Table 30: Sale prices for cassava products (Mean CDF/KG), by sex of trader

Product	Female	Male	Total	p>t
Fresh cassava	671.1	664.4	670.0	0.951
Dry cassava	742.5	881.6	726.1	0.092*
Cassava leaves	595.0	525.0	587.2	0.674
Cassava flour	925.0	916.7	922.4	0.936

* significant at 10% level

Sales prices for cassava products

The study also sought sale prices (means and medians) at different stages of the cassava value chain to understand the variation between wholesale and retail levels. However, in some instances, the margins between sales to traders and consumers are negative due to a minimal number of observations. Tables 31 and 32 shows these dynamics by province. Additional insights are provided in the Appendix.

Table 31: Mean sale prices (CDF/KG) of cassava products to consumers and traders, by province

	North Kivu			South Kivu			Overall		
	Consumer price	Trader price	Difference*	Consumer price	Trader price	Difference	Consumer price	Trader price	Difference
Fresh/raw cassava	911	623	287	583	555	27	709	569	140
Dry cassava	776	648	127	792	659	133	781	654	127
Cassava leaves	772	442	330	361	381	(19)	588	426	161
Cassava flour	954	761	193	900	1000	(100)	947	821	126

* consumer price less trader price

Table 32: Median sale prices (CDF/KG) of cassava products to consumers and traders, by province

	North Kivu			South Kivu			Overall		
	Consumer price	Trader price	Difference*	Consumer price	Trader price	Difference*	Consumer price	Trader price	Difference*
Fresh/ raw cassava	1000	550	450	500	500	-	650	500	150
Dry cassava	750	583	167	800	667	133	788	600	188
Cassava leaves	1000	400	600	180	375	(195)	550	400	150
Cassava flour	1000	708	292	900	1000	(100)	1000	854	146

* consumer price less trader price

Cassava product flow map

The flow of cassava into and out of the two provinces is illustrated in **Figure 7**. Major cities and towns – including Goma, Rutchuru, Butembo, and Beni in North Kivu and Uvira and Bukavu in South Kivu – serve as primary market and consumption hubs within the provinces. Cassava products come from both within and outside these provinces, which serve as both cassava transport and consumption hubs. However, a very low quantity of cassava was exported, primarily to Burundi and Rwanda. Only 2% of the traders engaged in exporting cassava. Typically shipped under NGO or project arrangements that work within and DRC and neighboring countries such as Burundi, cuttings were the primary cassava product exported. These materials were mainly from research institutions and thus part of the formal system. There are more flows into North Kivu from elsewhere (including South Kivu), indicating that North Kivu provides a central consumption hub for cassava in the region.

Incomes from cassava significantly varied across the male and female traders. Whereas 57% of female traders earned less than CDF 50,000, the same is true for only 31% of their male counterparts. Male traders dominated the higher cassava incomes brackets, defined as those earning greater than CDF 151,000 (**Table 33**). There were no significant cassava income differences between North and South Kivu.

Table 33: Income level from cassava business per month, by sex of trader and province

Income level	Female	Male	Total	North Kivu	South Kivu	Total
Below CDF 50000	56.64	30.77	50.4	49.52	51.48	50.4
CDF 51000 – 150000	27.97	27.47	27.85	27.4	28.4	27.85
CDF 151000 – 250000	10.14	27.47	14.32	16.83	11.24	14.32
CDF 251000 – 500000	4.2	9.89	5.57	5.77	5.33	5.57
Above CDF 500000	1.05	4.4	1.86	0.48	3.55	1.86

Pearson chi2 (4) = 31.8385 Pr = 0.000 (Gender)

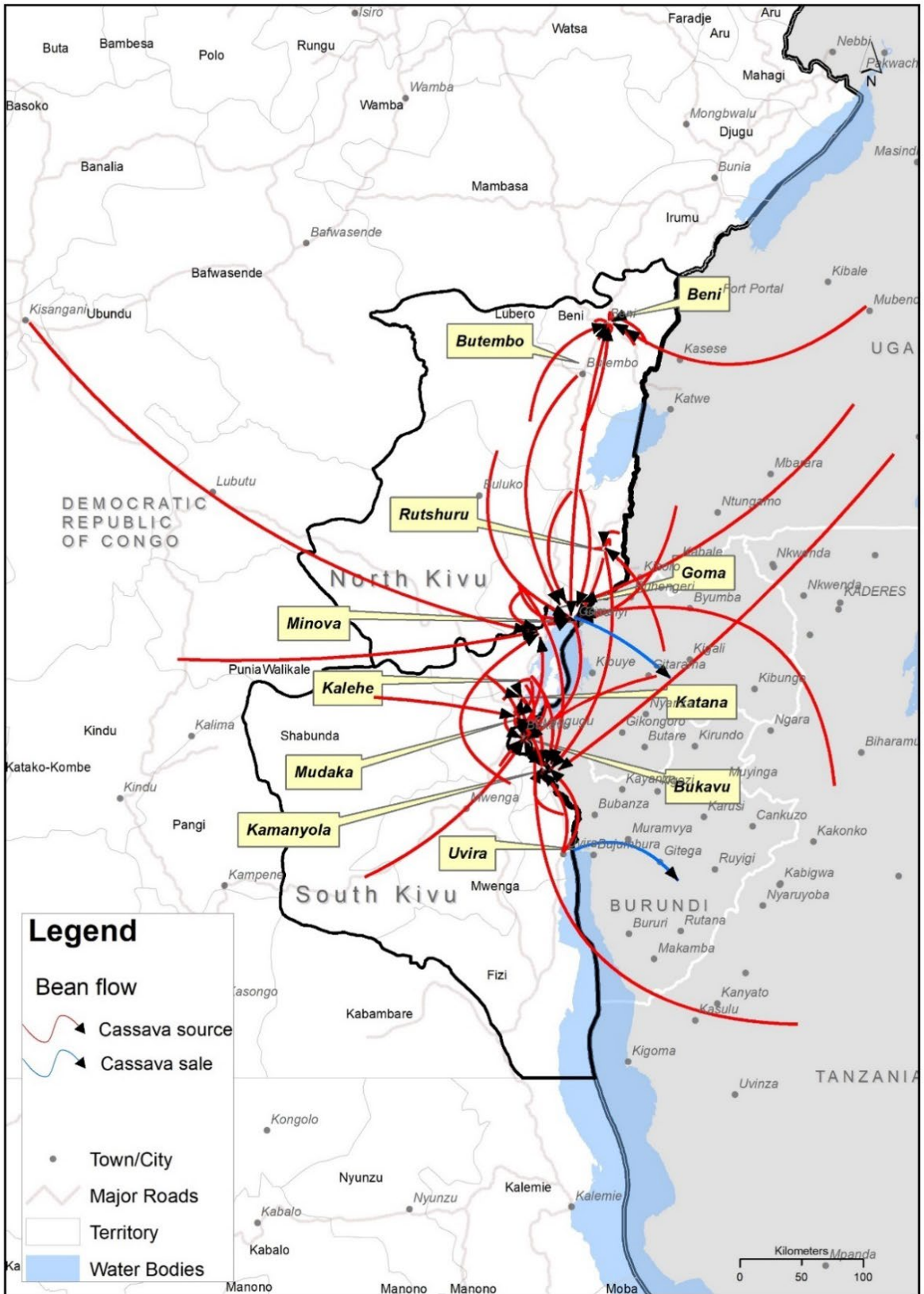


Figure 7: Cassava source and sale areas

Paid employment in bean and cassava businesses

The majority of bean businesses (75%) either did not employ any staff or employed only one to manage the business (**Table 34**). However, the number of employees varied significantly between male- and female-managed businesses. Whereas 84% of women-led businesses had one or no employee, only 30% of male-managed businesses fell into this category. Slightly less than 50% of male businesses employ between 2-5 employees, compared to 15% for female businesses. Roughly 21% of male-managed businesses employed more than five staff, while the same was true for less than 1% of female-managed businesses. The results further indicate that businesses in North Kivu employed significantly more staff than South Kivu; only 8% employed at least two staff in South Kivu as compared to North Kivu's 36%.

Table 34: Number of employees in the bean business, by sex of trader and province

Employees	Female	Male	North Kivu	South Kivu	Total
1 or none	83.78	29.87	64.26	91.71	75.21
2 – 5 employees	15.48	49.35	30.24	6.74	20.87
More than 5 employees	0.74	20.78	5.5	1.55	3.93

Pearson chi2 (2) Sex = 126.8791 Pr = 0.000; Pearson chi2 (2) province = 46.9442 Pr = 0.000

In the cassava businesses, relatively fewer employment opportunities can be observed (**Table 35**). Again, male-managed businesses were more likely to hire at least two employees than their female counterparts (40% and 14%, respectively). North Kivu cassava businesses feature higher employment levels as compared to those in South Kivu. About 27% of traders in North Kivu employ at least two people, while 11% do so in South Kivu. These differences are statistically significant.

