Data Collection Survey on Food Value Chain Study under the Influence of COVID-19 in the Eastern Region of Africa

Final Report

February 2022

Japan International Cooperation Agency (JICA)

Consortium of:
International Development Center of Japan (IDCJ)
Deloitte Tohmatsu Financial Advisory LLC (DTFA)
Sanyu Consultants Inc. (SCI)
Koei Research & Consulting Inc. (KRC)

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Exchange Rate

（February 2022）

1 USD = 115.262 JPY（USA）

1 ETB = 2.32289 JPY (Federal Democratic Republic of Ethiopia)

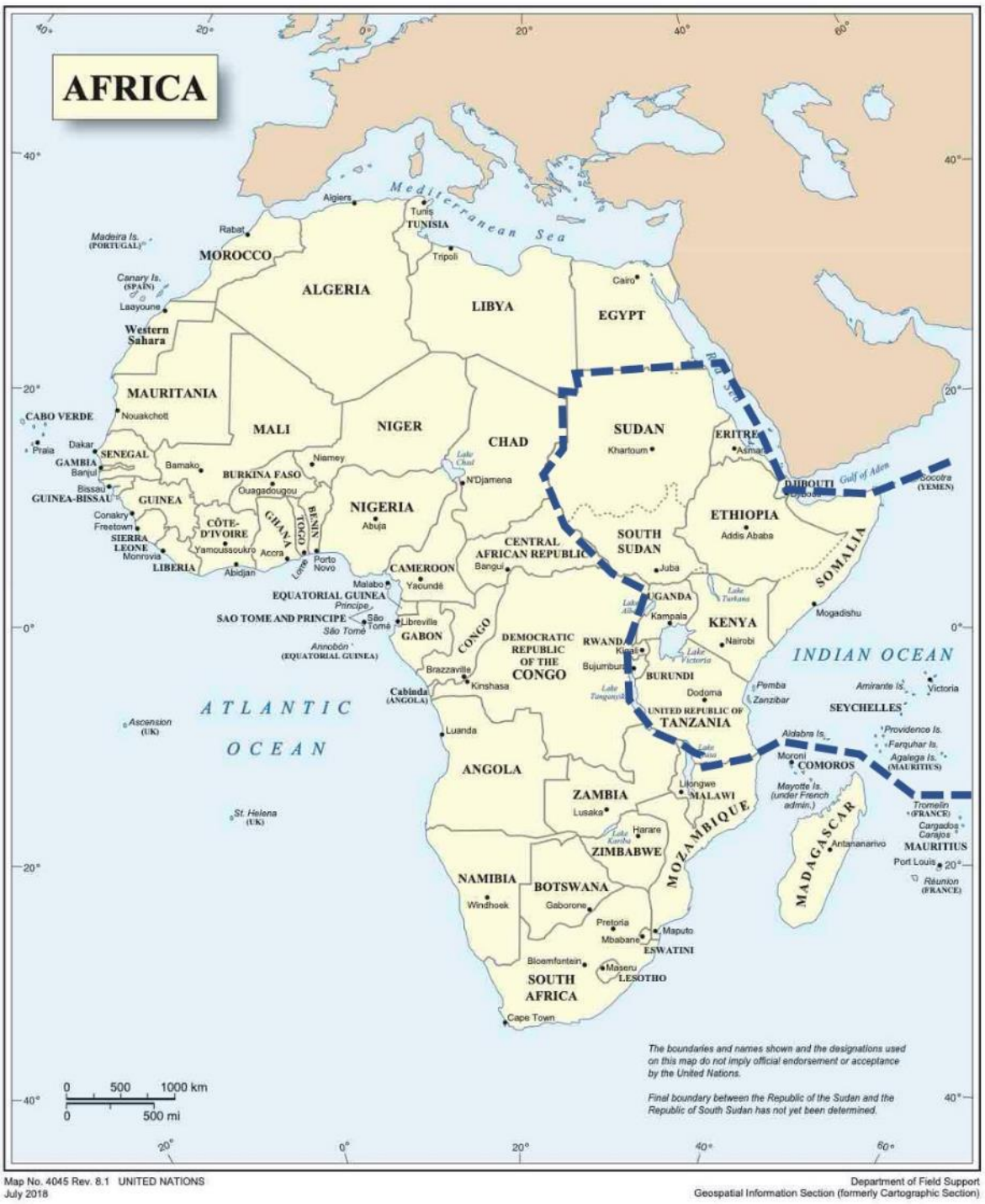
1 KES = 1.0186 JPY (Republic of Kenya)

1 UGX = 0.033040 JPY (Republic of Uganda)

1 RWF = 0.115080 JPY (Republic of Rwanda)

1 TZS = 0.050070 JPY (United Republic of Tanzania)

(JICA Monthly Exchange Rate)



The Eastern Region of Africa covers 12 countries: Ethiopia, Eritrea, Somalia, Djibouti, Kenya, Uganda, Rwanda, Burundi, Tanzania, Seychelles, Sudan, and South Sudan.

Location Map of the Region

Summary

The objectives of the study are: i) to collect information on the impact of the spread of COVID-19 on food value chain (FVC) in the Eastern Region of Africa, ii) to analyze the trends and underlying factors, and iii) to propose measures to overcome, how resilient FVC should be in With/Post COVID-19, and JICA's potential cooperation.

The study area covers 12 countries in the Eastern Region of Africa, of which the Study Team selected Ethiopia, Kenya, Uganda, Rwanda and Tanzania as target countries for field survey from the perspective of the potential for development of Northern Corridor. In each country, seven crops were selected in consideration of crop types (cereals/staple foods, horticultural crops, and export crops) and distribution types (domestic, regional, and outside regional distribution). The crops selected are teff, wheat, rice, onion, broad beans, chili sauce, and coffee for Ethiopia; maize, rice, plantain, potato, dry beans, sugarcane, and tea Kenya; maize, rice, plantain, potato, onion, tomato, and coffee for Uganda and Rwanda; and maize, rice, sorghum, potato, onion, tomato, and coffee for Tanzania. Based on the literature review, field surveys were conducted by key informant interview and followed by questionnaire survey from June to December 2021.

The desktop study found the 5 types of distribution exist; those are i) domestic distribution, ii) neighbor country distribution, iii) intra-corridor distribution, iv) inter-corridor distribution, and v) extra-region distribution. The field survey found the following impacts along VC stages: i) Initially, there were significant impacts in the input stage caused by disrupted access to imported inputs as well as distribution stages; ii) Accordingly, consumption demand shrank as a whole, and even after the supply chain recovered, the impact of shrinking demand has been prolonged from the downstream such as consumption shifted to lower priced staple foods; iii) As results, the processing and distribution stages as midstream have been suffering from squeezing profits.

By crop type, it is turned out that the impact on FVC was large for the crops with longer value chain (VC), with poor preservability, cultivated annually requiring annual inputs, and transacted informally. As for cereals/staple foods, the impacts were moderate in spite of large impacts observed in the upstream and midstream of the VC in the countries around the Northern Corridor (Kenya, Uganda, Rwanda and Tanzania). This is because that the impacts at the consumption stage were mitigated by the substitution among staple foods and the trade among countries around Northern Corridor. On the other hand, in Ethiopia, the impact on teff as main staple food at the distribution stage was significant. Also, the large impacts on wheat prevented from substituting for teff. In combined with non-smooth trade, those resulted in the significant impacts on staple food VC in the consumption stage, which could be a food security issue. Rice had a significant change in VC flow. Stagnation of the import from Asia have led to the inflow of lower priced Tanzanian rice to Kenya, Uganda, and Rwanda, which caused significant impacts on VC actors involved in domestic rice in those countries.

Horticultural crops, which have the potential of high value added with nutrition, were the most affected throughout the VC. This is because: i) these are intra-corridor distributed crops and are directly affected at the distribution stage because of poor preservability, its processing level, and lack of quality distribution such as cold chain; and ii) they have been replaced by lower priced crops such as cereals due to the shrinking

consumption demand, which poses concerns about nutrition issues. As for export crops, which are traditional export crop and have established supply chains, there was no significant impact except for the initial impact.

Comparing the countries, Ethiopia and Rwanda experienced larger impacts. Common features of those countries are their stringent policies against COVID-19 and their constraints to FVC. Ethiopia has large land area with landlocked and lack of access to major corridors. Rwanda is landlocked and mountainous, although it is located along the Northern Corridor.

FVCs in the Eastern Region of Africa are basically vulnerable. This has become apparent with the spread of COVID-19. The study proposes the measures to build resilient FVC. Short-term measures to overcome the impact include: i) ensuring smooth movement ii) strengthening ICT, iii) enhancing financial and other support systems during shocks, and iv) strengthening sanitation measures. Medium and long-term measures include: i) promotion of e-commerce and platforms; ii) enhanced access to inputs; iii) modernization of production and farming; iv) support for the improvement of processing and distribution and compatibility of food hygiene standards; v) improvement of the quality of logistics and promotion of efficient and smooth distribution, especially strengthening FVC in landlocked countries along the northern corridor (capitalizing he potential of horticultural crops for the opportunities in the Northern Corridor), and strengthening the corridors where Ethiopia locates for linkage with the northern corridor; and vi) sustaining consumer demand and sales.

Abbreviations

Acronym	Contents
AASS	Annual Agricultural Sample Survey (Tanzania)
ACES	African Centre of Excellence for Sustainable Cooling and Cold Chain
AEZ	Agro Ecological Zone
AFA	Agriculture and Food Authority (Kenya)
AfDB	African Development Bank
ASA	Agricultural Seed Agency (Tanzania)
ASDP	Agricultural Sector Development Program (Tanzania)
BXW	Banana Xanthomonas Wilt
CaDPERP	Capacity Development Project for Enhancement of Rice Production in Irrigation Schemes in Kenya
CARD	Coalition for Africa Rice Development
CBK	Central Bank of Kenya
CIP	Crop Intensification Program (Rwanda)
COMESA	Common Market for Eastern and Southern Africa
COVID-19	New coronavirus
CPB	Cereal and Other Products Board (Tanzania)
DRC	Democratic Republic of the Congo
DSIP	Development Strategy and Investment Plan (Uganda)
EAC	East Africa Community
EIF	Enhanced Integrated Network (Ethiopia)
EPHI	Ethiopian Public Health Institute
FAO	Food and Agriculture Organization
FVC	Food Value Chain
GDP	Gross Domestic Product
GLOBALG.A.P.	Global Good Agricultural Practices
GOU	Government of Uganda
ICR	Inception Report
ICT	Information and communication technology
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IGAD	Inter-Governmental Authority on Development
ITC	International Trade Statistics
JICA	Japan International Cooperation Agency
KALRO	Kenya Agricultural Livestock Research Organization
KTDA	Kenya Tea Development Agency Co. Ltd.
KEBS	Kenya Bureau of Standards
KEPHIS	Kenya Plant Health Inspectorate Service
LAPSSET	Lamu Port-South Sudan-Ethiopia-Transport Corridor
MINAGRI	Ministry of Agriculture and Animal Resources (Rwanda)
MINICOM	Ministry of Trade and Industry (Rwanda)
MoALFC	Ministry of Agriculture, Livestock, Fisheries and Co-operatives (Kenya)
NAEB	National Agricultural Export Development Board (Rwanda)
NFRA	National Food Reserve Agency (Tanzania)
NERICA	New Rice for Africa
NRDP	National Rice Development Policy (Uganda)
NSCA	National Sample Census of Agriculture (Tanzania)
OACPS	Organisation of African, Caribbean and Pacific States
OEC	Observatory of Economic Complexity

Acronym	Contents
RAB	Rwanda Agricultural Board
RICA	Rwanda Institute for Conservation Agriculture
RIPP	Rice Promotion Programme (Kenya)
RSB	Rwanda Standards Board
RwF	Rwanda Fran
SHEP Biz	Project for Smallholder Empowerment and Agribusiness Promotion
TAHA	Tanzania Horticulture Association
TCB	Tanzania Coffee Board
TFTA	COMESA-EAC-SADDC Tripartite Free Trade Area
ToT	Training of Trainers
UAE	United Arab Emirates
UCDA	Uganda Coffee Development Authority
UNADA	Uganda National Agro-Input Dealers Association
USAID	U.S. Agency for International Development
UNICEF	United Nations Children's Emergency Fund
VAT	Value Added Tax
VC	Value Chain
WHO	World Health Organization

Table of Contents

Figure & Table

Chapter 1 Outline of the Study

1.1 Background and Objectives of the Study

(1) Background

The new coronavirus (hereinafter referred to as "COVID-19") has spread worldwide, and as of February 8, 2021, approximately 153.9 million infected people have been confirmed worldwide (WHO, 2021). The number of infected people in Africa has reached about 2.65million and further spread of infection is expected in the region in the future (WHO, 2021). In response to this situation, Sub-Saharan African countries have taken various measures to prevent the spread of infection, such as domestic movement restrictions and border closures.

However, these measures caused stagnation of distribution and price increase of agricultural inputs (seeds, fertilizers, etc.) and agricultural products, affecting each process in the food value chain (hereinafter referred to as “FVC”). It has been pointed out that it may cause loss of added value and split up of VC (IFPRI, 2020). In Sub-Saharan Africa, agriculture accounts for 15% of GDP and is the main industry in which more than half of the total working population, 52.7%, is engaged (World Bank, 2019). The negative impact of the spread of COVID-19 infection on the agricultural sector can be an economic shock to the society. In particular, the poor, including smallholder farmers are affected. There is growing concern that COVID-19 will worsen livelihoods and food shortages.

Under such circumstances, each donor has taken various investigations and support measures, but does not cover the entire FVC from upstream to downstream. Therefore, the details of the influence of COVID-19 on each process and the relationship among processes other than production and consumption have not been fully studied. It also does not analyze differences in impacts by region, country, and crop. Even though there are agricultural inputs and crops that are traded between several countries, the impact of each country's measures on cross-border FVCs has not been analyzed.

Therefore, the study team 1) focus on the entire VC of several countries and crops, concretely, 2) investigate the influence of COVID-19 on each process and the relationship among processes, and 3) study these backgrounds. In addition, the study team will compare and analyze how the trends and backgrounds of these effects differ depending on the country and crop, and how VCs have changed throughout the eastern region. For each actor to overcome the effects of COVID-19, the study team propose various measures necessary for adapting with / Post COVID-19 society, and JICA's support measures for their realization.

(2) Objectives

The objectives of study are i) to collect the information on the influence on the food value chain of the crop in the target countries by COVID-19, ii) to analyze the background and trends, and iii) to propose measures to overcome, how resilient FVC should be and JICA’s support measures.

1.2 Study Methodology

(1) Study Policy

The Project systematically studies the impact of COVID-19 on FVC, and compare and analyze the factors, where resilience exists, trends, etc.

The study team proposes how resilient FVC should be, various measures necessary for adapting FVC actor with / Post COVID-19, for overcoming the effects of COVID-19, and JICA's support measures for their realization (See Figure 1.1.1). The study policies are proposed as follows.

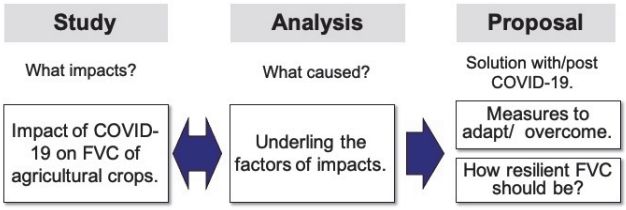


Figure 1.1.1 Objectives and Flow of the Study

1) From the perspective of the Northern Corridor

In East African countries, many corridor plans are proposed. These are Northern East Africa Corridor (Kenya, Uganda, Rwanda, and Burundi), Central Corridor (Tanzania), LAPPSET Corridor (Ethiopia, South Sudan and Kenya) and Djibouti Corridor (Djibouti, Sudan, South Sudan and Ethiopia). The study team, particularly focusing on Northern Corridor, studies the impact on the entire value chain of crops traded along the corridor.