Table 35: Number of employees in cassava business, by sex of trader and province

Employees	Female	Male	North Kivu	South Kivu	Total
1 or none	86.36	59.34	72.6	88.76	79.84
2 – 5 employees	12.59	29.67	23.08	8.88	16.71
More than 5 employees	1.05	10.99	4.33	2.37	3.45

Pearson chi2 (2) sex = 38.1504 Pr = 0.000; Pearson chi2 (2) province = 15.3418 Pr = 0.000

Seeds and Planting Materials

Bean seed

The number of traders selling at least some bean grain for seed was higher for females (49%) than males (39%). However, no significant difference was found between male and female seed traders. Overall, almost half of the bean traders participated in the informal seed trade (**Table 36**).

Table 36: Percent of bean traders that sold grain as seed, by sex of trader

Response		Female	Male	Total
Sold grain as seed	%	49.39	38.96	47.73
	n	407	77	484

Pearson chi2 (1) = 1.7592 Pr = 0.185

Roughly 40% of bean transactions involved the sale of been grain as seed (**Table 37**). While there was no significant difference between the male and female traders, results show significant differences between North and South Kivu provinces. A considerable proportion (54%) of transactions in South Kivu involved the sale of grain as seeds compared to only 32% in North Kivu. This case may be due to exposure to more improved varieties in South Kivu. The farmers and traders are close to the national bean research program located at INERA Mulungu, Bukavu, in addition to other dissemination agents present within the region. These findings suggest that greater access to new varieties is critical for participation in seed businesses.

Table 37: Percentage of bean transactions that involved the sale of bean grain as seed, by sex of trader

Response		Female	Male	Total
Sold grain as seed	n	267	71	338
	%	39.32	40.34	39.53
Total	n	679	176	855

Pearson chi2 (1) = 0.0606 Pr = 0.805 (Gender); Pearson chi2 (1) = 39.4210 Pr = 0.000 (Province)

Activities to maintain better quality for potential seed

Results on seed sales indicate that traders selling seeds undertook activities aimed at enhancing the planting materials. **Table 38** summarizes some of these activities. There were significant gender differences exist related to which activities each emphasized. For example, female traders placed greater emphasis on this specificity of grain source as compared to their male counterparts (52% and 41%, respectively). Female traders also more frequently sought out specific varieties that buyers could replicate as compared to male traders (51% and 36%, respectively). Other vital considerations included buying from specific growers known to grow high-quality grains, asking growers in advance to multiply selected varieties based on clients' preferences, maintaining single varieties, and sorting out dirt and bad grains. In each of these cases, female traders more frequently took actions to maintain better quality for potential seeds than male traders.

Table 38: Bean seed buying signals by farmers

Signals	% of traders with yes response			Chi2 /p*
	Male	Female	Total	
Get grain from specific areas/regions believed to have grain that grows in the local area (adapted)?	40.69	51.95	46.32	5.885**
Seek out specific varieties to buy (which can be planted)?	35.5	51.08	43.29	11.427***
Buy from specific growers who are known for high-quality seed?	18.18	27.27	22.73	5.435**
Ask growers (ahead of time) to multiply select varieties based on preferences of different segmented clients (female, male, youth)?	15.15	13.85	14.5	0.157
Keep each variety pure—as a single variety?	12.55	10.82	11.69	0.336
Keep freshly harvested stocks apart?	4.76	6.93	5.84	0.983
Grade stocks (which grain/which seed)?	4.33	5.19	4.76	0.191
Do germination tests?	1.3	2.6	1.95	1.02
Have special storage conditions (to help with seed viability)?	3.46	3.9	3.68	0.061
Sort out 'waste' (pebbles, dirt, dust)?	14.72	16.45	15.58	0.263
Sort out 'bad grains/seed'-that is broken, immature, or discolored?	14.72	14.29	14.5	0.017
Sell seed and grain separately, at different prices?	4.33	6.49	5.41	1.057

Several traders expressed concerns about the seed and grain quality in the beans they traded. More male traders (30%) than female traders (20%) indicated that they were concerned about the quality of the beans (**Table 39**). Some credit is provided to farmers by traders to achieve higher quality grains. About 22% of traders provided credit to farmers for seed materials bought. The provision of planting materials on credit was the most common form of credit.

Table 39: Do you have any concerns about bean seed, grain quality, or varieties?

Response	Female	Male	Total
No	79.75	70.13	78.22
Yes	20.25	29.87	21.78

Pearson chi2 (1) = 3.5164 Pr = 0.061

Results show that only around 5% of traders sold certified bean seed. There were significant gendered differences, as up to 18% of male traders sold certified seed, while only 3% of women did so. Certified seed sales involved networks and engagement with other seed actors such as research and development partners, which favored mainly men at the expense of women. Interestingly, around 13% of female and 9% of male traders either did not know if they sold certified seeds or did not answer the question (**Table 40**). Such confusion about certified seeds suggests that the sellers are potentially unable to trace the origins of beans, and additionally may not have gone through the processes of certification of materials and seeds according to the required standards. Planting materials originating from the research were considered by the sellers as formal or certified seeds.

Table 40: Have you ever sold certified seed?

Responses	Female	Male	Total
No	84.03	72.73	82.23
Yes	2.95	18.18	5.37
Don't know / no answer	13.02	9.09	12.4

Pearson chi2 (2) = 29.7839 Pr = 0.000

Vouchers were mainly used when providing seed during emergencies, where the vouchers were redeemed by farmers at the trader outlets. Strikingly, nearly a quarter of male traders (23%) participated in voucher use as compared to under 1% of female traders (**Table 41**). The vouchers were used primarily during the provision of emergency seeds by providers, especially international and humanitarian NGOs, and implemented with seed traders. The use of "coupons" was based on criteria and recommendations adopted by each organization with their targeted traders.

Table 41: Have you ever participated in the use of vouchers in the past?

Responses	Female	Male	Total
No	86.49	68.83	83.68
Yes	0.98	23.38	4.55
Does not know/no answer	12.53	7.79	11.78
Total	100	100	100

Pearson chi2 (2) = 75.0828 Pr = 0.000

In the seed transactions, the main varieties sold as seed included mixed beans, dark red kidney, purple, and others classified as "others" (many color schemes not represented by the leading market classes). Male traders primarily sold small red and mixed beans, while female traders mainly sold the purple, dark red kidney, and "others." Other varieties were sold relatively in smaller quantities (**Table 42**). In total, about 6700 MT of seed material were traded. Mixed beans are popular amongst consumers due to the insurance of unknown performance in the field once planted. They are also cheaper; hence, there is a ready market for seeds and grain. Traders also prefer mixtures for their convenience in handling, transporting, and lower pricing when they cannot get single types.

Table 42: Quantity of beans sold as local seed, by sex of trader

Bean type	Female		Male		Across gender	
	Mean MT	n	Mean MT	n	Mean MT	n
Red mottled	14.38	47	12.02	13	13.87	60
Sugar type	0.73	3	2.93	4	1.98	7
White beans	14.77	15	20.00	1	15.10	16
Purple	30.24	5	6.10	2	23.34	7
Dark red kidney	31.19	11	18.75	10	25.26	21
Small reds	2.42	44	60.00	1	3.70	45
Khaki	5.64	12	6.91	5	6.02	17
Mixed	25.77	68	73.47	12	32.92	80
Yellow	9.81	5	14.03	6	12.11	11
Black	11.67	26	2.12	5	10.13	31
Grey	1.36	6	20.72	5	10.16	11
Others* ⁹	65.04	21	17.29	7	53.10	28
Average	19.19	263	23.71	71	20.15	334
Total MT						6730.1

*a number of varieties that did not fit in the traditional bean market classes

Across the two provinces, generally larger quantities were sold as seed in South Kivu than North Kivu, particularly for white, mixed, dark red kidney, yellow, and “others” bean varieties (**Table 43**). Conversely, North Kivu sold more sugar, small red, khaki, and black beans as seed. Additionally, only North Kivu traders sold purple and grey beans as seed.

Table 43: Quantity of beans sold as local seed per year, by province

Bean type	North Kivu		South Kivu		
	Mean MT	n	Mean MT	n	
Red mottled	7.53	28	19.41	32	
Sugar type	2.40	5	0.94	2	
White beans	3.29	12	50.50	4	
Purple	23.34	7	-	-	
Dark red kidney	16.24	16	54.13	5	
Small reds	15.86	4	2.51	41	
Khaki	7.04	14	1.25	3	
Mixed	23.47	33	39.56	47	
Yellow	8.52	10	48.00	1	
Black	11.37	27	1.79	4	
Grey	10.16	11	-	-	
Others	9.68	11	81.19	17	
Average	11.75	178	29.83	156	
Sum	138.9		299.28		
Total MT					6730.1

The potential seed prices differed between male and female traders for most varieties, particularly red mottled and white beans. Male traders received relatively higher prices than female traders. With the

⁹ These include white-black (1), white spotted with black (2), dark brown, brown/chocolate (10), pure common (1), pure (1), rose (1), rural (1), green (5), many of the colors (2), brunette (1), ash (1), small reds – large streak seeds (1) and trié red – ash (1)

exception of black beans, prices were generally higher in North Kivu than South Kivu provinces, reflecting higher bean production and trading activities in North Kivu.

The analysis reveals that seed prices are significantly higher than grain prices in all bean types, especially for grey, yellow, and dark red kidney beans. Hence, a premium price is attached to materials destined for potential seed (Table 44).

Table 44: Comparison between grain and seed prices

Bean type	Mean CDF/KG			Mean USD/Ton			p>t
	Grain	Seed	Difference Between Seed and Grain	Grain	Seed	Difference Between Seed and Grain	
Red mottled	1,797	2,168	371	898.37	1,083.88	185.51	0.0006
Sugar type	1,767	1,879	112	883.33	939.29	55.96	0.4547
White beans	1,822	1,936	114	911.03	968.23	57.20	0.4021
Purple	1,511	1,646	135	755.30	822.92	67.62	0.4588
Dark red kidney	1,883	2,300	417	941.28	1,149.90	208.62	0.0339
Small reds	1,673	1,713	40	836.74	856.67	19.93	0.6299
Khaki	1,616	1,961	345	807.78	980.73	172.95	0.0217
Mixed	1,580	1,879	299	789.77	939.41	149.64	0.0000
Yellow	2,024	2,562	538	1,012.19	1,280.83	268.64	0.0316
Black	1,505	1,718	213	752.40	859.20	106.80	0.0004
Grey	1,582	2,344	762	790.91	1,171.97	381.06	0.0090
Others	1,882	2,062	180	940.81	1,031.10	90.29	0.1778
Average	1,693	1,976	283	846.73	988.22	141.49	0.0000

USD: approx. 2000 CDF

Traders primarily obtain information on bean varieties through farmer groups (52% of traders), with more male (66%) than female traders (50%) benefiting from this information source (Table 45). Social media also plays a significant role in information dissemination, and once more, male traders used this source more than women traders (39% and 16%, respectively). Similarly, more male traders than females relied on extension agents, seed companies, and agrodealer shops than female traders. Roughly a third of female traders relied on other information sources, such as other traders and – to a much lesser extent – research organizations, NGOs, and consumers.

Table 45: Where do you get information and knowledge on different varieties of beans?

Sources	% of bean traders			Chi2/p*
	Female	Male	Total	
Social media	15.72	38.96	19.42	22.339***
Extension agents	17.69	24.68	18.8	2.069
Farmer groups	49.63	66.23	52.27	7.154***
Seed companies	5.9	29.87	9.71	42.443***
Agrodealer shops	0.74	3.9	1.24	5.278**
Others (traders, NGOs, etc.)	32.68	10.39	29.13	15.58***

***, ** significant at 1% and 5% levels, respectively

Cassava Planting Material

Of the 55 traders selling planting material for cassava, 76% did so exclusively within their markets (Table 46). Of the planting material that was sold outside of traders' primary markets, around 31% was sold within 50 km [of their market], 46% was sold between 76 and 200 km, and 23% was sold over 200 (Table 47).

Table 46: Whether trader sells planting material for cassava outside the market they operate in

Response		Female	Male	Total
Sold planting material outside market they operate in	n	6	7	13
	%	24	23.33	23.64
Total	n	25	30	55

Pearson chi2 (1) = 0.0034 Pr = 0.954

Table 47: How far is the cassava planting material sold outside the market?

Distance	n	%
Less than 10 km	1	7.69
Up to 25 km	1	7.69
Up to 50 km	2	15.38
Up to 100 km	4	30.77
Up to 200 km	2	15.38
Over 200 km	3	23.08
Total	13	100

The main buyers of cassava planting material were other traders (49%) and farmers (40%) (Table 48). NGOs represented the remaining 11% of buyers. Male traders (23%) reported more sales to NGOs compared to female traders (7%) due to the larger scale of their businesses compared to women.

Table 48: Main buyers of cassava planting material, by sex of trader

Buyer type	Sex of trader (%)		Total
	Female	Male	
Farmers	42.98	32.5	40.37
Other traders	50.41	45	49.07
NGOs	6.61	22.5	10.56

Pearson chi2 (2) = 8.1838 Pr = 0.017

At the province level, a similar trend was noted as above (Table 49). However, for NGO purchases, more were recorded in North (12%) than South (9%) Kivu. NGO purchases are aimed at humanitarian assistance to enable the production of cassava for the affected population.

Table 49: Main buyers of cassava planting material, by province

Buyer type	North Kivu	South Kivu	Total
Farmers	38.37	42.67	40.37
Other traders	50	48	49.07
NGOs	11.63	9.33	10.56

Pearson chi2 (2) = 0.4154 Pr = 0.812

When traders were asked whether there is a possibility of a regional commercial problem that affects cassava trade, there seemed to be a 50% split (Table 50). Responses were similar by gender and province, with traders generally observing that the trend in seasonal supplies was stationary. Traders further noted that the cassava product demand from other markets has been non-responsive or decreasing.

Table 50: Traders' opinion on the existence of a regional commercial problem that may affect cassava trade

Response	Female	Male	Total
No	50.7	49.45	50.4
Yes	49.3	50.55	49.6

Pearson chi2 (1) = 0.0431 Pr = 0.836

Traders indicated that social media, extension agents and farmers' groups served as their primary source of information on cassava market prices, trade laws, and quantities (79%) (Table 51). More male traders (83%) indicated private entities as being their primary cassava information source compared to their female counterparts (78%). Women are far less likely to receive information from social media and seed companies relative to men. This observation could be attributed to inadequate access to smart devices. These largely private information sources point to relatively high information asymmetries in the cassava cuttings trade, which benefits male more than female traders.

Table 51: Sources of information and knowledge on different varieties of cassava, by sex of trader

Source	Female	Male	Total	Chi2/p*
	% of cassava traders			
Social media	16.43	35.16	20.95	14.623***
Extension agents	27.97	32.97	29.18	0.834
Farmer groups	58.74	57.14	58.36	0.073
Seed companies	4.2	17.58	7.43	17.993***
Agrodealer shops	1.05	1.1	1.06	0.002
Others	19.58	6.59	16.45	8.474***

***, ** significant at 1% and 5% levels, respectively

There were significant differences in information and knowledge sources between North and South Kivu though, across both provinces, farmer groups served as traders' primary source (58%), followed by extension agents (29%). In the provinces, North Kivu (88%) reported a higher use of private information sources compared to South Kivu (68%). Social media plays a significant role in information dissemination in North Kivu (33%), while other sources (e.g., traders, NGOs, and research institutions) play a more prominent role in South Kivu (30%). Thus, access to information differs significantly between traders from the two provinces (Table 52).

Table 52: Sources of information and knowledge on different varieties of cassava, by province

Source	North Kivu	South Kivu	Total	Chi2/p*
	% of cassava traders			
Social media	32.69	6.51	20.95	38.592***
Extension agents	26.44	32.54	29.18	1.68
Farmer groups	60.1	56.21	58.36	0.579
Seed companies	8.65	5.92	7.43	1.016
Agrodealer shops	1.44	0.59	1.06	0.643
Others (NGOs, traders)	5.77	29.59	16.45	38.49***

***, ** significant at 1% and 5% levels, respectively

Trading margins on beans and cassava

Prices at trader and consumer stages of the commodity chains were used to estimate the profitability of trading for both beans and cassava products. Overall, the gross trading margins are positive or profitable for both commodities. The red mottled, khaki, and grey beans commanded the highest margins in beans. Apart from khaki and grey beans, the margins are relatively higher in North Kivu than South Kivu. The margins were slightly higher for male traders (USD 138) than female traders (USD 133). Trade margins followed the same trend in the case of cassava products, as they were higher in North Kivu than South Kivu. Only dry cassava appears profitable in South Kivu. The relative profitability of both product types suggests that traders can keep in pace with the needs arising from humanitarian assistance trends, serving as suppliers of produce and planting materials. These seed models can strengthen the seed and grain enterprises and build on the potential profitability of the enterprises.