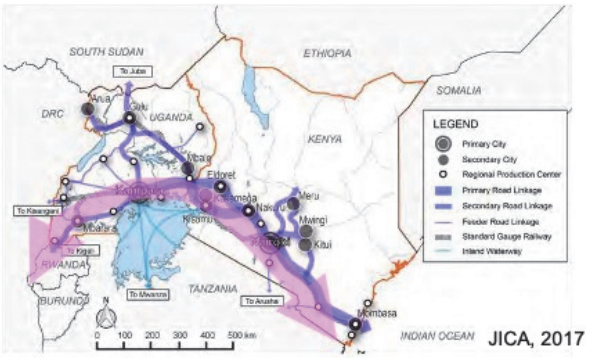


Figure 1.1.2 Perspective of Northern Corridor

2) Setting hypotheses on the impact of COVID−19 on FVC of Eastern Africa

Based on review and analysis of existing information, the study team sets up hypotheses. The study team focuses on the following impacts on FVC: i) negative impacts on livelihoods for smallholder farmers and the poor, ii) threats to food security and nutrition, and iii) potential barriers to future opportunities. The team also selects target crops classified by crop type as well as traded areas, which are domestically distributed, traded within the region, traded outside the region from the viewpoint of border trade according to the policy above,

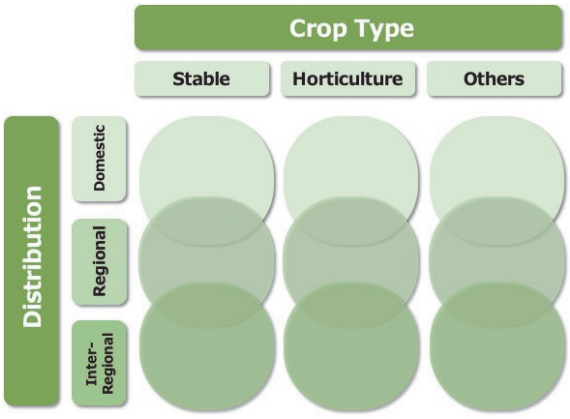
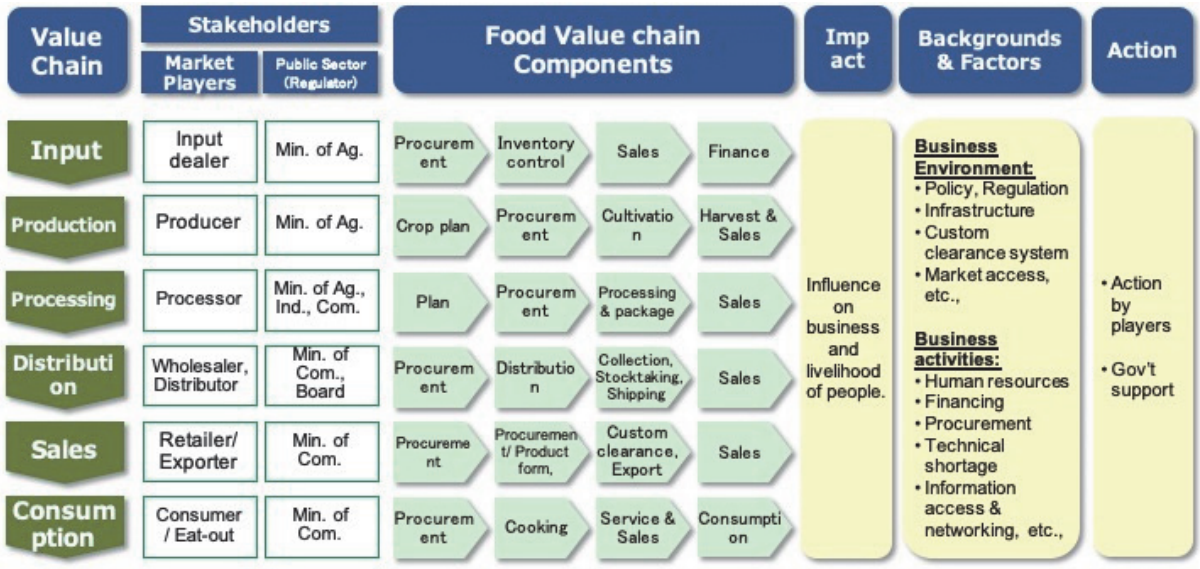


Figure 1.1.3 Selecting Crop by Traded

3) Applying Common Value Chain framework for Study

In accordance with the above policies, the study team applies a common framework for studying each process of FVC across the crops and countries for the comparative analysis. This makes it possible to

make comparative analyze of the effects on each process and the relationship between processes, and the differences in the effects on regions, countries, and crops. The processes of the FVC are input, production, processing, distribution, sales, and consumption in this study. The following figure shows an example of the FVC framework of the study.



Source: JICA Study Team

Figure 1.1.4 Study Framework

(2) Work Plan and Timeframe

The work plan was modified in consideration of the spread of COVID-19. Key Informant Interview Survey was conducted to understand the status prior to Value Chain questionnaire Survey (VC Survey).

Table 1.1.1 Work Plan

Year	2021												2022		
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1. Preparing the Survey Policy and Method		□□													
2. Selecting Countries to Study		□□													
3. Selecting Crops to Study		□□													
4. Preparing Inception Report (ICR)			□												
5. Preparing for Field Survey															
6. Field Survey															
6.1 1st Period Field Survey															
6.1.1 Key Informant Survey							■■	■■							
6.1.2 VC Survey								■■	■■	■■					
6.2 2nd Period Field Survey: VC Survey										■■	■■	■■			
7. Analyzing Collected Information						□	□	□□	□□	□□	□□	□□	□□		
8. Participating in Meeting of Africa FVC Survey for Sharing Ideas		□					□						□		
9. Preparing Progress Report (PR)							□□								
10. Preparing Draft Final Report (DFR)													□□		
11. フ Preparing Final Report (FR)														□□	
Outputs			ICR				PR						DFR	FR	

Note: □ Work in Japan: ■ Work in Eastern Region of Africa

(3) Selecting Countries to Study

The study team selected 5 countries to study out of 12 countries in the region, taking following criteria into consideration. Selected countries are Ethiopia, Kenya, Uganda, Rwanda, and Tanzania, which are proposed in meeting with JICA held on February 26, 2021. The region includes 12 countries: Ethiopia, Eritrea, Kenya, Seychelles, Somalia, Uganda, Tanzania, Burundi, Djibouti, Rwanda, Sudan, and South Sudan.

Selection criteria:

- Include countries with different measures and policies for COVID-19.
- Include countries with different memberships in regional communities.
- Include 3 or more CARD target countries.
- Include 3 or more countries implementing JICA agriculture and rural development projects.
- Include core countries connecting the Northern Corridor in accordance with Survey Policy 1.

The background information of 12 countries is as follows (see Table below).

Table 1.2.2 Status of 12 countries in the Region

Country	Impact and response to COVID-19	Regional communities	CARD	JICA agricultural Project	Corridor concept	Assessment
Sudan	Moderate impact (30,364 infections, 1,880 deaths) Declaration of a state of emergency	COMESA, TFTA, IGAD	✔	Rice cultivation		Applicable
Ethiopia	High impact (159,072 infections, 2,365 deaths), Declaration of a state of emergency, lockdown	COMESA, TFTA, IGAD	✔	Rice research, SHEP, Agricultural insurance		Selected
Eritrea	Low impact (2,847 infections, 7 deaths) Lockdown	COMESA, TFTA, IGAD		—		NA
Kenya	High impact (105,973 infections, 1,856 deaths), lockdown	EAC, COMESA, TFTA, IGAD	✔	Rice cultivation, SHEP Biz, Natural resource management, Northern corridor agricultural development advisor	Northern corridor	Selected
Seychelles	Low impact (2,618 infections, 11 deaths) Immigration restrictions	COMESA, TFTA		—		NA
Somalia	Low impact (7,257 infections, 239 deaths) Immigration restrictions, nightly curfew	IGAD		—		NA
Uganda	Moderate impact (40,357 infections, 334 deaths) Lockdown	EAC, COMESA, TFTA, IGAD	✔	Rice cultivation, livelihood improvement, Planning advisor for Ministry of Agriculture	Northern corridor	Selected
Tanzania	Low impact (509 infections, 21 deaths) (May 2020), COVID-19-free declaration in June 2020, immigration restrictions	EAC, TFTA	✔	SHEP	Central corridor	Selected
Burundi	Low impact (2,217 infections, 3 deaths). Immigration restrictions	COMESA, TFTA	✔	Rice cultivation	Northern Corridor	Applicable
Djibouti	Low impact (6,089 infections, 63 deaths). Lockdown	COMESA, TFTA, IGAD	✔	—		Applicable
Rwanda	Moderate impact (18,850 infections, 261 deaths). Lockdown	EAC, COMESA, TFTA	✔	Irrigation, coffee	Northern corridor, Central corridor	Eligible
South Sudan	Low impact (7,926 infections, 93 deaths). Immigration restrictions, nightly curfew	EAC, COMESA, TFTA, IGAD		CAMP/IDMP	Northern corridor	Applicable

Sources: JICA Study team

Table 1.2.3 Measures and Policies on FVC of 12 Countries in the Region

Country	Input	Production	Processing	Distribution	Sales	Consumption
Sudan					Export ban of sorghum	In-kind Food transfer
Ethiopia	Farm input support	Loan for cooperatives		Customs duty exemption		Price control of food
Eritrea						Price control of food
Kenya	Price control of farm input, Supply of farm input (e - vouchers)	Supply of home garden kit, Support on export farmers, Price intervention on maize	Buy Kenya Build Kenya program	Support on air transportation of agricultural products	Reduction of corporate income tax	Import food, price control of food, VAT reduction
Seychelles						Guaranteed salary, tax payment postponed, loan repayment reduction
Somalia	Farm input support					School meals, in-kind food transfer to pregnant women and infants under 5 years old, food distribution and cash transfer to refugees
Uganda	Farm input support	Farmers are encouraged to grow a variety of food crops to diversify their diets		Open markets only for food stuffs	Delivery recommended, e-commerce platform	Import food, price control of food, in-kind food transfer, extension of VAT refund
Tanzania	Promotion of domestic input goods				Resume tourism	Strengthen food reserve
Burundi	Farm input support					Cash transfer
Djibouti		Expansion of support for farmers damaged by locust				Assistance of cash vouchers, distribution of food vouchers to refugees
Rwanda	Economic Reconstruction Fund, Fertilizer/seed distribution	Price intervention on cash crop and staple food (rice, coffee)	Retain workers to sustain factory (tea, coffee, sugar, milk, rice, flour)	Support on cross-border women traders		Import food, release of food stock, price control of food, cash transfer, in-kind food transfer
South Sudan						Take-home school meals

Sources: JICA Study team

(4) Selecting Crops to Study

The study team selected crops to study, along with the selection criteria below, with approval by JICA in meeting with held on February 26, 2021. Those are 7 crops in each country, i.e., 3 crops each from staple crops and horticultural crops, and 1 crop from export crops (industrial crops such as tea, coffee, cacao, etc.), as shown in Table below.

Selection criteria:

- Select crops produced by many smallholder farmers.
- Include both crops which are mainly for domestic consumption and for export (Depending on main distribution channel, the study team classify it into different type, i.e., mainly domestic distribution, mainly internal distribution, and mainly external distribution).
- Exclude crops which are mainly self-consumed.
- Include crops with active trade within the eastern region of Africa.
- Include rice in CARD target countries.
- Crops of high consumption per capita (except export crops).
- Prospective and priority crops in each country.

Table 1.2.4 Crops to Study

	Ethiopia	Kenya	Uganda	Rwanda	Tanzania
Cereals/ Staples	wheat（D/R） rice（D） teff（D）	maize（D/R） rice（D/R） plantain（D/R）	maize（D/R） rice（D/R） plantain（D）	maize（R） rice（R） plantain（D）	maize（R） rice（R） sorghum（R/D）
Horticultural crops	broad bean（D/R） onion（D） spice（R/E）	potato（D） soybean（E） sugarcane（D）	potato（R） onion（R） tomato（R/E）	potato（R） onion（R） tomato（R）	cabbage（D） onion（R/E） tomato（R）
Export crops	coffee（E）	tea（E）	coffee（E）	coffee（E）	coffee（E）

Note: D: Mainly domestic distribution, R: Mainly distributed within the region, E: Mainly distributed outside the region, written together is mainly the former one.

(5) Reporting

The study team submitted the reports to JICA as follows.

- Inception Report: March 2021.
- Progress Report: July 2021.
- Draft Final Report: January 2022.

(6) Field Survey

Field survey was conducted as follows.

- Ethiopia: conducted by the local-based consultants under the supervision of JICA Study Team due to the unstable security.
- Kenya: June and November -December 2021.
- Uganda: November 2021.
- Rwanda: November 2021.
- Tanzania: conducted by the local-based consultants under the supervision of JICA Study Team due to the spread of COVID-19.

(7) Participating in Meeting of Africa FVC Survey for Sharing Ideas

The study team participated in meetings hosted by JICA and shares information and exchange views with FVC survey team in other regions of Africa and JICA

- 1st meeting: 26th of February 2021.
- 2nd meeting: 3rd of September 2021.
- 3rd meeting: 24th of January 2022.

Chapter 2 Food Value Chain in the Eastern Region of Africa

2.1 Overview of eastern Africa and agricultural production and trade

(1) Regional and national overview

Table 2.1.1 and Table 2.1.2 provides basic information on 12 countries in eastern Africa. The population of 12 countries is approximately 365 million, with a total area of 6.2 million km^2, and the population density varies greatly from country to country, from 20 people / km^2 in South Sudan to 480 people / km^2 in Rwanda. Many countries adopt the language of the local majority ethnic group and the language of the former colonial power as the official language.

The economy is centered on economic models that depend on primary industries such as agricultural products, oil, gas, and mineral resources. The GDP of agricultural sector accounts for 75% in Somalia, followed by Uganda at 37%, Ethiopia at 34%, and Rwanda at 33%, i.e., many eastern Africa countries are agricultural country. Trade in eastern Africa is heavily dependent on external factors, as crops are heavily affected by the weather and resources are also susceptible to fluctuations in international trading prices (PWC, 2014, The growth of Sub-Saharan Africa). In order of agricultural production volume, the seven countries of Ethiopia, Tanzania, Sudan, Kenya, Uganda, Rwanda, and Burundi have total agricultural production of more than 20 million tons, and many agricultural products produce more than 1 million tons annually. The production of cereal crops such as maize and sorghum, potatoes such as cassava and sweet potato, and sugar cane is noticeable. On the other hand, in Seychelles, Djibouti, South Sudan and Eritrea, the agricultural sector is less important. In Seychelles, Djibouti, Eritrea, Somalia[1], and South Sudan, no crop produced more than 1 million tons per year.

Economic growth is positive in countries other than Sudan. Especially in Rwanda and Ethiopia, it is in the 9% level (2019).

[1] In Somalia, the agricultural sector accounts for 75% of GDP, but the economy is devastated because of the civil war and drought, and agricultural production is low.

Table 2.1.1 Basic information on 12 countries in eastern Africa (1)

	Sudan	Ethiopia	Eritrea	Kenya	Seychelles	Somalia
Area	1.88 million km^2	1.097 million km^2	117,600 km^2	583,000 km^2	460km^2	638,000km^2
Population	42.81 million people (World bank, 2019)	112.07 million people (World Bank, 2019)	5.5million people (AfDB, 2017)	52.57 million people (UN, 2019)	97,625 people (World Bank, 2019)	14 million people (IMF, 2015)
Capital	Khartoum	Addis Ababa	Asmara	Nairobi	Victoria	Mogadishu
Language	Arabic, English	Amharic, Oromo, English	Tigrinya, Arabic, language of the tribes	Kiswahili, English	English, French, Creole	Somali, Arabic
Main industry	Mining, agriculture and forestry, livestock, fishery	Agriculture, flowers, leather	Agriculture, mining	Agriculture, mining	Tourism, fishery, agriculture	Livestock industry, agriculture
GDP	$18.9 billion (World Bank, 2019)	$96.1 billion (World Bank, 2019)	$6 billion (World Bank, 2018)	$96.5billion (World Bank, 2018)	$1.7billion (World Bank, 2019)	$ 6.2 billion (IMF, 2016)
GDP Share of agriculture	28.4%	33.9%	11.7%	26%	2.3%	75%
Main crop[2]	Sugar cane, sorghum, peanuts, millet, onions, sesame seeds	Maize, wheat, sorghum, barley, sweet potato, sugar cane, millet, broad bean	Sorghum	Sugar cane, maize, potatoes, bananas	Coconut	Banana
GNI per capita	$ 590 (World Bank, 2019)	$ 850 (World Bank, 2019)	$ 740 (AfDB, 2015)	$ 1,750 (World Bank, 2019)	$16,870 (World Bank, 2019)	$ 433.0 (IMF, 2016)
Economy growth rate	-2.5% (IMF, 2019)	9% (World Bank, 2019)	3.6% (AfDB, 2016)	5.4% (World Bank, 2019)	4.7% (World Bank, 2019)	2.5% (IMF, 2016)
Total trade amount	Export: $ 5.5 billion, Import: $ 8.4 billion (World Bank, 2015)	Export: $1.5billion, Import: $ 14.9 billion (ITC, 2018)	Export: $ 274 million 、 Import: $ 308 million (OEC, 2017)	Export: $ 5.6 billion, Import: $ 13.9 billion (Kenya National Bureau of Statistics, 2016)	Export: $ 1.1billion、 Import: $ 1.4billion (World Bank, 2019)	Export: $ 899 million (IMF, 2016), Import: $ 3.8 billion
Major	Export: Oil,	Export:	Export:	Export: Tea,	Export:	Export:

[2] The main agricultural products are those with an annual production of 1 million tons or more. The countries with low production (Djibouti, Seychelles, Somalia, Eritrea, South Sudan) are agricultural products with highest production. Source: FAOSTAT (2017-2019 average)

trade items	cooking oil, gold, livestock, Import: Aircraft parts, sugar cane, pharmaceuticals, tractors, flour (World Bank, 2015)	Coffee, oil seeds, cut flowers, Import: Machinery, automobiles, electrical appliances	Zinc, copper, rare metals, Import: Wheat, sorghum, pasta	horticultural crops, coffee, fish, Import: Industrial products, capital equipment, transportation equipment, food products (Kenya National Bureau of Statistics, 2016)	Canned tuna, oil, tobacco, etc. Import: Ship and vessel, oil, frozen tuna, etc. (OEC, 2018)	Livestock, bananas, leather, seafood, Import: Industrial products, petroleum products, food
Currency	Sudanese pound	Birr	Nakfa	Kenyan shilling	Seychelles rupee	Somali shilling

Table 2.1.2 Basic information on 12 countries in eastern Africa (2)