Table 53: Trading margins (USD/Ton) of grain sales between buyers - trader interface by province

Beans				Cassava			
	North Kivu	South Kivu	Overall		North Kivu	South Kivu	Overall
Red mottled	158	333	233	Fresh/raw cassava	225	-	75
Sugar type	50	-	50	Dry cassava	83	67	94
White beans	50	-	50	Cassava leaves	300	-98	75
Purple	167	-	150	Cassava flour	146	-50	73
Dark red kidney	173	233	100				
Small reds	250	67	67				
Khaki	175	333	260				
Mixed	175	150	158				
Yellow	200	183	167				
Black	75	17	100				
Grey	92	400	217				
Others	143	-	67				

Impact of COVID-19 pandemic on bean and cassava traders

COVID-19 and bean traders

Nearly 97% of both male and female bean traders were felt the impacts of the COVID-19 pandemic, facing significant challenges such as inadequate demand for bean grains, costly and insufficient bean supplies, lack of market stability, and poor road conditions. These challenges affected men and women differently; for example, while inadequate demand became an increasing challenge for women during COVID-19, less men cited it as an important challenge than they had prior to the pandemic. Interestingly, several previously considerable challenges seem to have diminished during the pandemic for male and female traders (e.g., costly/inadequate transportation, low prices, taxes) (**Table 54**).

Table 54: The most important challenge faced by bean traders before and during COVID-19

Challenge	Before COVID-19			During COVID-19		
	Female	Male	Total	Female	Male	Total
No challenges	4.18	0	3.51	3.69	0	3.1
Low prices	11.06	3.9	9.92	5.65	1.3	4.96
Inadequate demand	10.81	15.58	11.57	16.71	7.79	15.29
Costly &/or inadequate transportation	13.76	25.97	15.7	9.34	9.09	9.3
Lack of a stable market	13.76	3.9	12.19	8.35	11.69	8.88
Delayed payments	0.74	5.19	1.45	1.47	2.6	1.65
High taxes/levies	15.72	15.58	15.7	9.09	6.49	8.68
Inadequate/poor storage facilities	1.72	1.3	1.65	1.72	3.9	2.07
Poor grading	1.23	0	1.03	0.98	0	0.83
Buyers are not trustworthy	2.21	1.3	2.07	3.69	3.9	3.72
Inadequate market information	1.23	1.3	1.24	1.23	1.3	1.24
Inadequate supply	3.44	3.9	3.51	9.34	9.09	9.3
Road condition	1.47	3.9	1.86	3.93	11.69	5.17
Credit constraints	7.86	1.3	6.82	6.39	2.6	5.79
Security	2.21	1.3	2.07	3.19	6.49	3.72
Thefts	4.42	5.19	4.55	2.46	3.9	2.69
Cultural factors	0.49	0	0.41			
Mixed beans	0.74	3.9	1.24	0.74	0	0.62
Weather/climate related	1.23	3.9	1.65	0.98	2.6	1.24
Mobility restrictions				4.67	2.6	4.34
Closed borders that limit imports				2.46	2.6	2.48
Increased domestic responsibilities*				0.25	0	0.21
Gender-based violence				0.74	1.3	0.83
Business closed				0.74	1.3	0.83
Others^	1.72	2.6	1.86	2.21	7.79	3.1

^such as childcare, care of the sick, increase household size due to lack of migration

COVID-19 and cassava traders

Similarly, nearly 96% of cassava traders felt the effects of the COVID-19 pandemic. Pre-pandemic, high taxes and levies (16%), low prices (15%), and inadequate product demand (14%) were identified as the top three overall challenges (**Table 55**). These figures decreased during the pandemic, as other new issues arose (e.g., mobility restrictions, border closures, increase domestic responsibilities). During the COVID-19 period, inadequate demand (12%), market instability (10%), and inadequate supply (9%) served as highest overall challenges. There are noteworthy gender differences in traders' perceptions of top challenges both prior to and throughout the pandemic. For female traders, low prices, high taxes/levies, and inadequate product demand were primary challenges prior to COVID-19. While these remained as key issues, inadequate supply and road conditions became increasingly of concern as the pandemic went on. Male traders felt that costly and inadequate transport and high taxes and levies were central challenges pre-COVID-19; however, these became far less critical as road conditions and [lack of] market stability became more problematic.

Table 55: The most important challenge faced by cassava traders before and during COVID-19

Challenge	Before COVID-19			During COVID-19		
	Female	Male	Total	Female	Male	Total
No challenges	9.09	2.20	7.43	4.90	2.20	4.24
Low prices	16.78	7.69	14.59	10.49	3.30	8.75
Inadequate demand	13.29	17.58	14.32	12.24	10.99	11.94
Costly &/or inadequate transportation	10.14	24.18	13.53	6.99	5.49	6.63
Lack of a stable market	9.09	2.20	7.43	9.44	12.09	10.08
Delayed payments	2.80	1.10	2.39	2.45	4.40	2.92
High taxes/levies	13.64	21.98	15.65	9.09	5.49	8.22
Inadequate/poor storage facilities	3.15	2.20	2.92	1.40	2.20	1.59
Poor grading				0.35	0.00	0.27
Buyers are not trustworthy	1.40	1.10	1.33	1.40	7.69	2.92
Inadequate market information				0.70	0.00	0.53
Inadequate supply	2.45	5.49	3.18	9.79	6.59	9.02
Road condition	3.15	0.00	2.39	6.64	15.38	8.75
Credit constraints	4.20	0.00	3.18	5.24	9.89	6.37
Security	2.45	2.20	2.39	3.15	4.40	3.45
Thefts	2.80	0.00	2.12	1.75	3.30	2.12
Cultural factors				0.35	0.00	0.27
Weather/climate related	3.15	8.79	4.51	1.40	0.00	1.06
Not easy to process				0.70	0.00	0.53
Mobility restrictions				0.00	2.20	0.53
Closed borders that limit imports				2.45	1.10	2.12
Increased domestic responsibilities*				2.10	0.00	1.59
Gender-based violence				0.70	0.00	0.53
Business closed				1.05	0.00	0.80
Others	2.45	3.30	2.65	5.24	3.30	4.77

Challenges that women face in businesses during the pandemic and other periods

The assessment indicates that certain cultural norms can create challenges for women, especially those that inhibit male vendors from engaging with female clients or inhibit women and female youth in running a business (**Table 56**). Others challenges that impact women include the lack of financial products tailored to women entrepreneurs, lack of access to business services, heavy domestic responsibilities, social prejudices, and even the inability of women and youth vendors to move freely and trade or safety concerns. These challenges are raised by a significant number of female traders and are likely to detrimentally impact their businesses.

Table 56: Women-specific challenges for traders (overall)

Challenge	Frequency	Percent*
Cultural norms that inhibit male vendors from engaging with female clients	84	29.27
Cultural norms that inhibit women and female youth in running a business	88	30.66
Women and female youth vendors mobility restrictions due to cultural norms and safety concerns	39	13.59
Laws and regulations that constrain females in owning/ running a business	18	6.27
Restrictions to credit attributed to women's lower levels of business training and financial literacy, limited access to professional networks, a limited number of financial products tailored to the needs of women entrepreneurs	67	23.34
Lack of access to business services	55	19.16
Heavy domestic responsibilities such as childcare, household chores	61	21.25
The Family Code not being implemented	14	4.88
Social prejudices	67	23.34
Cultural norms that restrict land ownership	6	2.09

*Multiple responses per woman trader

Women in the two provinces also felt the challenges differently. Mobility restrictions for women and female youth were much higher in North Kivu (21%) than in South Kivu (9%), as were restrictions on credit access (22% and 9%, respectively). On the other hand, laws and regulations constraining females on business ownership were felt more in South Kivu (16%) than North Kivu (7%). Enforcement of family codes and cultural restrictions on land ownership were also expressed more by female traders in South Kivu relative to North Kivu (**Table 57**).

Table 57: Women-specific challenges for traders, by province

Challenge	North Kivu	South Kivu	Total	Chi2/p*	Total n
Cultural norms that inhibit male vendors from engaging with female clients	30.37	26.14	28.7	0.467	64
Cultural norms that inhibit women and female youth in running a business	30.37	23.86	27.8	1.124	62
Women and female youth vendors mobility restrictions due to cultural norms and safety concerns	21.48	9.09	16.59	5.91**	37
Laws and regulations that constrain females in owning/ running a business	7.41	15.91	10.76	4.009**	24
Restrictions to credit attributed to women's lower levels of business training and financial literacy, limited access to professional networks, a limited number of financial products tailored to the needs of women entrepreneurs	22.22	9.09	17.04	6.498**	38
Lack of access to business services	21.48	15.91	19.28	1.063	43
Heavy domestic responsibilities such as childcare, household chores	28.89	21.59	26.01	1.474	58
The Family Code not being implemented	5.19	13.64	8.52	4.882**	19
Social prejudices	20	19.32	19.73	0.016	44
Cultural norms that restrict land ownership	2.96	9.09	5.38	3.929**	12
N	135	88	223		401

** significant at 5% level

Bean traders have utilized several strategies to cope with COVID-related challenges. About 49% made use of memberships in informal savings groups, 35% borrowed from relatives, 31% used informal trust-based credit, 11% took out commercial loans, and 5% reduced staff to cut costs (**Table 58**). There were significant differences in coping strategies between male and female traders. While male traders were most likely to use informal trust-based credit (43%), female were most likely to obtain membership in informal savings groups (36%) to access credit. While females were more likely to borrow from relatives and friends than their male counterparts, males were more likely to change staffing levels to cope with business-related challenges.

Table 58: Main coping strategies employed by bean traders, by sex of trader

Coping strategy	% of bean traders			Total frequency [†]	Chi2/p*
	Female	Male	Total		
Informal trust-based credit from suppliers	28.22	42.86	30.56	147	6.531**
Membership in informal savings groups	47.77	55.84	49.06	236	1.686
Loans from commercial banks	6.44	35.06	11.02	53	54.065***
Borrowing from relatives and friends	35.89	28.57	34.72	167	1.529
Reduced staff	2.97	15.58	4.99	24	21.707***
Hiring more staff	0.74	2.6	1.04	5	2.163
Others	25.74	9.09	23.08	111	10.102***

***, ** significant at 1% and 5% levels, respectively

Gender differences in coping strategies are also readily apparent amongst cassava traders. For example, significantly more male traders relied on informal group memberships and commercial bank loans, whereas more women relied on other strategies, such as own savings (**Table 59**). Notably, female cassava traders were more likely than female bean traders to employ staff-based coping strategies. Similarly, male bean traders were more likely than male cassava traders to obtain loans from commercial banks and/or borrow from relatives and friends.

Table 59: Main coping strategies employed by cassava traders, by sex of trader

Coping strategy	% of cassava traders			Chi2/p*
	Female	Male	Total	
Informal trust-based credit from suppliers	24.48	34.07	26.79	3.237*
Membership in informal savings groups	50.7	61.54	53.32	3.259*
Loans from commercial banks	5.59	12.09	7.16	4.378**
Borrowing from relatives and friends	26.92	19.78	25.2	1.869
Reduced staff	10.84	12.09	11.14	0.109
Hiring more staff	2.1	0	1.59	1.94
Others	24.13	10.99	20.95	7.193***
N	286	91	377	

***, **, * significant at 1%, 5% and 10% levels, respectively

Significant differences were also noted in the coping strategies across the provinces. In North Kivu, membership in informal savings groups (67%) served as a primary coping strategy, followed by informal trust-based credit from suppliers (44%), borrowing from relatives and friends (38%), and loans from commercial banks (15%) – all of which were adopted significantly more by North than South Kivu traders (**Table 60**). South Kivu traders, on the other hand, tended to use other coping strategies (51%), followed by borrowing from relatives and friends (29%) and membership in informal savings groups (22%).

Table 600: Main coping strategies employed by bean traders to deal with challenges, by province

Coping strategy	% of bean traders			Chi2/p*
	North Kivu	South Kivu	Total	
Informal trust-based credit from suppliers	43.99	10	30.56	62.565***
Membership in informal savings groups	66.67	22.11	49.06	91.334***
Loans from commercial banks	15.12	4.74	11.02	12.64***
Borrowing from relatives and friends	38.49	28.95	34.72	4.616**
Reduced staff	7.9	0.53	4.99	13.197***
Hiring more staff	1.72	0	1.04	3.299*
Others	4.81	51.05	23.08	138.463***

***, **, * significant at 1%, 5% and 10% levels, respectively

Cassava trader coping strategies also differed across provinces. Membership in informal savings groups was again the most popular coping strategy in North Kivu (72%), followed by informal trust-based credit from suppliers (40%) and borrowing from relatives and friends (28%) (Table 61). Cassava traders in South Kivu were most likely to employ other coping strategies (37%), membership in informal savings groups (31%), and borrowing from relatives and friends (22%). Of traders across commodities and provinces, cassava traders in South Kivu were most likely to reduce staff as a means of coping with the pandemic (16%).

Table 611: Coping strategies employed by cassava traders, by province

Coping strategy	% of cassava traders			Chi2/p*
	North Kivu	South Kivu	Total	
Informal trust-based credit from suppliers	40.38	10.06	26.79	43.72***
Membership in informal savings groups	71.63	30.77	53.32	62.56***
Loans from commercial banks	6.73	7.69	7.16	0.13
Borrowing from relatives and friends	27.88	21.89	25.2	1.776
Reduced staff	7.21	15.98	11.14	7.236***
Hiring more staff	0.96	2.37	1.59	1.176
Others	8.17	36.69	20.95	45.766***
N	208	169	377	

***, significant at 1% level

Opportunities in bean and cassava enterprises

Opportunities for youth

Based on responses provided by traders, opportunities for youth were primarily associated with providing entrepreneurial support (47%), such as assisting youth to get into business and improving their business skills (Table 62). These critical areas can be fostered through training and skill-building. Additional youth opportunities include creating prospects for them to engage in grain trade and export in the region (18%) and improved security (11%), the latter of which allows for improved environments in which to conduct business or earn a living.

Table 622: Opportunities for the youth

Opportunity	Freq.	Percent	Cum.
Employ more of the youth in the enterprise	8	6.50	6.50
Engage in grain supplies, export, and value addition	22	17.89	24.39
Improve the security environment for youth	13	10.57	34.96
Provide more support to meet their basic needs	12	9.76	44.72
Support for entrepreneurship	58	47.15	91.87
Support to engage in more production of beans	10	8.13	100.00
Total	123	100	

Opportunities for men

Interviews with male traders indicate that they see the most significant opportunities in growing their businesses through access to more resources and inputs and credit provision (**Table 63**). Such opportunities would enable them to grow and expand their enterprises.

Table 633: Opportunities for men

Opportunity	Freq.	Percent
Grow the business with more resources	96	64.00
Meeting basic family needs	24	16.00
Leadership opportunities	11	7.33
Cooperative memberships	9	6.00
Public infrastructure for business	7	4.67
Security to work better	3	2.00
Total	150	100

Opportunities for women

Female traders also indicated that growing their businesses was their greatest priority, with most intending to do so through the use of available resources such as credit or good markets. Other opportunities they cited include expanding into [export] markets, and increasing cooperative memberships (**Table 64**).

Table 644: Opportunities for women

Opportunity	Freq.	Percent
More growth opportunities	127	38.03
Expanding markets, including exports	57	17.07
Cooperative memberships	43	12.87
Family support and care	37	11.08
Increased farm-level production	32	9.58
Infrastructure and government support	18	5.39
Improve the quality of the bean and post-harvest management	9	2.69
Improve seeds and supplies	7	2.10
Security to work	4	1.20
Total	334	100

NGO organizations play a significant role in bean and cassava production and marketing. Opportunities that traders highlighted concerning NGOs included facilitating the provision of credit and value chain support (e.g., helping them organize better and leading specific interventions) (**Table 65**). Market support – such as organizing the markets and actors, identifying new markets, helping access larger orders, and accessing cross-border markets – were additional NGO intervention areas, which could directly target women and youth. Seed availability and quality were issues actors thought hold potential to improve their production and quality, with NGO support.

Table 655: Opportunities working with NGOs

Opportunity	Freq.	Percent
Enhancing the capacity of the actors to grow their enterprises	34	11.11
Extension and business and market information	26	8.50
Facilitating credit provision	86	28.10
Facilitative support to value chains	69	22.55
Infrastructure including market structures	14	4.58
Output market support and information	32	10.46
Supporting seed provision	30	9.80
Supporting to address security issues	15	4.90
Total	306	100

4. CONCLUSIONS

The study makes the following conclusions:

Data gaps on variety dominance, institutional bottlenecks, and practical investment options

- i. The critical role of NGOs and development partners in supporting the growth and development of the studied trade enterprises was emphasized by traders, particularly in the areas of providing general facilitation to the actors (e.g., helping them to better organize) and taking the lead in certain interventions. The study showed that more male traders had working opportunities with NGOs, especially those related to planting material and seed sales.
- ii. Information asymmetries exist in both bean and cassava trade, to the disadvantage of women. Pricing of bean and cassava products also remain non-uniform across genders. Women use fewer social media, extension, or other formal sources of information while relying more on other traders. On the other hand, men utilize a large variety of information sources.
- iii. Development and relief work has not been deliberately integrated in the seed supply systems. Such active collaboration could positively contribute to strengthening the sustainability of the seed supplies.

Sustainable variety and information access for market demanded varieties

- i. The results of this study reinforce the notion that North Kivu serves as an essential bean and cassava production hub and significant player within the Eastern DRC bean and cassava corridors.
- ii. Traded bean and cassava varieties in North and South Kivu show very high diversity and include both release and traditional varieties. Mixed beans were favored due to their ability to mitigate against total crop failures.
- iii. Distinct coping strategies were applied across gender, age, provinces, and commodity types.