	Uganda	Tanzania	Burundi	Djibouti	Rwanda	South Sudan
Area	241,000 km^2	945,000 km^2	27,800 km^2	23,200 km^2	26,300 km^2	640,000 km^2
Population	42.7 million people (World Bank, 2018)	58 million people (World Bank, 2019)	11.53 million people (World Bank, 2019)	974,000 people (World Bank, 2019)	12.63million people (World Bank, 2019)	12.58million people (2017)
Capital	Kampala	Dodoma	Gitega	Djibouti	Kigali	Juba
Language	English, Kiswahili, Luganda	Kiswahili, English	French, Kirundi	Arabic, French	Kinyarwanda, English, French, Kiswahili	English, Arabic, language of the tribes
Main industry	Agriculture, forestry and fisheries, manufacturing / construction, service industry	Agriculture, forestry and fisheries, mining / manufacturing / construction, services	Agriculture	Transportation industry	Agriculture	Crude oil, agriculture, forestry, livestock, fisheries
GDP	$ 27.46billion (World Bank, 2018)	$63.2 billion (World Bank, 2019)	$ 3.0billion (World Bank, 2019)	$3.3 billion (World Bank, 2019)	$10.1billion (World Bank, 2019)	$11.9billion (World Bank, 2015)
GDP Share of agriculture	37%	26.7%	28.9%	3%	33%	10.4%
Main crop	Sugar cane, plantain, cassava, maize, sweet potato, vegetables, dried beans	Cassava, maize, sweet potato, sugar cane, rice, banana, dried beans, potato, sunflower seed	Cassava, banana, sweet potato	Vegetables	Banana, sweet potato, cassava	Sorghum, vegetables
GNI per capita	$ 620 (World Bank, 2018)	$ 1,080 (World Bank, 2019)	$ 280 (World Bank, 2019)	$ 3,540 (World Bank, 2019)	$ 820 (World Bank, 2019)	$ 1,090 (World Bank, 2015)
Economic growth rate	6.2% (World Bank, 2018)	5.8% (World Bank, 2019)	1.84% (World Bank, 2019)	7.47% (World Bank, 2019)	9.4% (World Bank, 2019)	3.2% (World Bank estimate, 2015)
Total trade amount	Export: $ 3.6billion,	Export: $ 5.1billio	Export: $ 180	Export: $ 5.1billion,	Export: $ 1.1billion,	Export: $ 800

	Import: $ 6.7billion (Uganda Bureau of Statistics, 2018)	n, Import: $ 8.4 billion (Central Bank of Tanzania, 2018)	million, Import: $ 887 million (World Bank, 2019)	Import: $ 4.7 billion (World Bank, 2019)	Import: $ 3.1 billion (UNCOMTRADE, 2019)	million, Import: around $ 5.1billion (World Bank estimate, 2015)
Major trade items	Export: Coffee, gold, cereals, vegetables, fish, Import: Petroleum / petroleum products, automobiles, iron, medical equipment / pharmaceuticals, plastic raw materials (Uganda Bureau of Statistics, 2018)	Export: Gold, cashew nuts, tobacco, sisal, coffee, Import: Oil, machinery, transportation equipment, building materials (Central Bank of Tanzania, 2018)	Export: Gold, coffee, tea, tantalum, etc. Import: Petroleum, pharmaceuticals, cement, sugar cane, etc. (World Bank, 2019)	Export: Sheep / goats, other animals, beans, Import: Refined petroleum products, coconut oil, raw sugar (OEC, 2018)	Export: Gold, oil, tea, coffee, tin, Import: Petroleum, gold, communication equipment, chemicals, raw sugar (UNCOMTRADE, 2019)	Export: Crude oil, etc., Import: Vehicles, etc.
Currency	Ugandan shilling	Tanzanian shilling	Burundian franc	Djiboutian franc	Rwandan franc	South Sudanese pound

Source: Ministry of Foreign Affairs

(2) Agricultural production (12 countries)

Figure 2.1.1 and Figure 2.1.2 show the production volume and harvested area of typical agricultural products in eastern Africa. In all 12 countries, maize production is highest, followed by sugar cane, cassava, sorghum, sweet potatoes, bananas, and wheat. Cereal crops and potatoes, which are consumed as staple foods in eastern Africa, occupy the top positions. On the other hand, the harvested area is wide for sorghum and maize, followed by sesame, peanuts and dried beans. Cereals and protein source crops, which are staple foods in eastern Africa, occupy the top positions.

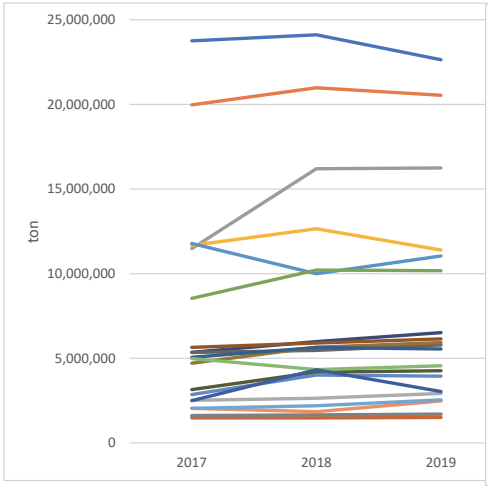


Figure 2.1.1 Production volume of main crops in Eastern

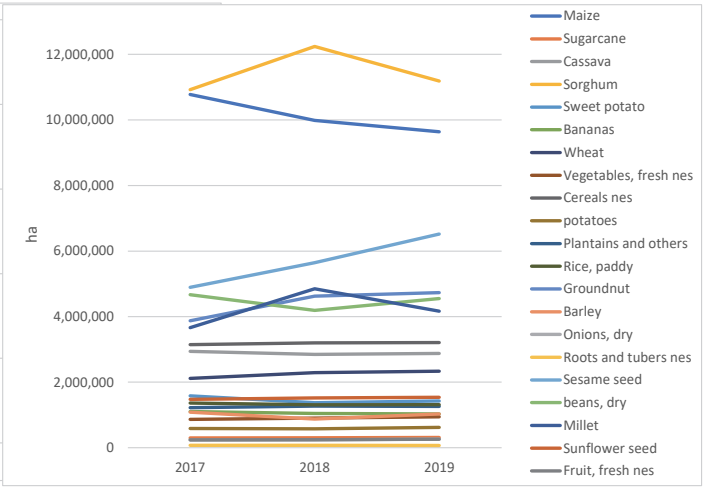


Figure 2.1.2 Harvested area of maincrops in Eastern Africa

Source：FAOSTAT（2017-2019 average）

The production of these major crops by 12 countries, Africa and world as a reference is shown (Table 2.1.3, Table 2.1.4 Major crop production in 12 eastern African countries (2) (million ton)Table 2.1.4). Compared to world production, the most produced crops in Africa are plantain (65% of the world total), cassava (62%), sorghum (49%) and millet (48%). Among them, sorghum (42% of the whole Africa and 21% of the whole world) has the highest production ratio in eastern Africa. Conversely, cassava (8% of Africa and 5% of the world) had the lower production rate in eastern Africa. On the other hand, compared to the world production, the crops that are less produced in Africa are vegetables (7.3% of the world total), rice (4.7%), barley (4.7%), and wheat (3.6%). A similar trend was seen in eastern Africa. However, it is not possible to describe eastern Africa as a whole, and it becomes clear that important crops differ in each country. Details of agricultural production of 5 countries is described in 2.2.

Table 2.1.3 Major crop production in 12 eastern African countries (1) (million ton)

	Maize	Sorghum	Millet	Wheat	Barley	Rice
Sudan	0.1＞	4.5	1.6	0.6	N/A	0.1＞
Ethiopia	10.1	5.2	1.1	4.9	2.0	0.2
Eritrea	0.1＞	0.1	0.1＞	0.1＞	0.1	N/A
Kenya	3.7	0.2	0.1	0.3	0.1	0.1
Seychelles	N/A	N/A	N/A	N/A	N/A	N/A
Somalia	0.1	0.1	N/A	0.1＞	N/A	0.1＞
Uganda	2.7	0.4	0.2	0.1＞	N/A	0.2
Tanzania	6.2	0.7	0.3		0.1＞	3.1
Burundi	0.3	0.1＞	0.1＞	0.1＞	N/A	0.1
Djibouti	0.1＞	N/A	N/A	N/A	N/A	N/A
Rwanda	0.4	0.2	0.1＞	0.1＞	N/A	0.1
South Sudan	0.1	0.7	0.1＞	N/A	N/A	N/A
Eastern Africa	23.5	12.1	3.3	6.0	2.2	3.9
Africa	84.7	29.0	14.2	27.5	7.0	35.4
World	1,137.3	58.8	29.6	757.2	149.1	756.7

Table 2.1.4 Major crop production in 12 eastern African countries (2) (million ton)

	Banana	Plantain	Cassava	Sweet potato	Irish potato	Vegetables
Sudan	0.9	N/A	N/A	0.2	0.4	3.6
Ethiopia	0.5	N/A	N/A	1.7	0.9	1.0
Eritrea	N/A	N/A	N/A	N/A	0.1＞	0.1
Kenya	1.5	0.1＞	0.9	0.8	1.8	2.5
Seychelles	0.1＞	N/A	0.1＞	N/A	N/A	0.1＞
Somalia	0.1＞	N/A	0.1	0.1＞	N/A	0.1
Uganda	0.5	3.5	2.8	1.9	0.2	1.6
Tanzania	3.1	0.6	6.9	4.4	0.9	3.4
Burundi	1.2	0.6	2.4	0.7	0.3	0.6
Djibouti	N/A	N/A	N/A	N/A	N/A	0.1＞
Rwanda	1.8	0.8	1.1	1.1	0.9	0.6
South Sudan	N/A	N/A	0.5	N/A	N/A	0.7
Eastern Africa	9.6	5.4	14.7	10.9	5.4	14.2
Africa	20.9	26.2	183.2	27.6	25.4	81.7
World	114.9	40.6	295.1	92.2	368.6	1111.9

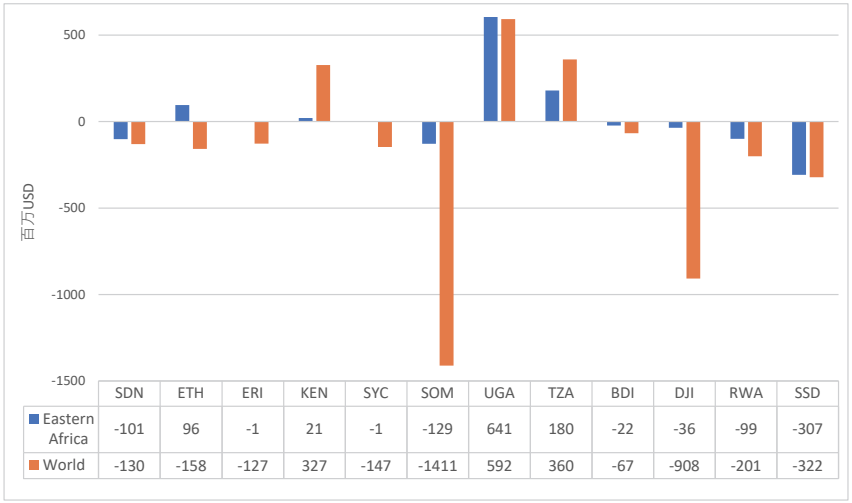
Source: FAOSTAT (2017-2019 average) *Vegetables are the total of Vegetables primary, and gray shading area is a crop that is considered to be important in each country.

(3) Agricultural products and food trade (12 countries)

In the three years from 2017 to 2019, the average export of agricultural products and foods[3] from 12 eastern African countries to the whole world was $ 9.7 billion, and the average import was $ 11.9 billion, and imports exceeded exports by $ 2.2 billion. It was found that exports to outside the region of Kenya, Uganda, and Tanzania exceed import. The other nine countries are over-imported, and Somalia and Djibouti are heavily dependent on imports from outside the region.

In terms of trade within the region, export of Ethiopia, Kenya, Uganda, and Tanzania exceed import. Export of Kenya, Uganda and Tanzania exceed import for both within the region and outside the region. The other eight countries were found to be excess of imports (Figure 2.1.3).

[3] FAOSTAT Detailed Matrix



Country code SDN: Sudan, ETH: Ethiopia, ERI: Eritrea, KEN: Kenya, SYC: Seychelles, SOM: Somalia, UGN: Uganda, TZA: Tanzania, BDI: Burundi, DJI: Djibouti, RWA: Rwanda, SSD: South Sudan (The same applies to the charts shown below.)
Source: FAOSTAT Detailed Trade Matrix

Figure 2.1.3 Agricultural and food trade balance of eastern Africa (2017-2019 average)

Table 2.1.5 shows the amount of trade by the combination of the exporter country and the export destination country. Comparing the value of exports to eastern Africa, Uganda has the largest export value at $ 835.62 million, followed by Kenya at $ 482.71 million and Tanzania at $ 226.45 million. On the other hand, there are few exports from Seychelles, Eritrea, and South Sudan. Comparing imports within eastern Africa, Kenya has the largest import value of $ 461.54 million, followed by South Sudan at $ 317.15 million. It can be said that Kenya is thriving in both imports and exports. In South Sudan, it became clear that within regional imports account for nearly 90% of the import value.

Table 2.1.5 Agricultural and food trade value in eastern Africa (2017-2019 average)

Unit: US $ 10,000

		Import													
		Sudan	Ethiopia	Eritrea	Kenya	Seychelles	Somalia	Uganda	Tanzania	Burundi	Djibouti	Rwanda	S. Sudan	East Africa total	World total
Export	Sudan	-	2,654 (2,234)	0	2,147 (1,958)	0	N/A	5 (4)	38	0	1,559	0	N/A	6,403	166,662
	Ethiopia	3,996	-	0 (15)	2,367 (1,075)	38 (5)	3,331 (3,215)	18 (5)	49 (1)	45 (0)	2,478 (1,834)	7 (5)	161 (129)	12,490	146,252
	Eritrea	0	0	-	0.1	0	0	12	0	0	0	0	0	12	192
	Kenya	5,406 (5,312)	730 (511)	69 (61)	-	88 (81)	9,679 (9,601)	**16,756** **(10,087)**	3,948 (3,191)	1,701 (846)	282 (275)	3,350 (3,798)	6,262 (6,245)	48,271	327,373
	Seychelles	0.3	0	0	2	-	0	0	0.3 (0)	0	0	0 (2)	0	3	1,359
	Somalia	N/A	48 (24)	0	19 (12)	0	-	0	0	0	0	0	N/A	67	22,172
	Uganda	6,552 (6,546)	214 (2)	0	**43,619** (34,073)	8 (25)	26 (23)	-	1,957 (1,230)	1,154 (1,008)	0	5,861 (5,617)	**24,171** (24,120)	83,562	133,374
	Tanzania	32 (22)	289 (2)	2 (3)	**15,188** (7,882)	1 (0.1)	39 (23)	592 (6,803)	-	1,056 (1,434)	1	5,432 (6,034)	13 (7)	22,645	124,083
	Burundi	0 (297)	0	0	187 (62)	0 (0)	0	472 (264)	134 (70)	-	0	65 (45)	0	858	8,335
	Djibouti	0	32 (24)	0	68 (76)	0	0	0	0	0	-	0	0	100	7,403
	Rwanda	361 (344)	0	52 (19)	827 (1,013)	0	159 (56)	2,943 (2,323)	295 (73)	597 (126)	0	-	393 (215)	5,627	37,806
	S. Sudan	N/A	0	0	0.3	0	N/A	2	15	0	0	0.1	-	17	3,050
	East Africa total	16,516	2,797	98	46,154	111	12,918	19,500	4,617	3,414	3,669	15,501	30,715	-	-
	World total	179,659	162,100	12,920	294,658	16,022	163,239	74,150	88,091	15,010	98,172	57,882	35,200	-	-

N/A: No data (The same applies to the charts shown below)
If there is a difference in the data between the export side and the import side, the value on the export side is shown in the upper row and the value on the import side is shown in the lower row.
Source: FAOSTAT data

In the four combinations shown below, the trade value exceeds 100 million dollars, and the trade of agricultural products and food between Uganda and Kenya is the most active in the eastern region. It can be said that they are trading base in eastern Africa.

Top combinations of agricultural and food trade value (export value) between eastern African countries (in order of total amount)

1. From Uganda to Kenya (US $ 430 million)
2. From Uganda to South Sudan (US $ 240 million)
3. From Kenya to Uganda (US $ 160 million)
4. From Tanzania to Kenya (US $ 150 million)

The corridor connecting Uganda, Kenya, Rwanda, and Burundi is the "Northern Corridor" (Figure 2.1.4). Uganda is the largest export destination for Rwanda, and Uganda is the largest export destination for Burundi, indicating that trade in the northern corridor is active. In addition, there are three corridors adjacent to the Northern Corridor, the "Central Corridor" from Tanzania to Rwanda and Burundi, the "LAPSSET Corridor[4]" that runs through central Kenya to Ethiopia and South Sudan, and the “Kampala- Juba- Addis Ababa- Djibouti Corridor” connecting Uganda, South Sudan, Ethiopia, and Djibouti. The trade volume in the Northern Corridor is $ 775.32 million, while the Kampala-Juba-Addis Ababa-Djibouti Corridor is $ 270.76 million, the Central Corridor is $ 75.79 million, and the LAPSSET Corridor is $ 95.2 million, which can be said that they are still small and developing corridor. (

Table 2.1.6).