Critical information to drive better seed supply

- i. North and South Kivu feature mixed seed systems, with a more well-developed formal seed system present in the latter, likely due to both its close proximity to a national research station and the presence of development and aid organizations. North Kivu, on the other hand, is currently only remotely connected to research.
- ii. Roughly half of the bean traders sold potential seed for planting, which was able to fetch a higher price than grains. Informal seed sales dominate in both provinces. Traders undertake different quality management activities for materials designed for sale as potential seeds.
- iii. Outside of universal business challenges, we find that women of all ages face deeply embedded cultural norms that restrict them from fully engaging in bean and cassava enterprises, including restrictions on movements and ownership of assets. Furthermore, women are less able to access capital, which restricts their business development and serves as an explanation for why female-owned trade enterprises tend to be low-income.

Business improvement and strategic plans to enhance the capacity of the informal seed system

- i. Mixed beans, usually comprising three or more bean types, are the most dominant bean type traded and constitute 32% of the beans traded. Red mottled, yellow, and red kidney beans serve as the most commonly sold single bean types.
- ii. There is a diversity of sources for released cassava varieties, which include those released from neighboring countries and local indigenous varieties.
- iii. Women dominate the bean and cassava trade targeted at food markets, whereas men dominate specialized seed markets, such as formal markets and major buyers (e.g., NGOs).
- iv. Compared to male traders of the same age, females appear to be trapped in small-scale businesses. Similar business sizes of both younger and older women indicate that women do not tend to grow their businesses over time.
- v. The COVID-19 pandemic has significantly impacted the bean and cassava trade. While certain challenges (e.g., low trader mobility) have gone down in terms of relative importance to the traders during the COVID-19 period, new issues emerged (e.g., inadequate supplies, diminished demand, and lack of credit), which tended to affect women more than men.

5. RECOMMENDATIONS

The assessment aimed at bridging the gaps in data on DRC seed systems. Based on the information collected and the findings of bridging the gaps in data on DRC seed systems, this section provides recommendations to strengthen the formal and informal seed systems in the North and South Kivu provinces.

Varietal dominance and institutional bottlenecks

In the survey, traders identified crucial, market-preferred varieties (i.e., for beans and cassava) (see page 52). Improved varieties have not permeated many parts, especially in North Kivu, and there are significant information asymmetries in both bean and cassava trade, to the disadvantage of women. With this information comes an opportunity to **promote single bean or cassava variety trade through sensitization and increased extension services**. Producers require evidence-based assurance that planting fewer varieties will not expose them to risks. Women need additional support, particularly given the unique challenges they face and their reliance on informal information sources. Collaborations between research, NGOs, producer groups, and private seed and grain traders can help achieve objectives related to information-sharing and the scaling out of new varieties based on single bean types. Results on exports and distant markets indicate that small quantities were sold to international consumers, and no exports involved mixed varieties. This observation could suggest that the actors' current efforts were targeting local markets that quickly got saturated. Thus, **expanding bean and cassava markets will require a focus on single varieties driven by market demand and using appropriate platforms**. Export or distant markets such as Kinshasa require more significant volumes of a selected single type of beans. Closer interactions between breeders/seed systems, market specialists, and bean and cassava traders will help open opportunities for developing appropriate varieties and seed supply systems for Eastern DRC by strengthening existing commodity business platforms within the two provinces.

The prevalence of formally certified seed, especially beans and cassava cuttings in South Kivu, is illustrative of promoting a seed system based on demanded varieties. Located in the province, INERA been integral in the promotion of the varieties, but the diffusion of the varieties has been much slower beyond the neighborhood of the institution due to inadequate funding, low staff capacity and limited orientation towards markets and wider partnerships. INERA was thus unable to extend services to North. The current capacity of INERA to reach the entire pool of farmers and traders with the requisite information is low due to limited funding and challenges in developing market-facing seed systems. More sustainable variety and information access can be achieved through targeted stakeholder collaborations. Relevant stakeholders in the DRC include INERA, relief and development organizations, private sector seed companies and processors (including traders), and the Ministries of Agriculture and Trade. These stakeholders need to draw insights from both smallholders and medium- to large-scale farmers, who become the pull for seed and planting material as they supply commodities to markets. To drive better access and supply, specific varieties should be identified, along with supplementary information (e.g., sourcing locations, yield, special attribute information).

Among the challenges affecting trade as cited by informal traders were the high cost of transport, poor road conditions, insecurity, and high taxes and levies. These constraints require public-driven interventions rather than actions from individual value chain actors. Policies to eliminate infrastructural and non-tariff barriers while mitigating insecurity will reduce the cost of producing and trading **commodities within and beyond the provinces**. The two provinces are major food production hubs in the DRC and could play a much more significant role in the country's food situation and humanitarian efforts. However, concerted efforts will need to be applied when addressing these constraints. Prioritization of infrastructure and security in the region would be vital for enhancing production and trade and developing sustainable seed supply systems.

Gender

Results from the study indicate that, unlike male traders, the growth of female-owned trade businesses remains stagnant, with most women – regardless of age – unable to break out of earning less than \$75 per month from their businesses. These observations imply a **need to support females of all ages in overcoming barriers to resource access and growing their businesses**. Women must contend with major cultural norms (e.g., restrictions on movement and ownership of assets) that limit their and ability to fully engage in, grow, and expand their bean and cassava enterprises, as well as their potential to graduate from low-income businesses as they age. Interventions should target gender-transformative actions deliberately for women and female youth to overcome such barriers to their growth. The survey found that traders, especially women, could not access credit, skills, or information to support them in their work. Potential interventions to address these challenges include facilitating access to working capital, working with communities to address cultural norms that inhibit their growth, and enhancing business management skills. Additional research, including a barrier analysis, is needed to inform the development and implementation of context-specific interventions.

Collaboration with relief agencies

Evaluations from the traders firmly pointed to widening the scope of NGO partners to support the growth and development of trade enterprises. More specifically, traders suggested that NGO partners provide training opportunities to help them better organize, deliver extension and advisory services, and lead interventions that de-risk trader investments (e.g., developing linkages to affordable credit and supporting dissemination of improved varieties). These and other related **activities that broaden NGO partners' roles to address systemic challenges facing value chain actors align well with the shift towards resilience-building approaches within the international humanitarian and development communities**.

Seed supply models and business options for North and South Kivu

This section explores potential interventions to support informal seed supplies in Eastern DRC, focusing on the seed supply models and business options identified during the survey. The data utilized comes from the study of traders and key informants in the seed sub-sector. The models form a basis for follow-up implementation work to test their efficiency and enhance seed supply/delivery capacities for smallholder farmers in North and South Kivu. The highlighted business options summarize the case for sustainability of seed and commodity businesses by working with informal seed and planting material traders, their commodity counterparts, and other key stakeholders, i.e., processors, researchers, and development organizations.

Seed supply models

In the future, Alliance-PABRA proposes to look at two models to document potential solutions to the highlighted challenges and existing opportunities. The first model (Model 1) targets a seed supply chain involving INERA, local informal or non-registered seed entrepreneurs, and informal seed/planting material traders culminating in farmer use. In the DRC FY21 study, most traders (48%) considered to provide entrepreneurship support through training and equipping youth to empower them in bean and cassava enterprises. Model 1 builds on traders' specific variety needs and seed demand coupled with related information and knowledge. Critical components in testing the efficiency of this model will include exploring support mechanisms for youth to engage in commodity supplies, exports, and value addition. Provision of leadership skills, seed support, extension services, and information and other capacity enhancements will be part of factors of success in this model. In line with overcoming barriers faced by young women, this model will endeavor to tailor specific knowledge sharing approaches. For example, seed business support will be provided after understanding the unique needs of female traders (and as a proxy, their customers' needs as well). Following this better understanding, the models will tailor approaches in a) information delivery, b) product development, and c) product deployment.

The second model (Model 2) targets seed supply involving INERA, formal seed companies, decentralized seed shops (agrodealers), culminating into farmers and/or informal traders. Model 2 will specifically draw on the perspective of women traders, existing opportunities, and ways to improve their participation as women in the value chains while expanding growth opportunities (similar to men). This model's choice of seed companies seeks to tap opportunities beyond the regular seed company operation space. Additionally, and drawing from male traders' views, a review of credit and cash support modalities for seed businesses as a means of growth will be critical to document. Model 2 will seek solutions to the challenges of variety prioritization, access to early generation seed, and technical backstopping.

For both models, and as confirmed by some KIIs, NGOs could support interventions such as better organization and traders' training, including enhancing collective action. From an NGO perspective, there are also opportunities to support access to affordable credit via the impact investing route. Other support options include seed availability and quality, which actors thought could improve their production and produce quality. Market support such as organizing markets and actors, identifying new markets, helping access larger orders, and accessing cross-border markets were also indicated as some intervention areas that NGOs could support.

Business Options

Results from the survey in Eastern DRC suggest that, while challenging, opportunities for investment exist. Both bean and cassava enterprises show potential for profitability, which is demonstrated by the positive trading margins observed among the traders. As described below, the two seed supply models proposed above could have long-term effects in several areas and can yield business options for men, women, and youth along the commodity supply chains.

REFERENCES

- ACDI/VOCA. 2015. Assessment of the DRC's Agriculture Market System.
- Asanzi, Christophe, Abdias Utoto, Mainza Mugoya, and Edward Mabaya. 2017. 'The African Seed Access Index (TASAI) Country Report – the Democratic Republic of the Congo.' 2017 (December 2017).
- Bak, M., J. Vrushi, and E. Mpararo. 2019. The Democratic Republic of the Congo: Overview of Corruption and Anti-Corruption. Berlin: Transparency International. <https://www.jstor.org/stable/pdf/resrep20485.pdf?refreqid=excelsior%3A31619c519fc94b4ae593f4586a05c60e>.
- Eliud B, Robin B, Collins O, Sylvia K, and Rubyogo JC. 2017. Bean corridors: A novel approach to scale up national and regional trade in Africa.
- FAO-GIEWS. 2020. FAO-GIEWS Country Brief - Democratic Republic of the Congo.
- Green, S., and S. Marysse. 2016. "The Democratic Republic of the Congo: Mining Sector." In Encyclopedia of Mineral and Energy Policy. Berlin: SpringerLink. DOI:10.1007/978-3-642-40871-7_112-1.
- Grebner K, Bernstein J, Wiemers M, Achaempong K, Hanano A, et al. 2020a. Democratic Republic of Congo: A Closer Look at Hunger and Undernutrition. Prepared as part of the Global Hunger Index Report. Available from: <https://www.globalhungerindex.org/case-studies/2020-drc.html#fn-01>
- Grebner K, Bernstein J, Wiemers M, Achaempong K, Hanano A, et al. 2020b. Global Hunger Index Report: One Decade to Zero Hunger.
- Jean-pierre, Cirimwami Kashangabuye, Ramanarivo Sylvain Bernard, Ngaboyeka Augustin, Muhigwa Bahananga, and Bisimwa B. Espoir. 2019. 'Organization of Agricultural Production Unit Seen as a Family Business in Mountainous South Kivu in the Democratic Republic of Congo.' *MOJ Ecology & Environmental Sciences* 4(6):296–306.
- Kasindi, L., Fassioti, C., Bisimwa, B., Bashwira, M. R. and Rames, V. 2017. Gender, Social Inclusion, and Conflict Mitigation Strategy for the DRC. Prepared by Search for Common Ground and Banyan Global for the United States Agency for International Development, USAID Contract Number AID 1700003, Feed the Future Democratic Republic of the Congo Strengthening Value Chains Activity.
- Kibriya, Shahriar, Graham Savio, Edwin Price, and Joseph King. 2016. 'The Role of Conflict in Farmers' Crop Choices in North Kivu, the Democratic Republic of the Congo.' *International Food and Agribusiness Management Review* 19(3):99–118.
- Nyamwaro, Sospeter O., Josaphat Mogabo, Rebecca Kalibwani, M. Moses, Robin Buruchara, and Fatunbi Oluwole. 2018. Innovation Opportunities in Bean Production in DRC. Vol. 2.
- PABRA. 2018a. Bean Value Chain Opportunities in DRC.
- PABRA. 2018b. 'PABRA DRC EAST Report 2017-2018 Final 3'. 37.
- PABRA. 2020. ECABREN Steering Committee Meeting.
- Seed Systems Group. 2020. Strategy for the Development of Sustainable Seed Systems in the DRC.
- Ulimwengu, John M., David M. Bugeme, and Sarah Thontwa. 2020. Spatial Food and Nutrition Security Typologies for Agriculture and Food Value Chain Interventions in Eastern DRC.
- USAID. 2019. FtF Enabling Environment for Food Security Project Seedclir: the Democratic Republic of the Congo.
- World Bank 2019a. "Project Appraisal Document," May 13. Washington, DC. <http://documents.worldbank.org/curated/en/826401558117375531/pdf/Congo-Democratic-Republic-of-Multisectoral-Nutrition-and-Health-Project.pdf>.

ANNEXES

Annex 1: Varieties of beans and cassava presently promoted in North and South Kivu markets by partners

Crop	South Kivu	North Kivu
Beans	Yellow: Pigeon Vert, Marungi, More8800; Red and Red mottled: Hm21-7, Toka Chini, Africa (Small grain/LCA), Africa (large grain)/Munyama (Red), RWR2245, RWR2154, G59, Namulenga; Purple/Grey: M'Sole; White: Kabenga	Yellow: Pigeon Vert, Marungi, More8800 (Milayi); Red and Red Mottled: VCB, G59, Kanyamanza, Nab 44; Purple/Grey: Kablangeti, Kivuyu, Kishibisha, Kambinee, Kasoda (M'sole); White: Kabenga
Cassava	Sawa sawa; Mayombe; Nabana; Naro-Cas1	Mayombe; Mapendo; Kambekisayi; Ilona; Nabana

Annex 2: Humanitarian actors and other stakeholders in Eastern DRC

Provinces	Humanitarian Actors and Other Stakeholders	
	Bean	Cassava
South Kivu	FAO (Seed), CICR (Seed), OXFAM, FHI (Grain), Mercy Corps (Grain), USAID (Grain) via Mercy Corps, World Bank (Grain) via Harvest Plus	FAO (Seed), CICR (Seed), FHI (Production), USAID via FHI, World Bank via CIAT/Harvest Plus
North Kivu	FAO (grain and seed), CICR (grain), OXFAM (grain), FHI (grain), USAID via FH, World Bank via CARITAS, CARITAS (grain and seed)	FAO (cassava flour and planting material, CICR cassava flour and planting material), OXFAM, Cassava flour, FHI (cassava flour and planting material), USAID via FHI, World Bank via CARITAS, CARITAS (cassava flour and planting material)

Annex 3: Supplementary Tables

Distribution of bean and cassava traders, by territory

Territory	Beans	Cassava
Kabare	53	27
Walungu	18	26
Kalehe	30	34
Bukavu	83	67
Uvira	10	8
Masisi	7	28
Rutchuru	57	16
Butembo	29	11
Goma	151	118
Beni	46	42
Total	484	377

Percent distribution of sampled bean and cassava traders, by sex of trader

Sex	Beans	Cassava	Combined
Female	84.09	75.86	81.04
Male	15.91	24.14	18.96

Types of business by the age of trader

	% of traders		Total	chi2/p*
	45 & younger	Over 45		
Retailer	75.5	67.15	73.14	3.487*
Collector/aggregator/broker	31.99	35.77	33.06	0.633
Wholesaler	8.07	5.84	7.44	0.709
Processor	0.86	0	0.62	1.192
Producer-trader	0.58	0.73	0.62	0.038
Exporter	3.75	5.11	4.13	0.461
Others	0.58	0.73	0.62	0.038

Business activities are undertaken by bean traders, by province

Business activity	% of traders			chi2/p*
	North Kivu	South Kivu	Total	
Grain trading/selling	95.88	96.89	96.28	0.334
Informal sector seeds/local seeds	24.74	38.34	30.17	10.188***
Formal Certified seed	4.12	4.66	4.34	0.081
Bean product processing	0	0.52	0.21	1.511
Other crops	1.03	0	0.62	2.002
Others	0.69	1.04	0.83	0.172
N	291	193	484	

***Significant at 1% level of significance

The average number of bean varieties traded, April 2020-April 2021, by sex of trader

	Female	Male	Total	p>t	North Kivu	South Kivu	Total	p>t
Mean	1.65	2.29	1.75	0.000	1.91	1.51	1.75	0.000

The number of traders selling some bean grain for seed was slightly higher for females than males at 49% compared to 39% for males. However, the difference was insignificant. Thus, almost half of the traders participated in the informal seed trade (Table 18)

Percent of bean traders that sold seed, by sex of trader

	Female	Male	Total
Yes	49.39	38.96	47.73
No	407	77	484

***Pearson chi2 (1) = 1.7592 Pr = 0.185

Highest grain price (Mean CDF/KG), April 2020-April 2021, by province

Bean type	North Kivu	South Kivu	Average	p>t
Red mottled	2,036	1,985	2,014	0.6908
Sugar type	2,057	1,792	1,998	0.4608
White beans	1,991	2,280	2,023	0.2639
Purple	1,617	2,167	1,708	0.0454**
Dark red kidney	2,353	1,820	2,121	0.0221**
Small reds	2,211	1,908	1,978	0.1106
Khaki	1,833	1,633	1,813	0.3349
Mixed	1,795	1,714	1,763	0.213
Yellow	2,279	2,107	2,245	0.4991
Black	1,703	1,737	1,705	0.8103
Grey	1,961	1,244	1,831	0.0216**
Others	1,979	2,366	2,143	0.0209**