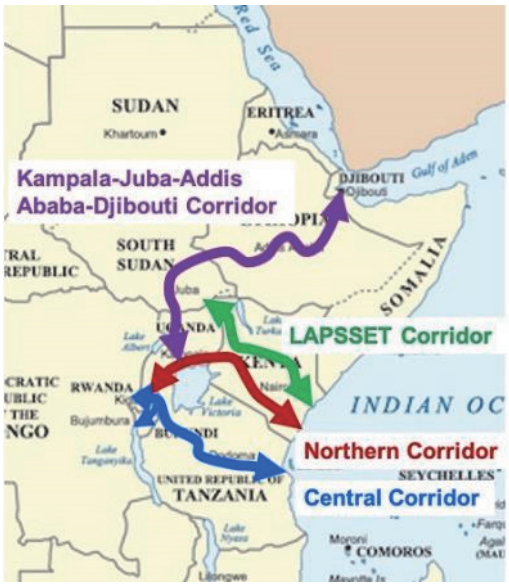


Figure 2.1.4 Economic corridor of Eastern Africa

Source: JICA, Transformation of Corridor Economy in Northern Economic Corridor, 2016

[4] Lamu Port (Kenya)-South Sudan-Ethiopia-Transport (LAPSSET) Corridor

Table 2.1.6 Comparison of agricultural and food trade scales in each corridor (2017-2019 average)

Unit: US $ 10,000

Northern corridor		Import				
		Kenya	Uganda	Burundi	Rwanda	Northern total
Export	Kenya	-	**16,756**	1,701	3,350	21,807
	Uganda	**43,619**	-	1,154	5,861	50,634
	Burundi	187	472	-	65	724
	Rwanda	827	2,943	597	-	4,367
	Northern total	44,633	20,174	3,452	9,276	77,532

Kampala-Juba-Addis Ababa-Djibouti corridor		Import				
		Ethiopia	Uganda	Djibouti	S. Sudan	KJAD total
Export	Ethiopia	-	18	2,478	161	2,657
	Uganda	214	-	0	**24,171**	24,385
	Djibouti	32	0	-	0	32
	South Sudan	0	2	0	-	2
	KJAD total	246	20	2,478	24,332	27,076

Central corridor		Import			
		Tanzania	Burundi	Rwanda	Central total
Export	Tanzania	-	1,056	5,432	6,488
	Burundi	134	-	65	199
	Rwanda	295	597	-	892
	Central total	429	1,653	5,497	7,579

LAPSSET corridor		Import			
		Ethiopia	Kenya	S. Sudan	LAPSSET total
Export	Ethiopia	-	2,367	161	2,528
	Kenya	730	-	6,262	6,992
	S. Sudan	0	0.3	-	0.3
	LAPSSET total	730	2,367	6,423	9,520

Source: FAOTSAT data
Note: If the values on the export side and import side are different, the values on the export side are used.

(4) Major agricultural products in regional trade in the eastern region of Africa

Table 2.1.7 shows the major products of agricultural trade in eastern Africa in terms of the combination of exporter countries and exporting destination countries. Here, the products that exceed $ 10 million or the largest traded products between the countries concerned are shown. Cases with large transaction values can be said to be products with great needs in trade within the eastern part of Africa. However, some products have been re-exported.

Table 2.1.7 Major agricultural and food trade products in eastern Africa (2017-2019 average)
(Extracted $ 10 million or more or the largest traded products between applicable countries)

Unit: US $ 10,000

		Import											
		Sudan	Ethiopia	Eritrea	Kenya	Seychelles	Somalia	Uganda	Tanzania	Burundi	Djibouti	Rwanda	S. Sudan
Export	Sudan	-	**Onion (1,411)**	N/A	**Sorghum (1,864)**		N/A	Tobacco (3)	Molasses (38)		Sorghum (1,537)		N/A
	Ethiopia	**Coffee (2,143)** **Broad bean (1,079)**	-	Coffee (15)	**Dry beans (1,286)**	Strawberry (2)	**Fresh vegetables (2,508)**	Beer (1)	Dry vegetables (4)	Dry vegetables (45)	Fresh vegetables (682)	Avocado (2)	Distilled alcoholic beverage (59)
	Eritrea	N/A		-			N/A	Distilled alcoholic beverage (10)					N/A
	Kenya	**Tea (4,236)**	Processed foods (110)	Tea (57)	-	Non-alcoholic drink (18)	**Tobacco (4,085)**	**Palm oil (5,192)** **Sugar confectionary (1,509)**	Margarine (642)	Processed foods (556)	Tea (139)	Sugar confectionary (742)	**Beer (1,492)**
	Seychelles	Cinnamon (0.3)			Distilled alcoholic beverage (2)	-			Tobacco (0.3)				
	Somalia	N/A	Milk (6)	N/A	Processed foods (15)		-						N/A
	Uganda	**Coffee (6,398)**			**Tea (8,160)** **Dry beans (5,925)**	Pineapple (8)	Distilled alcoholic beverage (11)	-	Maize (685)	Maize (270)		**Maize (1,191)**	**Sorghum (4,957)** **Sugar (4,600)**
	Tanzania	Broken	Tobacco		**Maize**	Coconut	Tobacco	Molasses	-		Maize Raw material (1)	Groundnut	Rice

	Import											
	Sudan	Ethiopia	Eritrea	Kenya	Seychelles	Somalia	Uganda	Tanzania	Burundi	Djibouti	Rwanda	S. Sudan
	rice (17) Rice (9)	(258)		**(3,402) Dry vegetable (2,703)**	(1)	(30)	(366)		(164)		(821)	(5)
Burundi	Tobacco (297)			Coffee (153)	Coffee (53)		Coffee (406)	Distilled alcoholic beverage (55)	-		Malt (18)	
Djibouti		Processed foods (10)		Dry pea (68)						-		
Rwanda	Tea (336)		Processed foods (47)	Bran (209)		Processed foods (149)	**Processed foods [5](1,191)**	Processed foods (241)	Refined sugar (443)		-	Coffee (155)
S. Sudan	N/A		N/A	Vegetable oil (0.3)		N/A	Raw material (1)	Raw material (15)			Orange (0.1)	-

N/A: No data, blank: no transaction
Source: FAOSTAT data

Of these, there were 20 cases of trade with a trade value of more than US $ 10 million, and the top 10 cases are shown below. The largest is tea exports from Uganda to Kenya (US $ 81.6 million), followed by coffee exports from Uganda to Sudan (US $ 63.98 million), followed by dried bean exports from Uganda to Kenya (US $ 59.25 million). As mentioned above, exports from Uganda to Kenya are also the largest in country trade. It was found that many agricultural products and foods are distributed in the northern corridor, but not only specific products.

Top 10 cases of agricultural and food trade in eastern Africa (in order of value)

1. Tea export from Uganda to Kenya (US $ 81.6 million)
2. Coffee export from Uganda to Sudan (US $ 63.98 million)
3. Dried beans export from Uganda to Kenya (US $ 59.25 million)
4. Palm oil export from Kenya to Uganda (US $ 51.92 million)
5. Sorghum export from Uganda to South Sudan (US $ 49.57 million)
6. Sugar exports from Uganda to South Sudan (US $ 46 million)
7. Tea exports from Kenya to Sudan (US $ 42.36 million)
8. Tobacco export from Kenya to Somalia (US $ 40.85 million)
9. Maize export from Tanzania to Kenya (US $ 34.02 million)
10. Dried vegetables export from Tanzania to Kenya (US $ 27.03 million)

(5) Agricultural trade in the economic corridor

Table 2.1.8 shows the trade scale of agricultural products in each corridor running in eastern Africa mentioned in 2.1. Unlike Table 4, this table excludes livestock-related products (meat, processed livestock products, livestock, forage, etc.), processed foods other than sugar (juice, oil, baby food, sugar

[5] Exports of processed food products from Rwanda are conspicuous, but exports of processed food products, which were rarely seen before 2016, are gradually increasing from 2017. Lots of cereals, flour, starch, milk and confectionery are seen (Small Scale Cross Border Trade Data, COMSTAT). However, the export value to Uganda in 2019 were more than 10 times the export value of the previous year (FAOSTAT), which is considered to be an abnormal value.

confectionery, etc.), and non-edible items, e.g., tobacco, food waste, bacteria, bran, rubber, etc.

In the Northern Corridor, exports from Burundi are relatively low, but in Kenya, Uganda, Rwanda's imports and exports and Burundi's imports, cereals, beans, horticultural crops, and coffee trade are active within neighboring countries. As mentioned above, Kenya, Uganda, and Rwanda have active intra-regional trade, and it is thought that trade in the northern corridor is steadily growing.

The trade value of central corridor and LAPSSET corridor are less than the northern corridor, but agricultural products are traded among countries, and beans and cereals are mainly distributed. On the other hand, the Kampala-Juba-Addis Ababa-Djibouti Corridor has a larger trade volume than the Central Corridor and the LAPSSET Corridor. However, only exports of cereals and sugar from Uganda to South Sudan are large, and other agricultural products trade is sparse. It is expected that the trade corridor in the eastern region of Africa will grow in the future.

Table 2.1.8 Comparison of top trade crops and trade scale in each corridor (2017-2019 average)

Unit: US $ 10,000

Northern corridor		Import			
		Kenya	Uganda	Burundi	Rwanda
Export	Kenya	-	**Sorghum965** **Carrot245** **Spice212** **Irish potato183** **Barley176**	Dry bean11 Spice9 Rye7 Refined sugar2 Garlic1	Maize422 Wheat46 Spice34 Refined sugar21 Apple14
	Uganda	**Tea8,160** **Dry beans5,925** **Maize5,386** **Sugar2,694** **Millet1,289**	-	Maize271 Dry beans57 Fresh beans26 Broken rice19 Ground nut10	**Maize1,192** **Refined sugar648** **Irish potato484** **Sorghum334** **Cassava277**
	Burundi	Cofffee168 Fruits0.2	Coffee409 Maize20	-	Dry bean9 Refined sugar9 Tea0.2
	Rwanda	Coffee213 Mushroom18 Fruits2 Garlic1	Dry beans552 Coffee333 Fresh beans63 Irish potato29 Carrot7	Refined sugar443 Maize13 Dry beans13 Irish potato12 Broken rice9	-

Central corridor		Import		
		Tanzania	Burundi	Rwanda
Export	Tanzania	-	Maize164 Brown rice110 Ground nut60 Rice55 Sorghum30	**Ground nut821** **Cassava498** **Maize431** **Rice384, Milled rice358** **Tropical fruit214**
	Burundi	Avocado31 Banana9 Coffee7 Sunflower seeds6 Plantain1	-	Dry beans9 Refined sugar9 Tea0.2
	Rwanda	Fresh beans3 Dry beans2 Carrot, turnip 0.1 Frozen vegetables0.1 Irish potato0.1	Refined sugar443 Maie13 Dry beans13 Irish potato12 Broken rice9	-

Kampala-Juba-AddisAbaba-Djibouti corridor		Import			
		Ethiopia	Uganda *	Djibouti	South Sudan
Export	Ethiopia	-	Dry vegetables0.4	Irish potato262 Onion256 Sesame199 Tomato176 Orange94	Coffee61 Broad beans3
	Uganda	Only processed foods	-	N/A	**Sorghum4,957** **Refined sugar4,600** **Maize1,420** **Dry beans1,180** **Rice789**
	Djibouti	Only processed foods	N/A	-	N/A
	South Sudan	N/A	Oats1	N/A	-

LAPSSET corridor		Import		
		Ethiopia	Kenya	South Sudan
Export	Ethiopia	-	**Dry beans1286** **Maize659** **Millet142** **Dry vegetables95** **Tea87**	Coffee61 Broad beans3
	Kenya	Maize27 Tea20 Clove19 Pepper5 Sorghum2	-	**Sorghum884** **Dry beans157** **Tea116** **Spice63** **Dry peas38**
	South Sudan	0 Only processed foods		-

Source: FAOSTAT data
Note: If the values on the export side and the values on the import side are different, the values on the export side are used.

2.2 Trade within region and outside region and major agricultural products of the

five countries surveyed

(1) Major products of 5 countries

In the five selected countries, the survey team focused on the crop type such as cereal crops, horticultural crops, and export crops, and the distribution type such as domestic distribution, within regional distribution, and outside regional distribution. To select the target crops in a well-balanced manner, the survey team investigated the production, trade, consumption, etc. of the main crops (

Table 2.2.1) and summarized the background of each crop (Table 2.2.2).

In terms of cereals, all five countries have high maize production and are highly important as national staple food crops. Mainly domestic distribution, and some distribution within the region is also seen. Conversely, the importance of cassava and millet, which are considered important cereals throughout Africa, seems to be low in the five countries. In addition, rice is produced in many countries. Although the production volume is lower than maize, wheat, and plantain, it is produced in all five countries. Rice consumption and imports are increasing more rapidly than the consumption and imports of other staple food crops, and imports from Asia are also conspicuous. From Rwanda and Uganda, many are exported within the region. On the other hand, Ethiopia has its own food culture. Teff, a traditional ingredient native to Ethiopia, is an important cereal crop.

As mentioned in 2.1, in Africa, horticultural crops are produced only 7% of the world's production. Among the five countries, Tanzania produces 3.4 million tons and Kenya produces 2.5 million tons. Onions, tomatoes, and cabbage are produced in Tanzania, and potatoes, legumes and sugar cane are produced in Kenya. They are mainly distributed domestically and within the region, but exports to outside of the region are also seen. On the other hand, although vegetable production in other three countries is limited, sweet potato production is high in Ethiopia as domestically distributed crop, onion production is high in Uganda as crop distributed within the region using Northern corridor, and Irish potato production is high in Rwanda as crop distributed within the region using the same corridor.

As other crops, coffee and tea are exported to Europe, the Middle East, the United States, Asia and other countries around the world in all five countries, and many are positioned as important export products. Kenya's tea accounts for 22% of the total annual export value and is positioned as an important cash crop produced by small-scale farmers.

Table 2.2.1 Production, trade, and consumption of major crops in 5 countries

Country	Crop type	Crop	Production volume (ton)	Harvested area (ha)	Export value (1000US$)	Export volume (ton)	Export destination	Import value (1000US$)	Import volume (ton)	Import partner	per capita food consumption (kg/capita/yr)
Ethiopia	Cereal crop	Wheat	4,932,103	1,744,739	0	0	(Sweden)	392,107	1,174,648	USA, Romania, Russia, Ukraine	37
		Maize	10,081,258	2,618,708	6,591	19,640	Kenya	26,675	47,069	Italy, Argentina, South Africa	47
		Rice	164,501	58,015	16	143	Djibouti, Yemen	1,020	1,732	India, Pakistan, Korea	3.5
		Teff	5,756,547	N/A	N/A	N/A	Mainly domestic distributiion				35.4
		Broad beans	990,156	465,359	12,656	24,197	Sudan, Egypt, Djibouti	6	8	UAE, China	2.3
	Horticultural crop	Onion	276,742	32,077	3,110	18,219	Djibouti, Somalia	17,158	73,203	Sudan	3.1
		Sweet potato	1,689,117	50,492	3	12	Djibouti	3	1	China	12.2
	Others	Spice	310,594	340,426	5,919	6,157	India, Egypt, Sudan	705	307	UAE, India, China	0.4
		Coffee	475,455	749,782	629,902	181,073	Saudi Arabia, USA, Germany, Japan, Korea	245	78	United Kingdom, Malaysia, UAE	2.4
Kenya	Cereal crop	Maize	3,820,820	2,157,636	7,004	5,740	Rwanda, Uganda, Tanzania	56,700	884,682	Uganda, Mexico, Ukraine, Tanzania	69.5
		Wheat	374,046	138,659	1,945	7,697	Uganda, Rwanda	439,000	1,899,396	Russia, Argentina, Ukraine (unmilled)	41.3
		Rice	140,660	25,467	692	3,140	Uganda	267,000	1,007	Tanzania, Pakistan, Thailand	20.6
		Plantain	33150	2,722	9	6	Somalia	0	0	–	27.5
	Horticultural crop	Irish potato	2,396,198	229,805	2,276	7,298	Uganda, Somalia	619	2,697	Tanzania	29.9
		Dry beans	597,420	1,098,225	16,183	28,157	Pakistan, India, South Suda	40,200	181,555	Tanzania, Ethiopia, USA	16
		Sugar cane	4,606,100	70,891	1,150	1,798	Tanzania, Rwanda, Uganda	278,000	250,345	Egypt, Mauritius, Estiwani, Zimbabwe	16.3
	Others	Tea	463,899	246,100	1,130,000	496,755	Pakistan, Egypt, United Kingdom, UAE, Yemen	14,964	9,500	Uganda, Rwanda, India, Tanzania	2.9
Uganda	Cereal crop	Maize	2,659,815	1,001,255	57,504	270,991	Kenya, Rwanda, South Sudan, Tanzania, Burundi	1,299	1,472	Asia, Tanzania	42.65
		Rice	235,122	85,301	17,962	35,545	DRC, South Sudan	56,693	126,128	Asia, Tanzania	8.56
		Plantain	3,454,615	811,327	1,103	1,306	South Sudan, Kenya	1	7	DRC	82.57
		Cassava	2,796,737	1,205,328	2,855	12,670	Rwanda	241	5,320	Tanzania	66.73
	Horticultural crop	Irish potato	178,043	41,660	3,332	9,336	Rwanda	1,794	6,803	Kenya	3.15
		Tomato	42,651	7,863	2,421	9,636	Rwanda	65	83	Kenya	0.75
		Onion	360,683	91,165	188	576	South sudan	1,587	13,220	Tanzania, Kenya	7.77
	Others	Coffee	280,125	507,934	446,765	248,308	Europe, Sudan, USA, Asia, North Africa	7,212	6,375	Tanzania, Burundi, Rwanda	0.57
Rwanda	Cereal crop	Maize	396,638	293,828	192	1,576	Burundi, DRC, Uganda	27,545	118,098	Uganda, Tanzania, Zambia, USA	16.75
		Rice	120,156	32,895	32,016	55,827	DRC, Burundi, Sudan	69,428	143,041	Pakistan, Thailand, Tanzania, India	10.57
		Plantain	770,654	91,151	1	2	United Kingdom	59	461	Uganda, Tanzania	62.95
	Horticultural crop	Irish potato	888,965	98,127	421	2,292	Uganda, Burundi	2,553	16,645	Uganda	115.36
		Onion	22,547	2,893	56	297	Uganda, Burundi	898	2,146	Tanzania, Uganda	0.93
		Tomato	103,629	9,944	3	7	DRC, Uganda	119	529	Uganda, Tanzania	7.83
	Others	Coffee	33,242	24,921	69,234	21,545	Switzerland, United Kingdom, Belgium, Uganda, USA, Singapore	342	849	Burundi, Tanzania	0.08
Tanzania	Cereal crop	Maize	6,201,971	3,597,652	42,686	165,113	Rwanda, Kenya, Burundi, DRC	32,508	70931	Asia, Tanzania	61.81
		Rice	3,113,763	1,060,911	5,846	16,475	Rwanda, Kenya, Burundi, Uganda	30,265	64306	South Africa, India, Uganda	34.81
		Sorghum	719,718	670,048	2,089	12,732	Rwanda, Comoro, Uganda	228	578	Russia, Germany, Canada, USA	5.46
		Wheat	56,835	45,591	421	378	Netherlands, Kenya, Israel, Rwanda	120,789	494840	India, South Africa, Malawi, Middle East	17.53
	Horticultural crop	Onion	253,436	17,067	1,404	3,361	Rwanda, Kenya, Uganda	22	111	South Africa, Italy, Kenya, Mozanbique	1.87
		Tomato	591,883	39,857	60	994	Kenya	7	49		6.32
		Cabbage	89,640	7,970	9	59	Kenya	4	1.6	Burundi, South Africa	N/A
	Others	Cofe	47,472	157,026	89,321	54,261	Japan, Germany, Italu, USA	7	2	Italy	0.056
		Sesame	646,667	896,667	114,756	92,158	China, Japan, Korea	41	66	Malawi	N/A
		Clove	8,891	6,890	7,667	1,137	India, Southeast Asia, Middle East	15	12	Comoro, Middle East	0.1

Source: Kenya: Production MALF & C 2019, 2020, per capita consumption: KNBS 2018
Ethiopia, Uganda, Rwanda, Tanzania: FAOSTAT data (2017-2019 average, per capita consumption: 2016-2018 average)

Table 2.2.2 Background of main crops

Country		Crop	Distribution type	Background, etc.
Ethiopia	Cereal Crops/ Staples	Wheat	Domestic distribution/ distributed outside the region	4th place in cereal production on a weight basis. Top Imports in terms of weight and value for cereals. Many imports from outside the region such as United States, Romania, Russia, Ukraine, etc. Improving self-sufficiency rate by policy promotion of future irrigation project is an issue.
		Rice	Domestic distribution/ distributed outside the region	Although it is a CARD target country, its self-sufficiency rate is rather low, and it also imports a certain percentage from India, Pakistan, and South Korea. Selected because of high nutritional value and is in line with the policy of JICA project "National Rice and Research Training Center Strengthening Project 2" etc.
		Teff	Staple food: domestic	Both domestic production and consumption are high. Promising from the perspective of studying the current

Country		Crop	Distribution type	Background, etc.
			distribution	status of the FVC structure of Ethiopia's unique food culture and verifying its future distribution potential in the region.
	Horticultural crops	Broad bean	Domestic distribution/ distributed within the region	Large domestic production volume and large exports within the region via the Djibouti Corridor, i.e., Sudan, Djibouti, Egypt, etc.
		Onion	Distributed within the region/ domestic distribution/	Traditionally, import volume from Sudan is extremely large, while different varieties are also exported to Djibouti and Somalia. Due to the influence of COVID-19, the price is soaring, and it is highly necessary to study the current situation of FVC and rebuild and strengthen FVC in the future.
		Second candidate: sweet potato	Domestic distribution	Highest production within tubers and roots, but basically it is only distributed domestically.
	Export crops, Others	Spice	Distributed within (outside) the region	The added value is relatively high. Export destinations are India outside the region, Sudan and Egypt within the region, etc. It is assumed that there is potential to expand exports within / outside the region in the future.
		Coffee	Distributed outside the region	As a representative cash crop, the exporting countries are diverse, such as Saudi Arabia, the United States, Germany, Japan, and South Korea. Export volume is extremely high.
Kenya	Cereal crops/ Staples	Maize	Domestic distribution/ distributed outside the region	It is the most consumed agricultural product with 69.5 kg / year (2018). It is traditionally an important crop. It is also consumed as feed crop and edible oil.
		Wheat	Domestic distribution/ distributed outside the region	It is one of staple foods in Kenya with 41.3 kg / year in spite of huge import at 5 times of domestic production from Russia, Ukraine and Argentina.
		Rice	Domestic distribution/ distributed outside the region	Domestic consumption is increasing mainly in urban area, and people's food preference are changing. It is a CARD target country and aims to improve self-sufficiency rate. The consumption is 20.6 kg / year.
		Plantain	Domestic distribution/ distributed outside the region	It is one of the staple foods around Lake Victoria and has trade with Uganda. The consumption is 27.5 kg / year.
	Industrial crops	Irish potato	Domestic distribution	The country is an international hub for tubers and roots research. Consumption is 29.9 kg / year, which is an important energy source.
		Second candidate: Soybean	Distributed outside the region	Although low in production, it is an important crop for cooking oil and feed crop.
		Second candidate: Sugarcane	Domestic distribution	The consumption of sugar is high, i.e., 16 kg / year (raw material equivalent), and the utilization of by-products is strongly desired.
	Export crops	Tea	Distributed outside the region/ domestic distribution	The annual export value is 22% of the total export value. It is an important cash crop produced by small holder farmers. KTDA, which was a public corporation was privatized and distribution was strengthened. It is meaningful to verify whether it was affected under COVID-19.
Uganda	Cereal crops/ Staples	Maize	Distributed within and outside the region	One of staple foods, 4th place in production volume and 7th place in export value. Exported from the region to South Sudan and Burundi. (Northern corridor) Import: Asia, Tanzania, Export: Kenya, Rwanda, South Sudan, Tanzania, Burundi
		Rice	Distributed within	One of staple foods. CARD target country. Exported

Country		Crop	Distribution type	Background, etc.
			and outside the region	from the region to DRC and South Sudan. (Northern corridor) Import: Asia, Tanzania, Export: DRC, South Sudan
		Plantain	Domestic distribution,	One of staple foods. Second place in production volume. Domestically distributed.
		Second candidate: Cassava	Distributed within the region	One of staple foods. 1st place in production area, 3rd in production volume Import: Tanzania, Export: Rwanda
	Horticultural crops	Irish potato	Distributed within the region	Crop distributed within the region of northern corridor Import: Kenya, Export: Rwanda
		Tomato	Distributed within and outside the region	Crop distributed within the region of northern corridor Export: Rwanda
		Onion	Distributed within the region	Crop distributed within the region of northern corridor Import: Tanzania, Kenya
	Export crops	Coffee	Distributed outside the region	The country's most important export product, which is exported to countries around the world with the highest export value. Export: Europe, Sudan, USA, Asia, North Africa, Import: Tanzania, Burundi, Rwanda
Rwanda	Cereal crops/ Staples	Maize	Within region	One of staple foods. 7th rank in production volume. From within the region to DRC, Burundi (Northern corridor, Southern corridor) IM: Uganda, Tanzania→ EX: DRC, Burundi
		Rice	Within and outside region	CARD. From Asia and within the region to DRC (Northern corridor, Southern corridor) IM: Asia, Tanzania→EX: DRC
		Plantain	Domestic	3rd rank in production volume. Distributed domestically.
		Second candidate: Cassava	Distributed within the region	1st place in production. Distributed within the region. Import: Tanzania, Uganda. Export: DRC, Burundi
	Horticultural crops	Irish potato	Irish potato	One of staple foods. 4th rank in production volume. Mutual distribution within the region. (Northern corridor, Southern corridor) IM: Uganda, Tanzania EX: Uganda, Burundi
		Onion	Onion	Mutual distribution within the region. (Northern corridor, Southern corridor) IM: Uganda, Tanzania EX: Uganda, Burundi
		Tomato	Tomato	Import within the region. (Northern corridor, Southern corridor) IM: Uganda, Tanzania
		Second candidate: sweet potato	Domestic distribution	2nd place in production area
	Export crops	Coffee	Outside region	Export outside region the region EX: Europe, Asia
Tanzania	Cereal crops/ Staples	Maize	Staple food: distributed within the region	First place in production area (2019), 70% of Cereal production, self-sufficiency rate: over 100%. Import: Zambia, South Africa, Uganda, Kenya Export: Kenya、Rwanda, Zimbabwe, Burundi, DRC
		Rice	CARD: distributed within the region	2nd place in production area (2019), 17% of cereal production, 25% of cereal consumption Import: Asia → Export: Rwanda, Kenya, Burundi, DRC
		Sorghum	Distributed within the region/ domestic distribution	8th place in production area (2019), 10% of cereal production, high consumption in rural areas Import: South Africa, India, Uganda Export: Rwanda, Kenya, Burundi, Uganda
		Second candidate: Wheat	Distributed within and outside the region	Imports 90% of domestic consumption. Third largest cereal consumed amount after Maize and rice. Consumed mostly in urban areas. Domestic production is mainly on large-scale farms. Not a priority crop from political perspective. Import: Russia, Germany, Canada, USA → Export: Rwanda, Comoros, Uganda
	Horticultural	Onion	Distributed within	The self-sufficiency rate is over 100%, and the surplus

Country		Crop	Distribution type	Background, etc.
	crops		and outside the region	is distributed in east African region. Import: India, South Africa, Malawi, Middle East Export: Netherlands, Kenya, Israel, Rwanda
		Tomato	Distributed within the region	Among horticultural crops. The production volume is outstandingly high. Import: South Africa, Italy, Kenya, Mozambique Export: Kenya, Rwanda, Comoros, Europe
		Second candidate: Cabbage	Domestic distribution	Among horticultural crops, the production volume is the second highest after tomato.
	Export crops	Coffee	Distributed outside the region	Third largest export volume (2019). Selected as a priority crop for VC development in cash crops by policy. Export: Japan, Germany, Italy, USA
		Second candidate: sesame	Distributed outside the region	2nd place in export volume followed by cashew nuts (2019). 4th largest producer in the world. Selected as a priority crop for VC development of oil crops by policy. Export: China, Japan, South Korea
		Second candidate: Clove	Distributed outside the region	Mainly produced in Zanzibar. Although it is the third largest producer in the world, both export volume and export value have been declining for the past 10 years. Import: Comoros, Middle East → Export: India, Southeast Asia, Middle East

Source: JICA survey team

(2) Distribution type of crops in 5 countries

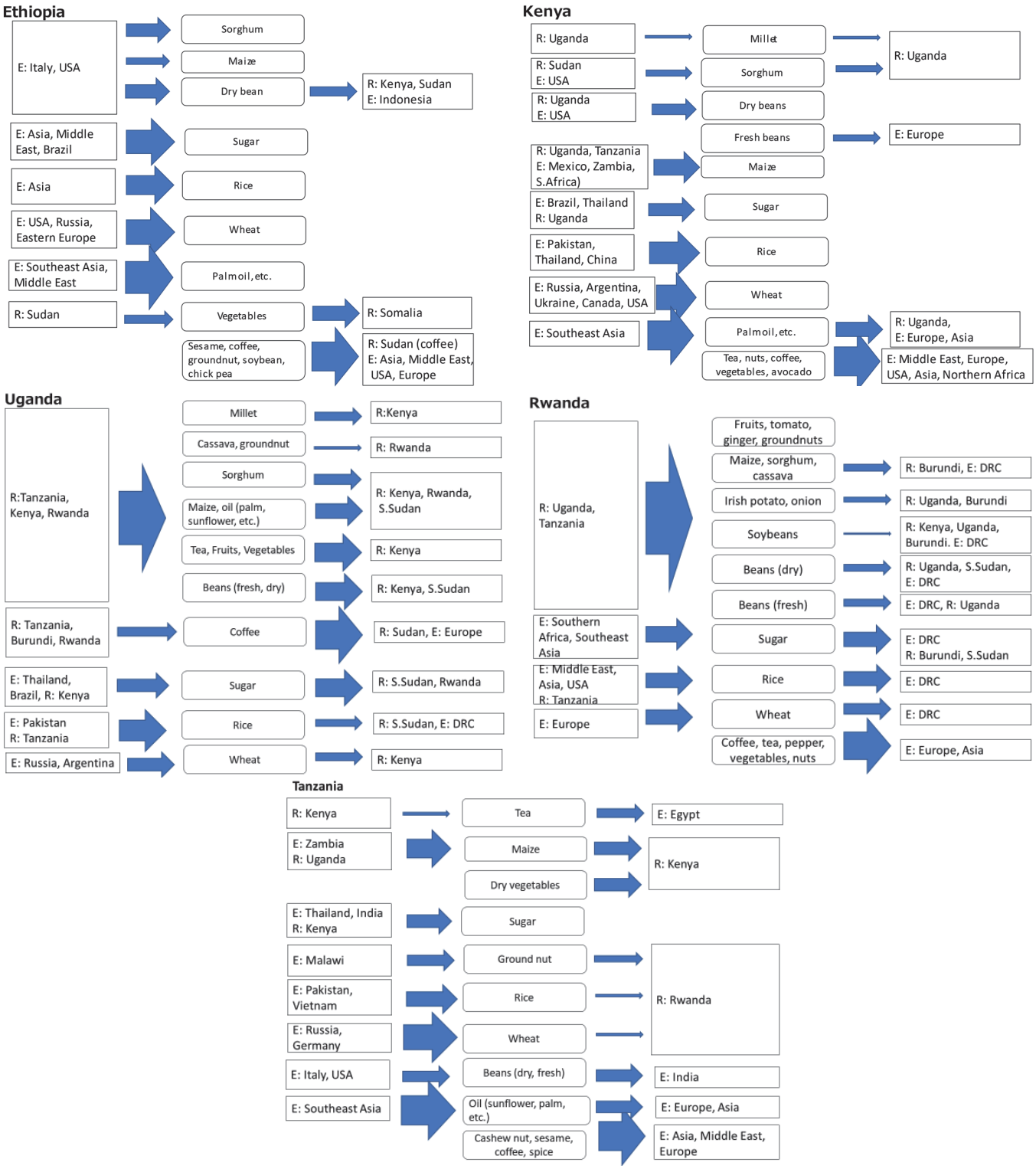
Figure 2.2.1 shows the distribution channels of major crops in the five selected countries. The distribution types could be roughly divided into three types: Kenya and Tanzania, where distribution within region and distribution outside the region is active, Uganda and Rwanda, where distribution within region is active, and Ethiopia, where import from outside the region and export within and outside the region is active.

Ethiopia is mainly imported from countries around the world such as Europe, North America, the Middle East, and Asia, and there are not many imports within the region. Sesame seeds, coffee, peanuts, soybeans, and chickpeas are exported to the outside of the region as export crops. As for the distribution within the region, only import of vegetables from Sudan, export of vegetables to Somalia, export of coffee and dry beans to Sudan are conspicuous. Thus, trade of agricultural products within the region is not active.

The distribution type of Kenya and Tanzania are similar, and imports within and outside the region are active. There is regional distribution mainly of cereals among Kenya, Tanzania, and Uganda. For outside the region, sugar, rice, oil, etc. are imported from North America, the Middle East, Asia, Southern Africa, etc. In both countries, cereals and oil are traded among Kenya, Tanzania and Uganda for regional exports. In addition, tea, nuts, coffee, etc. are distributed outside the region to the Middle East, Europe, northern Africa, the United States, and Asia.

The distribution type of Uganda and Rwanda are similar, and imports within the region are active. Agricultural products such as cereals beans, horticultural crops, and sugar are distributed among neighboring Kenya, Tanzania, Rwanda, and Uganda. In both countries, wheat and some rice and sugar are imported from Europe, Asia, and the Middle East. Both countries are actively exporting within the region. In addition to Kenya, Uganda and Rwanda, there are many trades with Sudan, South Sudan, and

DRC. On the other hand, there are not many exports to Tanzania, where regional imports are active. Most of the exports to outside the region are coffee trade to Europe, and in Rwanda, tea exports are also obvious.



Source: JICA Study team
Note: The large flow is shown, and the small flow is omitted.

Figure 2.2.1 Distribution type in 5 countries

(3) Flow of agricultural products in 5 surveyed countries

The distribution volume and value within the region before the occurrence of the COVID-19 pandemic in the surveyed crops (Table 2.2.3) in five countries are surveyed. Since there is no statistical data on FAOSTAT of teff and sugar cane, 13 other crops and initially selected cabbage were investigated. The cabbage was originally selected in Tanzania, but it was changed in consultation with the local government.