Lowest grain price (Mean CDF/KG), April 2020-April 2021, by sex of trader

Bean type	Sex of trader		Average	p>t
	Female	Male		
Red mottled	1,485	1,936	1,579	0.0006***
Sugar type	1,479	1,580	1,535	0.6721
White beans	1,613	1,654	1,622	0.7889
Purple	1,325	1,252	1,313	0.7108
Dark red kidney	1,422	2,401	1,644	0.0000***
Small reds	1,312	2,453	1,369	0.0000***
Khaki	1,360	1,623	1,418	0.0535*
Mixed	1,397	1,395	1,396	0.9773
Yellow	1,852	1,746	1,804	0.5509
Black	1,313	1,261	1,304	0.5304
Grey	1,246	1,594	1,333	0.0331**
Others	1,578	1,769	1,620	0.2157

***1 USD=1982 Congolese Francs

Lowest grain price (Mean CDF/KG), April 2020-April 2021, by province

Bean type	North Kivu	South Kivu	Average	p>t
Red mottled	1627	1512	1,579	0.2983
Sugar type	1557	1458	1,535	0.7292
White beans	1602	1783	1,622	0.3738
Purple	1262	1567	1,313	0.1113
Dark red kidney	1766	1484	1,644	0.1081*
Small reds	1676	1275	1,369	0.0028***
Khaki	1431	1293	1,418	0.4753
Mixed	1392	1402	1,396	0.845
Yellow	1842	1648	1,804	0.3844
Black	1293	1430	1,304	0.2376
Grey	1384	1111	1,333	0.1396
Others	1505	1776	1,620	0.0342**

Type of buyers for bean grain, by sex of trader

Type of buyers		Female	Male	Total	chi2/p*
Individual consumers	n	541	92	633	54.6***
	% of traders	79.68	52.27	74.04	0
Institutional buyers	n	9	31	40	83.152***
	% of traders	1.33	17.61	4.68	0
Traders	n	329	97	426	2.48
	% of traders	48.45	55.11	49.82	0.115
N (traders)		679	176	855	

Sex of buyers of beans, by sex of trader

Sex of trader	Sex of customer for beans	
	Male	Female
Female	28.97	71.03
Male	43.03	56.97
Overall	31.21	68.79

Did you export bean grain outside the country? (by sex of trader)

Response		Female	Male	Total	chi2/p*
Yes	n	18	4	22	0.0798 Pr = 0.778
	%	2.65	2.27	2.57	

Did you export bean grain outside the country? (by province)

Response		North Kivu	South Kivu	Total	chi2/p*
Yes	n	19	3	22	4.2263 / Pr=0.04
	%	3.37	1.03	2.57	

Export countries for beans

Country	Number of traders			Percent of traders	
	North Kivu	South Kivu	Total		
Burundi	-		2	2	0.23
Rwanda	7		1	8	0.94
Uganda	14		-	14	1.64
Total	21		3	24	2.81

Income level from bean business per month (2000 CDF = 1\$), by sex of trader and province

Income level	USD (midpoint)				North	South	Total
		Female	Male	Total	Kivu	Kivu	
Below CDF 50000	< 25	35.38	12.99	31.82	31.27	32.64	31.82
CDF 51000 – 150000	50	39.07	18.18	35.74	30.93	43.01	35.74
CDF 151000 – 250000	100	16.95	23.38	17.98	19.59	15.54	17.98
CDF 251000 – 500000	225	6.63	22.08	9.09	12.71	3.63	9.09
Above CDF 500000	> 250	1.97	23.38	5.37	5.5	5.18	5.37

***Pearson chi2 (4) = 91.8378 Pr = 0.000 (Gender); ***Pearson chi2 (4) = 16.4229 Pr = 0.003 (Province)

Relationships between age, sex, and incomes earned from bean businesses

Income level					Total
	15 to 29	30 to 45	46 to 65	66 and above	
Female traders					
Below CDF 50000	56.63	30.43	28.57	40	35.38
CDF 51000 – 150000	33.73	41.55	39.29	20	39.07
CDF 151000 – 250000	4.82	18.36	22.32	40	16.95
CDF 251000 – 500000	4.82	7.25	7.14	0	6.63
Above CDF 500000	0	2.42	2.68	0	1.97
Male traders					
Below CDF 50000	11.11	18.75	0	0	12.99
CDF 51000 – 150000	44.44	16.67	10.53	0	18.18
CDF 151000 – 250000	33.33	22.92	21.05	0	23.38
CDF 251000 – 500000	11.11	20.83	31.58	0	22.08
Above CDF 500000	0	20.83	36.84	100	23.38

Do you sometimes provide credit to farmers who want seed during planting season?

Response	Frequency	Percent
No	378	78.10
Yes	106	21.90
Total	484	100

The average price at which traders sold local bean seed (CDF/KG)

Bean type	Sex of trader		Province		Overall Average
	Female	Male	North Kivu	South Kivu	
Red mottled	2,014	2,737	2,211	2,128	2,168
Sugar type	1,883	1,875	1,880	1,875	1,879
White beans	1,866	3,000	1,972	1,829	1,936
Purple	1,461	2,200	1,595		1,646
Dark red kidney	1,866	2,777	2,431	1,881	2,300
Small reds	1,684	3,000	2,000	1,685	1,713
Khaki	1,782	2,500	2,119	1,278	1,961
Mixed	1,880	1,872	1,830	1,914	1,879
Yellow	2,079	2,883	2,661	1,667	2,562
Black	1,718	1,720	1,649	2,150	1,718
Grey	1,697	3,120	2,344		2,344
Others	1,840	2,729	2,089	2,045	2,062
Average	1,836	2,490	2,043	1,901	1,976

The trend of cassava product demand from other markets, by sex of trader and province

Demand trend	Female	Male	Total	North	South	Total
				Kivu	Kivu	
Decreasing	32.87	25.27	31.03	34.62	26.63	31.03
Stationary	36.71	50.55	40.05	37.5	43.2	40.05
Increasing	30.42	24.18	28.91	27.88	30.18	28.91

***Pearson chi2 (2) = 5.5127 Pr = 0.064 (Gender); ***Pearson chi2 (2) = 2.8418 Pr = 0.241 (Province)

The trend of seasonal supply to other markets, by sex of trader and province

Seasonal supply trend	Female	Male	Total	North	South	Total
				Kivu	Kivu	
Decreasing	36.71	40.66	37.67	45.19	28.4	37.67
Stationary	46.15	41.76	45.09	39.42	52.07	45.09
Increasing	17.13	17.58	17.24	15.38	19.53	17.24

***Pearson chi2 (2) = 0.5893 Pr = 0.745 (Gender); ***Pearson chi2 (2) = 11.2141 Pr = 0.004 (Province)

Source of information on market (prices, laws, and quantities) for cassava, by sex of trader and province

Information source	Female	Male	Total	chi2/p*	North	South	Total	chi2/p*
					Kivu	Kivu		
Official	14.04	23.08	16.22	4.149**	24.52	5.95	16.22	23.572***
Private	77.89	83.52	79.26	1.326	87.98	68.45	79.26	21.557***
Others	16.49	7.69	14.36	4.342**	4.33	26.79	14.36	38.114***

Market-preferred varieties and attributes

Commodity	Commercial types	Varieties	Special attributes	
Beans	<u>Red and Red mottled</u>	Hm21-7	High yielding	
		RWR2245	Drought tolerance and High yielding	
		RWR2154	Drought tolerance and High yielding	
		G59	High yielding; Disease tolerance	
		Africa (large grain) / Munyama	High yielding; Marketable; Appreciated by consumers for palatability	
		Toka Chini, Africa (Small grain/LCA)	High yielding; Marketable; Appreciated by consumers for high yields and palatability	
		Namulenga	High yielding	
		VCB	Climber; High protein	
	<u>White</u>	Kabenga	Appreciated by consumers for high yields and palatability	
	<u>Purple/Grey</u>	Kasoda (M'sole)	Drought tolerance; Disease tolerant; Appreciated by consumers for high yields and palatability	
		Kablangeti	Good yield; Appreciated by consumers	
		Kivuyu	Local variety; Good yield; Disease tolerance	
		Kishibisha	Local variety; Good yield; Disease tolerance	
		Kambinee	Local variety; Good yield; Disease tolerance	
	Yellow	Pigeon Vert (Marungi, Milayi)	Suitable for export to other parts of the country (Kinshasa, Kisangani & Congo Central); Appreciated by consumers and has a reasonable price at the market	
	Cassava	Sawa sawa	Sawa sawa	Disease tolerance (fresh root, also flour, leaves)
		Nabana	Nabana	Disease tolerance (fresh root)
Naro-Cas1		NARO-Cas1	Disease tolerance (fresh root and leaves)	
Mayombe		Mayombe	High yielding (fresh, flour leaves)	
Mapendo		Mapendo	Consumers appreciation for palatability (fresh, flour leaves)	
Kambekisayi		Kambekisayi	High yielding (fresh root and leaves)	
Ilona		Ilona	Disease tolerance (flour and leaves)	