Table 2.2.3 Target crop of 5 countries

Country	Cereals/ Staples	Horticultural crops	Export crops
Ethiopia	Wheat（D/R） Rice（D） Teff（D）	Broad beans（D/R） Onion（D） Spice（R/E）	Coffee（E）
Kenya	Maize（D/R） Rice（D/R） Plantain（D/R）	Irish potato（D） Dry beans（E）	Tea（E） Sugarcane（D）
Uganda	Maize（D/R） Rice（D/R） Plantain（D）	Irish potato（R） Onion（R） Tomato（R/E）	Coffee（E）
Rwanda	Maize（R） Rice（R） Plantain（D）	Irish potato（R） Onion（R） Tomato(R)	Coffee（E）
Tanzania	Maize（R） Rice（R） Sorghum（R/D）	Onion（R/E） Tomato（R） Irish potato (R)	Coffee（E）

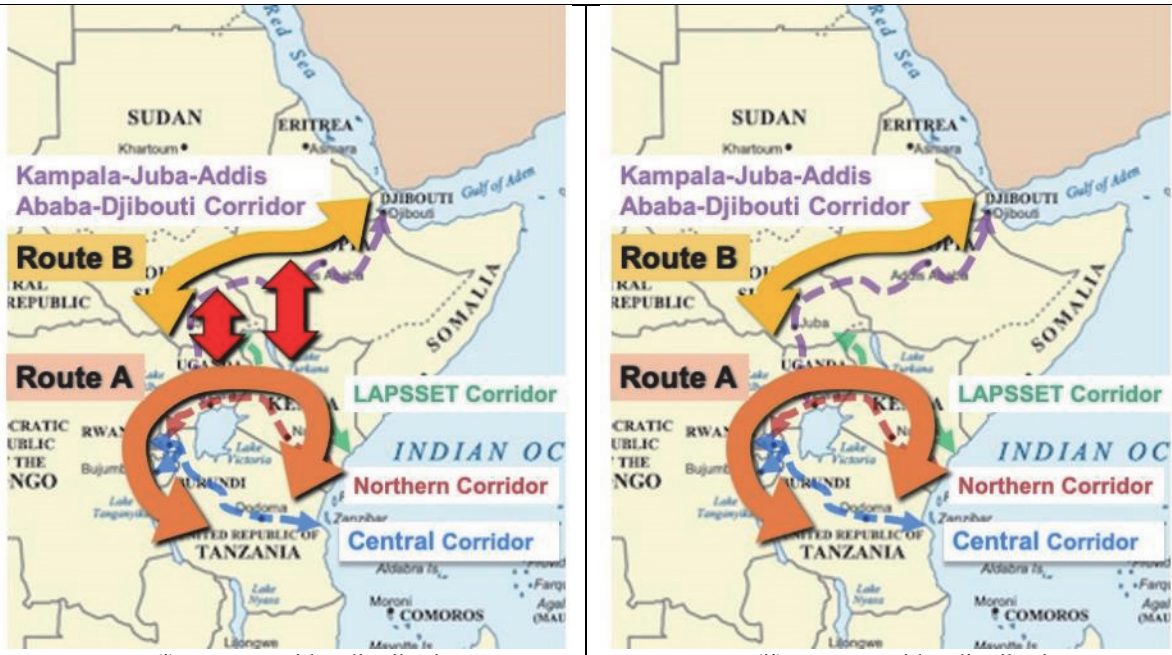
The distribution within the region of these 14 crops can be roughly divided into four distribution channels, i.e., i) crop distribution connected among the northern corridor, central corridor, Kampala-Juba-Addis Ababa-Djibouti corridor, and LAPSSET corridor (Inter-corridor distribution type), (ii) crop distribution connected between northern corridor and central corridor, connected between Kampala-Juba-Addis Ababa-Djibouti corridor and LAPSSET corridor, but not connected between those two channels (Intra-corridor distribution type), (iii) crops that are mainly distributed in specific countries (neighbor distribution type), and (iv) crops that are rarely distributed within the region (domestic distribution type) (Table 2.2.4).

Table 2.2.4 4 types of distribution within the region (excluding distribution outside the region)

Category by distribution channel	Crop	Remarks
(i) Inter-corridor distribution type	Maize, rice, sorghum, dry beans	Route A: Northern corridor+Tanzania Route B: Kampala-Juba-Addis Ababa-Djibouti Corridor There is distribution between these two routes.
(ii) Intra-corridor Distribution type	Tomato, onion, Irish potato	No distribution between routes A and B.
(iii) Neighbor distribution type	Spices, broad beans, tea, coffee	Spices: Ethiopia is the distribution base. Broad beans: Ethiopia is the distribution base. Tea: Kenya is the distribution base. Coffee: Regional distribution from Uganda to Sudan.
(iv) Domestic distribution type	Plantain, wheat, cabbage	Cabbage: Distributed mainly in Ethiopia. Wheat, plantain: Distributed between Northern corridor and Central corridor.

Source: JICA survey team

Category (i), i.e., Inter-corridor distribution type, includes maize, rice, sorghum, and dry beans. Firstly, the distribution of these crops is the route of Kenya, Uganda, Rwanda, Burundi in the northern corridor plus Tanzania in the central corridor (Route A). Secondly, there is route of Ethiopia, South Sudan, Djibouti, Sudan, Somalia, etc. focused on Kampala-Juba-Addis Ababa-Djibouti Corridor (Route B) and the distribution value and volume are smaller than the former route except for sorghum. The main hubs connecting these two routes are Uganda in the Northern Corridor and South Sudan in the Kampala-Juba-Addis Ababa-Djibouti Corridor, and Kenya in Northern Corridor and Ethiopia in LAPSSET Corridor.



Category (i): Inter-corridor distribution type | Category (ii): Intra-corridor distribution type

Figure 2.2.2 Category of regional distribution (i) and (ii)

The distribution value and volume of maize is overwhelmingly large in exports from Uganda to Kenya. Although distribution value and volume of rice is smaller than that of maize, the distribution of broken rice is more active than that of milled rice within the region. The largest rice distribution is that of broken rice from Uganda to South Sudan. Most of the milled rice is considered to be distributed outside the region. Sorghum is actively traded throughout the region, from Sudan to Djibouti, Kenya, and from Uganda, Kenya to South Sudan. The distribution of dried beans is also active throughout the region, but exports from Uganda to Kenya are prominent.

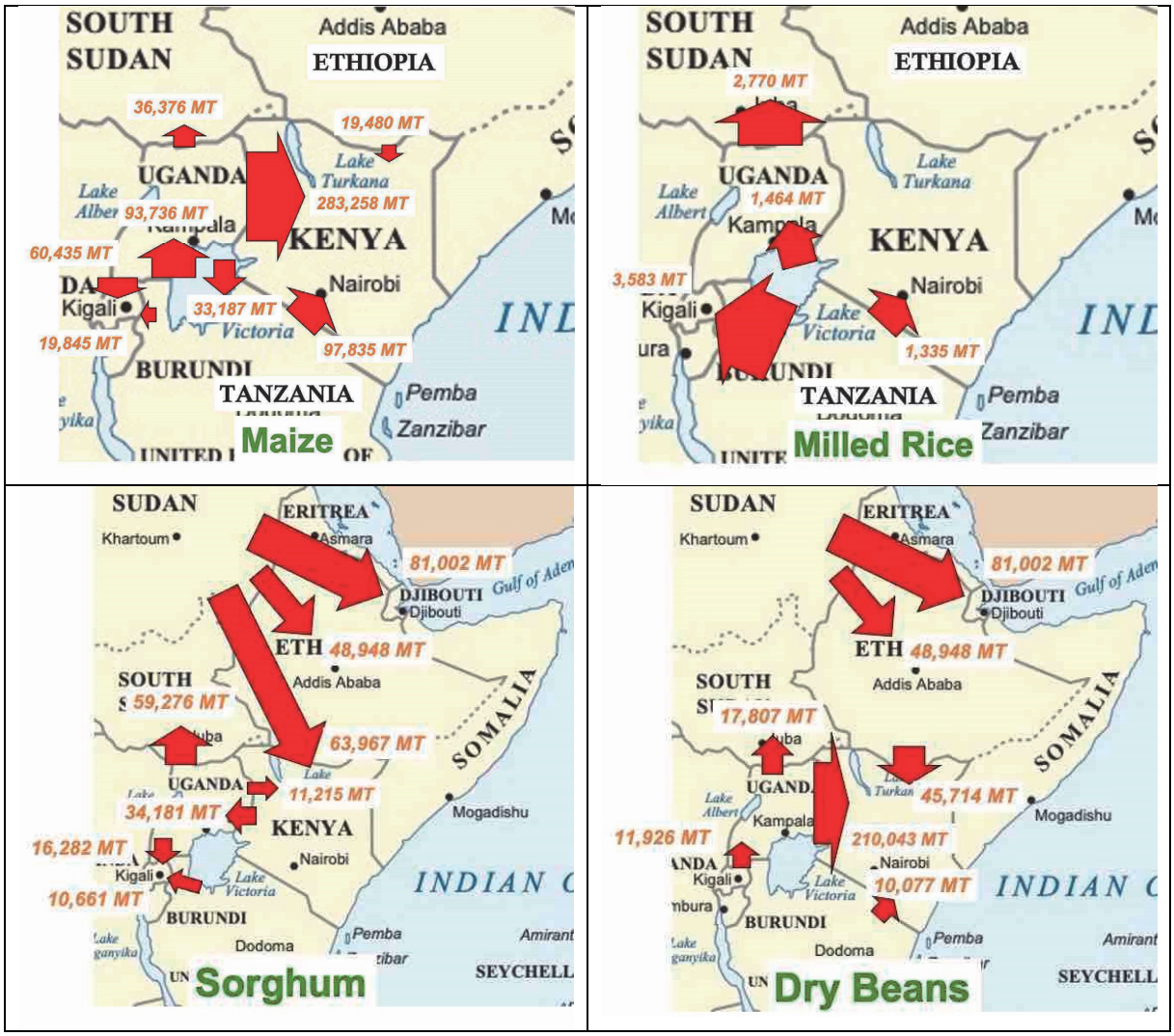


Figure 2.2.3 Regional distribution crops of category (i): Inter-Corridor Distribution

Category (ii), i.e., Intra-corridor distribution type, includes tomato, onion, and potato, all of which are horticultural crops. As in category (i), these crops have two routes, one is the route traded in the country centered on the northern corridor and the central corridor, and the other is the route traded in the country centered on the Kampala-Juba-Addis Ababa-Djibouti corridor and the LAPSSET corridor. The difference from category (i) is that there are few countries that connect the two routes, and the two routes are distributed independently. Onions are overwhelmingly distributed from Sudan to Ethiopia and from Ethiopia to Djibouti. As for tomato, the two routes are completely independent, with the largest exports from Uganda to Kenya, followed by Ethiopia to Djibouti. Most potatoes are exported from Uganda to Rwanda, followed by Ethiopia to Djibouti.

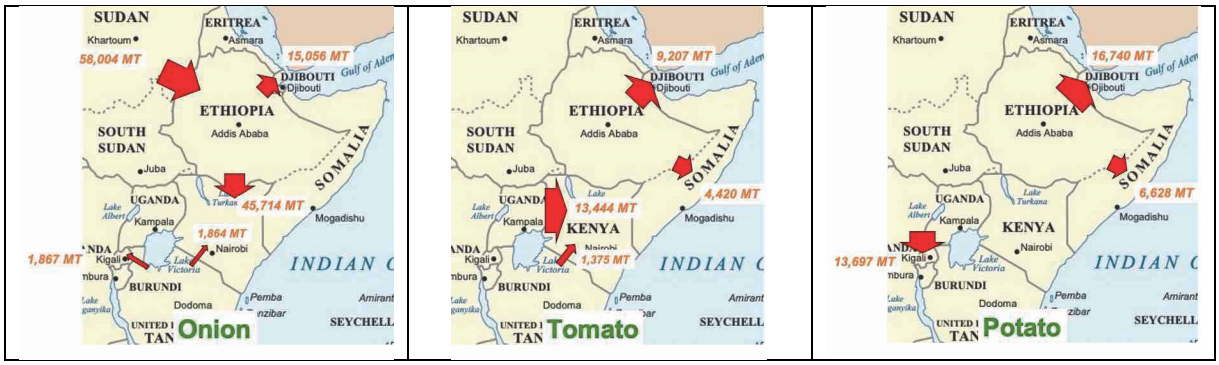


Figure 2.2.4 Regional distribution crops of category (ii): Intra-Corridor Distribution

Category (iii), i.e., neighbor distribution type contains spices, broad beans, tea, and coffee, and is a crop which distribution is centered in a specific country. Ethiopia is the center of distribution of spices, with a large amount of pepper being distributed to Sudan and Djibouti. Similarly, broad beans are mainly distributed in Ethiopia, with many exports to Sudan and Djibouti. In terms of distribution value and volume of tea among countries, the largest value and volume of tea is exported from Uganda to Kenya. However, Kenya is the center of distribution and exports to the entire region. As for coffee, Uganda is the center of export countries and Sudan is the center of import countries. Sudan's import volume within the region is outstandingly large compared to other countries.

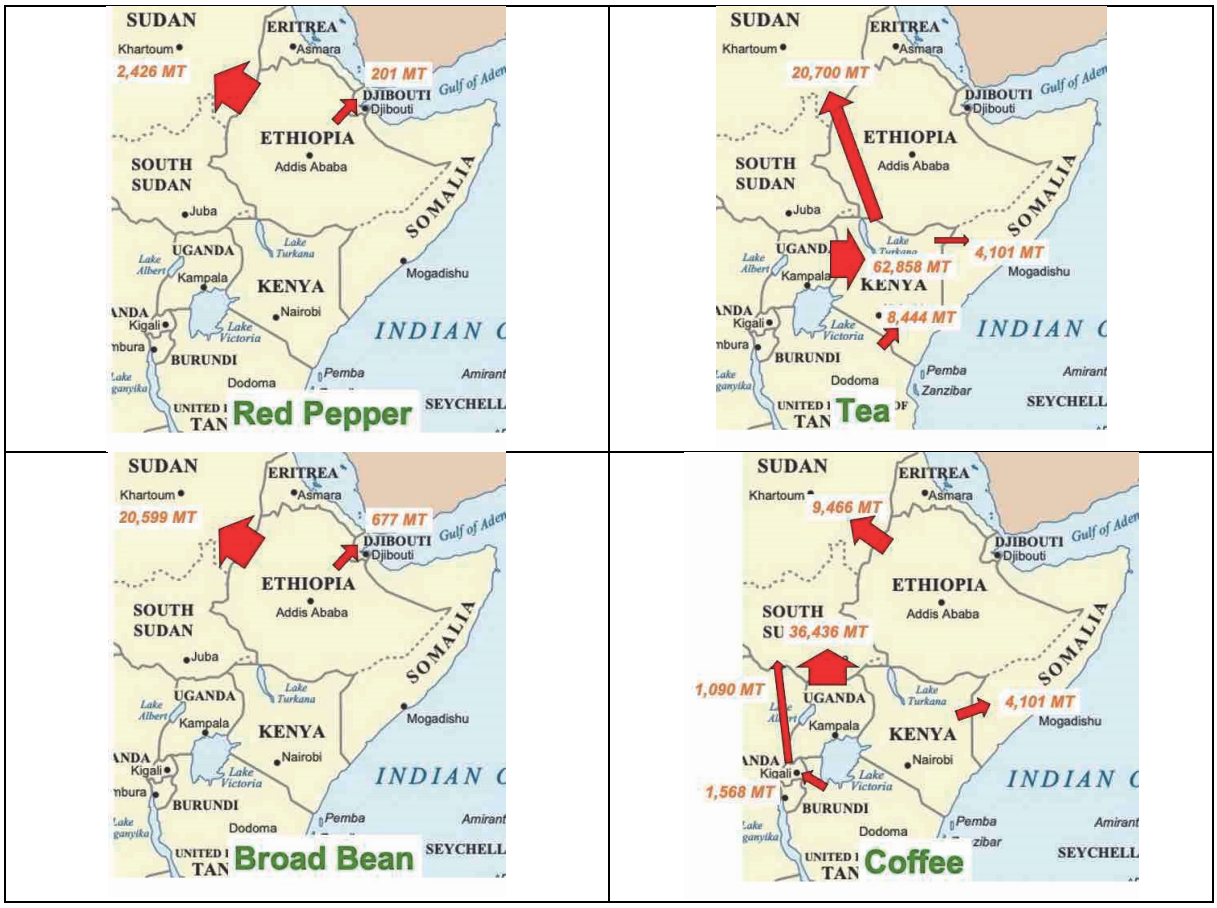


Figure 2.2.5 Regional distribution crops of category (iii)

Category (iv), i.e., domestic distribution type includes plantain, wheat, and cabbage. Although these

crops are relatively rarely distributed in the region, cabbage are distributed mainly in Ethiopia, and wheat and plantain are distributed between the northern and central corridors.

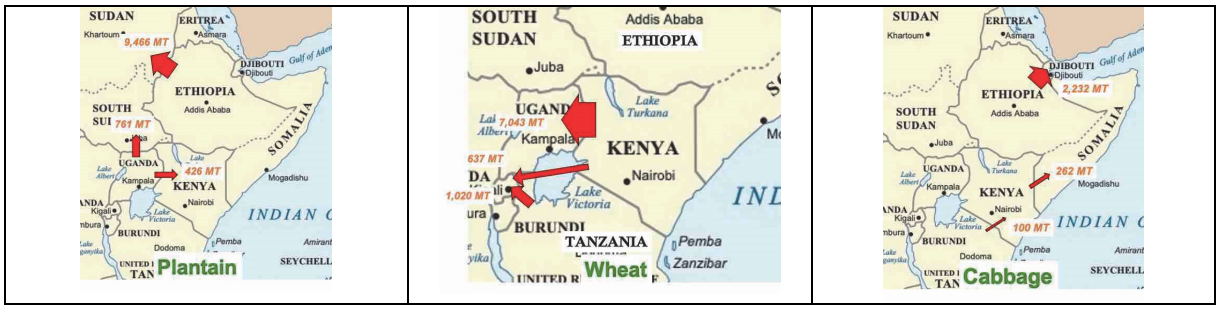


Figure 2.2.6 Regional distribution crops of category (iv)

In the future, as the survey progresses, the study team will also investigate how regional distribution was affected by the COVID-19 pandemic.

Chapter 3 Spread of COVID-19 and its Impacts on Food Value Chain

3.1 Ethiopia

In Ethiopia, after the first case of the disease was confirmed in March 2020, the number of infected people increased and a long period of restricted movement was imposed from the lockdown measures in May 2020 to mid-2021, resulting in more than 450,000 infections and about 7,000 deaths by early January 2022. A national state of emergency has been declared since April 2020, and Ethiopian government agencies have issued policies to protect farmers and businesses, as well as measures and support from FAO, World Bank, IFAD, EU, and others for food distribution, financial support, and farmer protection.

As for the impact on FVC as a whole, COVID-19 has only had a short-term impact on the production and marketing processes, which have recovered in 2021 despite negative impacts such as a decrease in production and sales volume in the first half of 2020.

On the other hand, input and distribution processes are the ones that are affected in the medium and long term, and the reason for this is that the facilitation of the supply chain, including import and export, has been prolonged due to movement and import/export restrictions. As for the consumption process, in the grain sector, the price of teff in particular has skyrocketed, which has led to a shift in consumer preference to other grains such as wheat, maize, and rice.

The grain sector was also affected by long term disruptions and restrictions in processing and distribution due to prolonged restrictions on movement. The horticulture sector, from the upstream input and production sector to the downstream distribution, marketing, and consumption sector, has been greatly affected by COVID-19, with a reduction in inputs and production, a decline in consumer demand, and import and export through informal channels as seen in the case of onions and other crops. On the other hand, coffee, a craft crop, and spices such as chili sauce have almost recovered to their previous FVC by the end of 2021 after the import and export restrictions were lifted.

In Ethiopia, which is about three times the size of Japan, the FVC process most notably affected by COVID-19 is the distribution process due to movement and import/export restrictions, and this is particularly true for stagnant domestic distribution and intra-regional distribution with neighboring countries, where some crops are still stagnant. On the other hand, exports of export crops such as coffee and spices are recovering, and there are some differences in the form of distribution. In addition, the long-term stagnation of distribution has increased the need for preservation and storage, but there are many wholesale businesses that leave agricultural raw materials unprocessed, resulting in a decline in the quality of their produce and bringing to light the need for more sophisticated processing to protect against quality deterioration due to processing.

Vulnerability in the input process was also prolonged as import/export restrictions made it difficult to obtain seeds and seedlings, fertilizers, pesticides, etc., which had previously been dependent on imports, and in the case of grains and horticultural crops, farmers cut back to self-production.

As the above issues and bottlenecks in FVC have become apparent, measures to strengthen FVC include: 1) domestic production of agricultural materials such as pesticides, seeds and seedlings, and fertilizers; 2) transfer of processing and packaging technologies from developed countries; 3) support for industrial human resource development in Ethiopia and provision (lending) of necessary equipment; and 4) selection of model regions and cities. 5) Support for the establishment and operation of collection warehouses (freezers), including for perishable goods, as there are not many distribution warehouses or freezers in Ethiopia.

3.1.1 Status of COVID-19 and Development Partners' Initiatives

(1) Status of COVID-19 Pandemic

As of January 11, 2022, there were 446,268 infected people confirmed to have COVID-19 and 7,042 total deaths.

First, the number of infected people increased rapidly in August 2020, reaching more than 1,700 people per day and reaching the "first group". After a brief decrease in the number of infected people, the number of infected people increased again in April 2021, reaching a maximum of 3,682 infected people per day, marking the "second group". This was followed by the "third group" in September 2021, and the situation was brought under control in November 2021, but the Omicron virus that broke out in late November 2021 entered Ethiopia, and by January 2021, the number of infected people was confirmed at about 4,000 per day.

As for the number of deaths, in August 2020, up to 28 people per day were counted, and the number has been declining since then. In October 2021, the number of deaths reached a maximum of 50 per day due to the impact of the "third wave". In the "fourth wave" in January 2022, the number of deaths settled down to a few people.

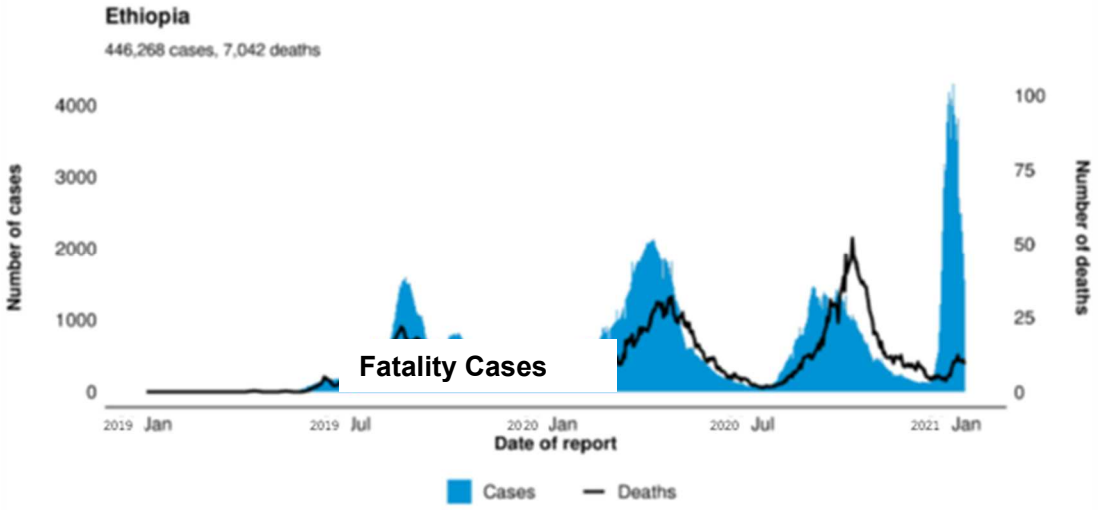


Figure 3.1.1 Trends in the number of COVID-19 cases and deaths in Ethiopia[1]

The status of COVID-19 infection in Ethiopia and the government's measures are summarized in the following table.

Table 3.1.1 COVID-19 Infection Status and Countermeasures in Ethiopia

season	Spread of infection and government measures	COVID-19 Infection Status and Government Prevention Measures
March 2020	First case confirmed	The first infected case in Ethiopia was confirmed.
April 2020	National State of Emergency Declared	The Act on The Declaration of a State of Emergency, which is valid for five months, entered into force. Border blockades (except for logistics), travel ban and other restrictive measures
May 2020	Lockdown	Lockdown started on May 25th (part of Addis Ababa City)
August 2020	First wave	Border blockades (except for logistics), travel ban and other restrictive measures continued.
March 2021	Second wave	Border blockades (except for logistics), travel ban and other restrictive measures continued.
August 2021	Third wave	Third-party notification from the government, but only general regulatory measures (ensuring social distance, encouraging proper mask use and hand washing, reducing unnecessary gatherings as much as possible, and avoiding the three densities (hermetic, dense, and close)) and encouraging vaccination.

[1] Based on WHO Coronavirus Disease (COVID-19) Dashboard (https://covid19.who.int/region/afro/country/et)

September 2021	Third wave	Government announcement of the discovery of a "delta mutant" strain in Japan and guidance on its characteristics and infection control measures only

Source: JICA Research Team by Ministry of Health of Ethiopia

(2) Government Polices and Measures against COVID-19[2]

Reflecting the expansion of COVID-19 infections in Asia and Europe, various multi-sectoral measures have been taken to combat the pandemic, including the declaration of a national state of emergency on April 8.

- The state prohibited gatherings and other social activities. For the period of about five months (April to September) of the state of emergency, strict public health measures with penalties were imposed. In particular, the following two activities were prohibited.
  - Prohibition of all public gatherings: Applied to all religious, governmental, non-governmental, commercial, political, and social gatherings. Small gatherings of maximum 4 people can take place with the individual participant always keeping two metre distance each other.
  - Restrictions on various social activities: greetings by handshake, prohibition of cross border movement, prohibition of all inter-province travels (2 weeks), work restrictions, restrictions on student and teacher meetings, securing social distance, closure of sport activity facilities and children's playgrounds

In addition, the Ethiopian government took the following measures on April 30.

- Tax Measures (direct and indirect taxes)
  - Extended and deferred payment deadlines of value-added tax (VAT) and sales tax (Turnover Tax) for some specific industries (service, manufacturing, construction, wholesale, etc.).
  - A 20% corporate income tax reduction in the next fiscal year for companies contribute to the National COVID-19 Countermeasure Fund. A personal income tax exemption for 4 months for those maintaining employment while they are unable to conduct business activities.
- Other Related Measures
  - Implementation of state-by-state compensation schemes and vocational training.
- Economic Stimulus Measures
  - In May 2020, the Central Bank of Ethiopia partnered with the Ethiopian Food and Drug Administration and provided 15 billion birr (about 46.5 billion JPY, 1 birr = about 3.1 JPY), equivalent to 0.45% of the country's GDP, for operating capital of private banks. The liquidity was intended to promote debt restructuring and prevent bankruptcy. Plus, for existing companies, promotion of authorization of personal protective equipment for distribution.
  - At a press conference held by the Prime Minister's Office on May 2, the Prime Minister announced that in addition to the above, the Ethiopian Development Bank will provide a total of 45 billion birr funds to small and medium-sized enterprises and cooperatives.
  - In addition, measures were taken to prevent the spread of COVID-19, such as foreign capital lending to companies that manufacture products which prevent COVID-19 and customs tariff exemption on related materials.

Considering Ethiopian measures described above, the African Development Bank provided a huge loan to the country in July 2020. However, the number of COVID-19 infection and death toll marked the

[2] Based on various government websites of Ethiopian government.

largest increase in August 2020.

The Ethiopian government took this situation very seriously and in October 2020, the Ethiopian Public Health Institute (EPHI), the body mandated to protect and promote the health of the Ethiopian people, issued "Directive No. 30/2020: A Directive Issued for the Prevention and Control of COVID-19 Pandemic (Directive 30/2020)" is now in effect. This directive had serious implications not only for international travelers, but also for employers, employees and customers of local businesses. It is important to note that the directive has not only had a legal impact on those doing business in Ethiopia, but it has also resulted in new business changes and impacts. It not only requires international travelers wishing to enter the country through international airports to have a negative PCR test certificate from a PCR test conducted up to 5 days prior to arrival in Ethiopia, but also requires international travelers to be quarantined in an isolated area for 7 days. This measure relaxes the number of days of quarantine measures from the directive that previously not only required international travelers to voluntarily quarantine themselves in quarantined locations for 14 days, but also required them to present a negative PCR test certificate that was done up to three days prior to arrival in Ethiopia.

On the other hand, it is important to note that apart from setting standards for border health control, Directive No 30/2020 is also enforceable in regulating how private companies interact with their employees and customers. For example, the directive requires employers to not only provide employees with prevention materials, but also to make information about COVID-19 readily available and to ensure that employees can work at a safe distance from each other. This obligation to create a safe work environment is particularly stringent per industry and in the construction and manufacturing sectors, where employers are required to return to work in a manner that allows for physical disengagement and adequate air circulation. Therefore, by requiring employers to provide hygiene materials (e.g. masks) and ensuring that workplaces follow public health guidelines for physical disengagement and masking, Directive No. 30/2020 can be seen as providing a robust legal framework to account for employee safety.

Overall, the content of the directive will have a significant impact not only on local businesses but also on international travelers wishing to do business in Ethiopia. Given the guidelines, it can be seen as providing a robust legal framework for companies to operate within, while limiting or mitigating the spread of COVID-19.

Despite the promulgation of the directive, the number of infected people increased again in March and April 2021, but the most recent June 2021, the infection is slowing down.

The following table summarizes the policies related to the prevention of COVID-19 infection and their contents and results for each of the representative governmental agencies in Ethiopia.

Table 3.1.2 Major Government Policies and Measures in Ethiopia

Entity	Policies and Measures (target, value chain process, time)	Contents and Result
National Government of the Federal Republic of Ethiopia (Government of Ethiopia (GoE))[3]	Content: Measures to prevent spread Target: Nation-wide VC stage: all stages Scale: Nationwide When: April 2020	● to counter its spread, including the declaration of a national state of emergency large-scale measures. ● Ban on gatherings (any religious, governmental, non-governmental, commercial, political, and social gatherings) and other social activities, for the entire country; greetings by handshake; banning the movement of borders; banning all movements in countries and provinces (two weeks)," restricting labour, and restricting student and teacher meetings. ● During the period of about six months (April-September) after the declaration of the state of emergency, people were subjected to strict public health measures with penalties. As a result of the above, the number of infectious disease cases and deaths decreased from May to July 2020.
Ministry of Trade and Industry	Contents: Tax measures Target: Retailers and wholesalers VC Stage: Distribution	● Extended and deferred deadlines for payment of value-added tax (VAT) and sales tax (Turnover Tax) for specific industries (service, manufacturing, construction, wholesale, etc.). The project contributed to some extent to the financial support of private sector companies

[3] It was issued by the Prime Minister of Ethiopia.

	When: April 2020	in the face of restrictions on movement that prevented them from operating.
Central Bank of Ethiopia	Description: Stimulus measures Target: Retailers and wholesalers VC stage: Production When: May 2020	● In partnership with the Ethiopian Food and Drug Administration, in order to promote debt restructuring and prevent bankruptcy in May 2020, the central bank provided liquidity for existing companies with 15 billion birr (about 46.5 billion JPY, 1 birr = about 3.1 JPY) or 0.45% of GDP of the country for operating capital to private banks that are quickly authorized to produce personal protective equipment to promote distribution. ● In addition to the above, the company announced that it will provide a total of 45 billion bull funds to small and medium-sized enterprises and cooperatives through the Ethiopian Development Bank. In addition, measures were taken to prevent the spread of covid-19 by 2016, such as the flexibility of foreign currencies to companies that manufacture products to prevent the spread of COVID-19, and exemption from tariffs on related materials. During the economic downturn of 2020, the government succeeded in mitigating to some extent the crisis of corporate bankruptcy and other business continuity. On the other hand, the exchange value of Ethiopia depreciated and inflation also increased.
Ethiopian Institute of Public Health (EPHI)	Content: Measures to prevent spread Target: Inbound, local company employers, employees, customers VC stage: all stages When: October 2020	● Stipulates a new set of requirements for international travellers wishing to enter through the international airport. ● In addition to requiring travellers to obtain a negative certificate of PCR test conducted up to five days prior to their arrival in Ethiopia, it also requires international travellers to quarantine in quarantined locations for seven days. In addition to setting standards for traditional border health management, it is also an enforceable provision for regulating how private companies deal with employees and customers. The attempt to revive the economy with clear provisions for those operating domestic and foreign businesses was limited, with several COVID-19 re-expansions in March 2021 and August 2021.

Source: JICA research team based on FAO website and WHO website, etc.

(3) Initiatives by Development Partners

Support for measures on COVID-19 in Ethiopia from development assistance organizations and international organizations other than Japan is shown in the table below.

Table 3.1.3 Cooperation of Key Development Partners in Ethiopia

Partner	Details of support (target, VC, scale, and timing)	Result
FAO	Content: Comprehensive Food Security and Nutrition Survey Target: Somali province (about 390,000 people), Oromia and Dire Dawa Cities (total 360,000), Afar Province (100,000), Amhara state (72,000), Tigray State (43,000), Southern Ethnic Province (SNNP: 13,000) VC stage: Sales and consumption Time Frame: April 2020	In addition to COVID-19, desert locust caused extensive damage to grain. It damaged about 200,000 hectares of arable land and caused the loss of more than 356,000 tons of grain. Sorghum, in particular, was the most affected grain, with 114,000 hectares damaged, followed by corn of 41,000 hectares and wheat of 36,000 hectares. In addition to responding to the immediate food demand of those affected, the above-mentioned increased grain prices due to stagnant and falling livestock prices, as well as strengthening the ability to warn, share information, and manage desert locust nationwide. This is sustainable humanitarian assistance for existing caseloads in the context of the general COVID-19 crisis, and in June 2020 we conducted a comprehensive food security and nutrition survey to conduct an IPC (Security Stage Classification) analysis of the effects of desert locust, seasonal food ins unrest and COVID-19[4]. (http://www.fao.org/ethiopia/news/detailevents/en/c/1270924/)
Enhanced Integrated Framework (EIF)	Content: Companies in developing countries (LDCs), including Ethiopia, A digital campaign aimed at analyzing how the COVID-19 pandemic is impacting participation in the global value chain. Target: Impact on coffee value chain and proposals for improvement measures	t describes the ways in which the food crisis caused by COVID-19 has directly affected businesses by disrupting global value chains. The aim is to raise awareness about the bottlenecks and successes of traders in the world's poorest countries and to make recommendations on how to improve the inclusiveness of global value chains In particular, it analyzed the potential for crises affecting the multilateral trading system to hurt businesses and workers in the least developed countries around the world, and recommended measures to help LDCs because of their limited resilience to problems affecting supply chains, markets, harvesting, and logistics. (https://www.wto.org/english/news_e/news20_e/if_25nov20_e.htm#:~:text=The%20campa

[4] http://www.fao.org/ethiopia/news/detailevents/en/c/1270924/

	VC stage: all stages Time Frame: October 2020 to December 2020	ign%2C%20entitled,capacity%20in%20LDCs.)
GIZ	Contents: Support for ensuring food security and raising awareness of COVID-19 among farmers Target: Agriculture and food industry VC stage: Production, processing Time frame: September 2020	As agriculture is a key industry in Ethiopia's economy, farmers play an important role not only in the economy but also in sustaining food production. Adopting measures to protect the health and production of farmers was a priority of the government and aimed to ensure that both the domestic supply of food and the maintenance of income for those whose livelihoods depend on agriculture. Specifically, a national awareness campaign on COVID-19 was implemented in remote communities. Information on risks, prevention, and symptoms was broadcasted and announced to 6.7 million people in Amhara, Oromia, Afar, and Somali regional states in local languages. The campaign included radio and television announcements and was also implemented in public spaces with lots of posters, flyers, bus stop banners, and stickers. In addition, support was extended to rural areas, equipped with megaphones and motorcycles to provide advice and assistance, raise awareness of COVID-19 in predominantly agricultural communities, and provide training on preventive measures. (https://www.giz.de/en/workingwithgiz/89388.html)
World Bank	Content: Financial support for COVID-19 damage Target: All private sector VC phase: Preliminary phase Timeframe: June 2020	Financial assistance (US$150 million) to support Ethiopia's economic transformation by increasing private sector participation and promoting good governance practices, including the transition to a sustainable financing model for Ethiopian development, in order to minimize the damage caused by COVID-19. (https://projects.worldbank.org/en/projects-operations/project-detail/P169080)
IFAD、EU	Content: Financing and debt relief for local finance to micro, small and medium enterprises (MSMEs) and cooperatives that play a critical role in creating jobs and sustaining livelihoods in rural areas VC phase: Overall VC with a focus on production Timeframe: May 2021-present	The International Fund for Agricultural Development (IFAD) and the European Union (EU) provided €26.5 million worth of liquidity and debt relief to local financial institutions to protect jobs and safeguard livelihoods during the COVID-19 pandemic. In Ethiopia, the agricultural sector and rural populations were the most affected by COVID-19, reducing the agricultural workforce, limiting access to inputs and productive capital, reducing production and productivity, and preventing access to markets and financial services, which led to job losses, reduced access to food, and increased domestic responsibilities for women. For micro, small and medium enterprises (MSMEs) and cooperatives, which play a critical role in creating jobs and sustaining livelihoods in rural areas, new credit for MSMEs and their farmers in the production areas of the country's major agro-industrial parks, additional assistance to the most at-risk rural financial institutions, and mitigation measures to cope with the impact of the pandemic, including support to the entire chain, MSMEs and farmer cooperatives. More than 1.5 million customers associated with rural financial institutions will be targeted to benefit. (https://www.ifad.org/en/web/latest/-/european-union-and-ifad-to-support-ethiopian-rural-financial-institutions-jobs-and-livelihoods-in-the-face-of-the-covid-19)

Source: Created by JICA research team based on FAO, WHO, GIZ, World Bank, and IFAD website, etc.

3.1.2 Agriculture and Crops to Study

(1) Production and Trade

1) Overview

a. Main Crops and Dietary Life in Ethiopia[5]

In Ethiopia, various agricultural products are harvested in a vast country about three times as large as Japan, and various kinds of crops are produced, such as grain, horticultural crops, and craft crops.

The main food in Ethiopia is a crepe-like fermented bread called "injera". The ingredient of injera is a very fine grain named tef.

Tef is a wild-like variety that can harvest a certain amount and is nutritious(calories) without the need for much fertilization. However, even if the amount of fertilization is increased, the yield per hectare does not exceed 2 tons. Research on breeding has cited countries, but since it is rarely cultivated in other countries, it

[5] JICA Research Team based on Ethiopian government under Agricsulture Sector Policy and Investment Framework (PIF) (2010-2020) and 「Ethiopia Agricultural Circumstances-How to Escape from the Poorest Countries-」 Shige Inomata

is difficult to find varieties to be multiplied, and I would like to look forward to future research. Also, since tef is relatively expensive, it is common for the poor to mix teff with other grain powders to make injera.

Maize has succeeded in increasing yields by introducing improved varieties in recent years, but it is one of the few crops in Ethiopia. However, it does not seem to be good for mixing with injera, and prices tend to collapse when it becomes a good product.

Wheat is also the most produced next to tef on a weight basis and is one of the main crops. Because of its high nutritional value (calorie), it is a popular food along with tef, and it is processed into bread etc. on a daily basis and eaten. In addition, the Ministry of Agriculture is promoting irrigation projects, etc., and grains are eager to increase wheat production.

Other grains include maize and barley.

On the other hand, the production of rice, a staple food in Japan, is low and rice consumption in Ethiopia is only just over 1% of total grain consumption, making it a somewhat unfamiliar crop to the average consumer. In recent years, there has been some interest among Ethiopian research institutions in the development of rice varieties such as NERICA rice (New Rice for Africa), which is being promoted with support from Japan, but it is not as well known in Ethiopia as other grains. However, the reason for the interest is that Ethiopian research institutes are aware of its high yield compared to other cereal crops, and the government is aware that it can help support Ethiopia's population, which is expected to grow by nearly 3% annually.

The advantage of this variety is that it matures quickly and can be grown and harvested in areas with short rainy seasons. The taste of the rice when mixed with teff to make injera has been well received, and further research is expected in the future.

Ethiopia's next nutritious (high calorie) crop is characterized by its relatively large production of potatoes, a large production of sweet potatoes, taro, and potatoes, and relatively high nutritional value, but it is often positioned as a "return food". In addition, the Ministry of Agriculture has set out a strategy to increase exports. As for potatoes, there are regions that produce potatoes even in the dry season.

Ethiopia's representative horticultural crops (fruit and vegetable fields) are characterized by broad beans being one of the world's leading producers, and onions are also produced for domestic consumption and as crops for export to neighboring countries such as Djibouti and Somalia.

Other vegetables are cited as important crops by the Ministry of Agriculture, and tomatoes have a strength that can be produced even in the dry season. Avocado is also valued as an export crop. Fruits, on the other hand, are produced less than vegetables.

Finally, in the southern part of Ethiopia, one of the main foods is "kocho", which ferments starch from banana-like plants called "ensete". It is not able to spread nationwide because it takes extremely large labor to the starch extraction work, and a lot of Ethiopians see the food made from starch of potatoes and ensete only as "substitute food" and there is an opinion that this crop spread is important as a drought measures because ensete is comparatively drought-resistant, too.

b. Main Cropping Seasons and Agricultural Zones

The main crop's cropping season and harvesting season are shown below. Rice can be sown, cultivated, and harvested all season due to the spread of NERICA rice, but it is common to sow it around May to June and harvest it around October to November. Wheat is produced a lot in Amhara Region but double cropping is also implemented. The first season's sowing is from June to July and its harvest is October to December. The second season's sowing is from March to April and its harvest is from June to July. Tef is also produced in Amhara Region, where sowing is carried out around July and harvesting is often around November. Onions and broad beans are produced in Oromia Region but July is the sowing season and October to December is the harvest time. Finally, among industrial crops, the famous coffee is often planted in summer and harvested in winter. Spices, in the case of chill sources, are planted in July and harvested from October to November. Coffee and spices are also produced mainly in Oromia Region.

Table 3.1.4 Major Crop Calendar in Ethiopia

Ethiopia			cropping type					cropping calendar												
production volume of major crops (t/yr) 2016-2018 average			Planting period - onset	Planting period - end	Harvesting period - onset	Harvesting period - end	Length of the cropping cycle	1	2	3	4	5	6	7	8	9	10	11	12	note
1	Rice	164,501	1/1	12/31	1/1	12/31	67-115 days													all-year harvesting is possible
			6/1	6/20	9/25	11/15	67-115 days													June sowing, Sept.-Nov. harvesting (Amhara Region)
			4/25	6/5	8/25	12/25	67-115 days													May sowing, Sept.-Nov. harvesting (Amhara Region)
2	Wheat	4,932,103	6/7	7/25	9/25	12/25	104-170 days													1st season (Amhara Region)
			3/15	4/30	6/10	7/31	104-170 days													2nd season (Amhara Region)
3	Tef	5,756,547	6/20	7/31	10/15	12/12	78-123 days													Amhara Region
4	Onion	276,742	6/25	7/31	9/25	12/12	100-140 days													Oromia Region
5	Broad Beans	990,156	6/7	8/31	10/5	1/31	103-170 days													Oromia Region
6	Spice (Pepper Sweet)	310,594	6/25	7/31	9/25	12/10	100-150 days													Oromia Region
7	Coffee	475,455	July - August		winter		a few months													Oromia Region

: sowing

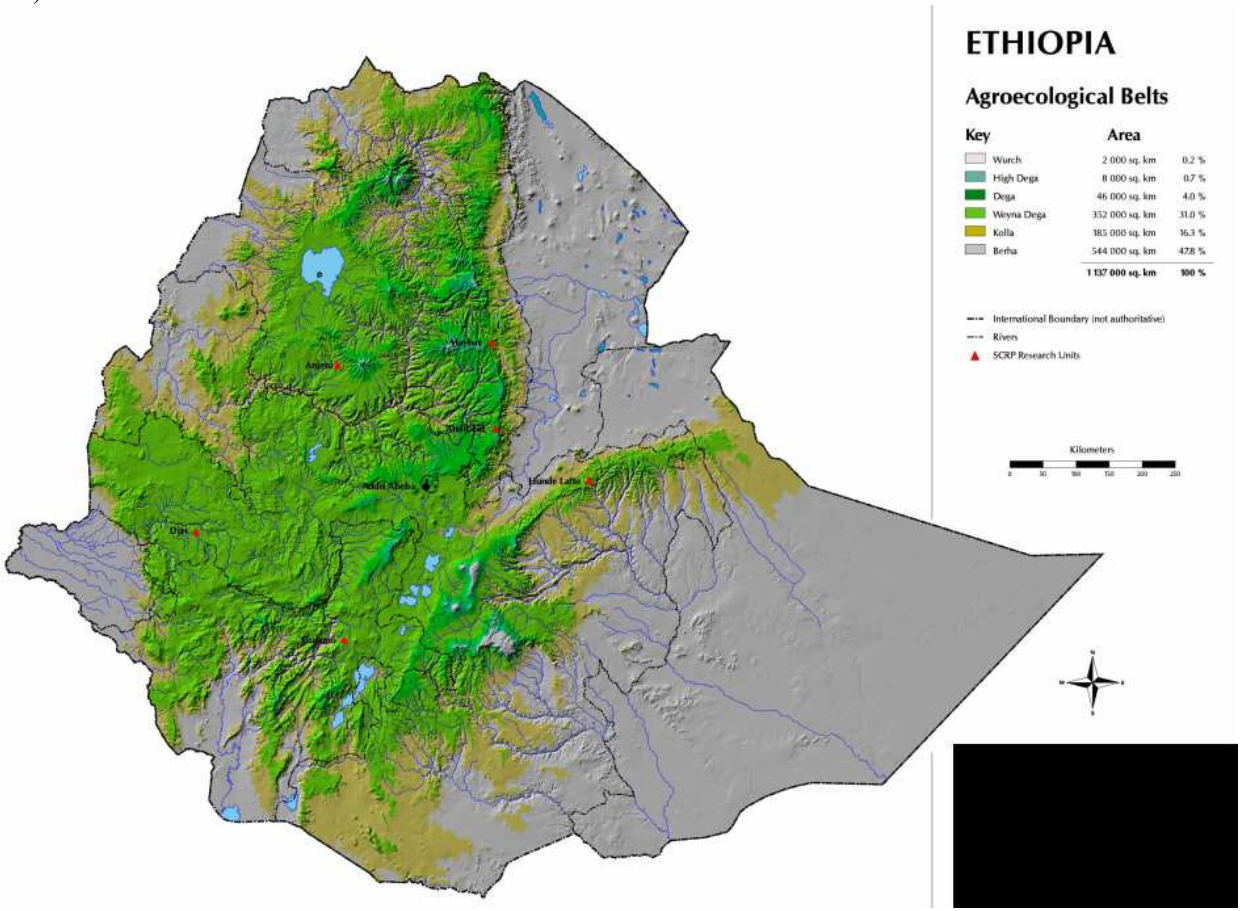
: harvesting (all-year harvesting is not shown)

Source: JICA Research Team based on FAO Crop Calendar (https://finitykt.hatenablog.com/entry/fathersday_coffee)

Ethiopia's climate varies greatly from region to region due to its geographical characteristics, with the following five main climate zones traditionally based on

elevation and temperature:

- Wurch (cold region at altitudes above 3,000m)
- Degas (highland climate, at an altitude of 2,500-3,000m)
- Woina dega (warm, 1,500-2,500m region)
- Kola (hot and dry areas below 1,500 m)
- Berha (hot and very dry area)



Source: "Agroecological Belts of Ethiopia "Centre for Development and Environment University of Bern, Switzerland in association with The Ministry of Agriculture, Ethiopia

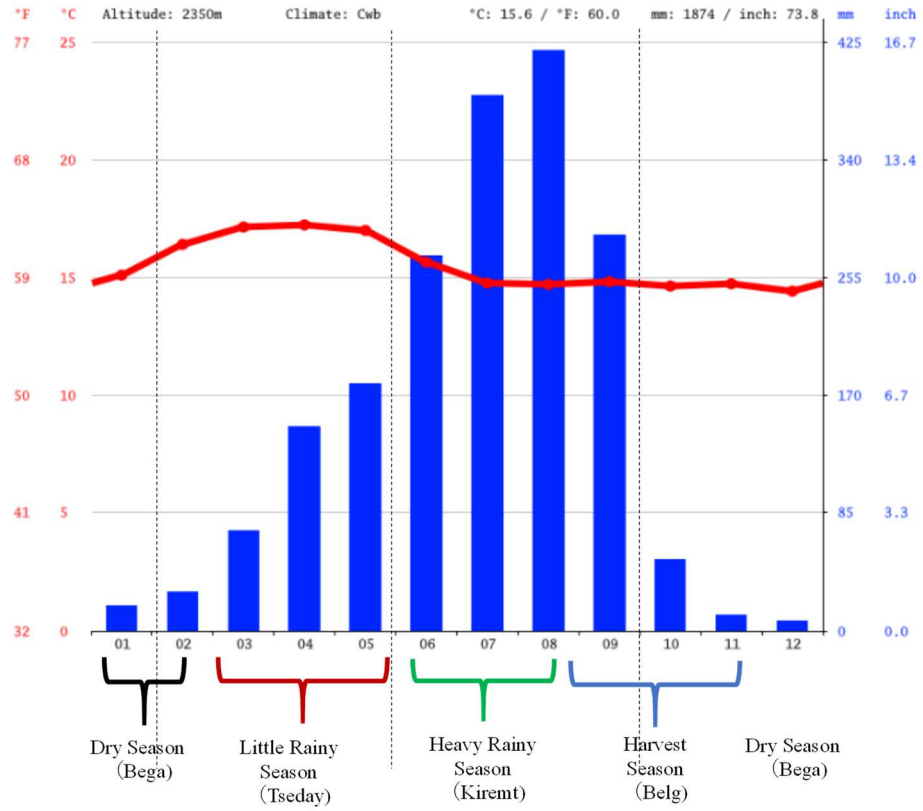
Figure 3.1.2 five Climate Zones Based on Altitude and Temperature in Ethiopia

Annual rainfall differs significantly by regions. While some record rainfalls below 2,000 mm, lowlands in northeastern Afar and Ogaden Regions in the southeast (from Ethiopia's eastern plateau to the deserts of neighboring Somalia) have less than 250 mm.

Ethiopia has a tropical climate, but it differs from other tropical climates in that it is said that "Ethiopia has four seasons. In other words, the four seasons are divided as follows

- Dry season from December to February (Bega)
- The light rainy season from March to May (Tseday)
- Heavy rainy season from June to August (Kiremt)
- Harvest season from July to September (Belg)

It should be noted that much of Ethiopia's agriculture relies on rainwater during these light and heavy rains, and droughts due to la Nina (a phenomenon in which sea surface temperatures continue to be below normal in the same sea area) increase the chances of a food crisis.



Source: JICA Research Team based on Roderick Grierson and Stuart Munro-Hay, The Ark of the Covenant(2000)

Figure 3.1.3 four Seasons based on Precipitation in Ethiopia (Addis Ababa)

It is a feature of Ethiopian agricultural environment that crop growth time varies greatly by the diversified climate in Ethiopia as outlined above, difference of the season such as the dry season, the light rain season, and the heavy rain season.

2) Main Crop Production

The table below summarizes Ethiopia's major crop production.

Looking at FAO's average production volume (weight basis) over the last three years, Maze is the top with over 10 million tons per year, Teff with 5.2 million tons per year, followed by sorghum with 5.15 million tons and wheat with about 5 million tons. is there.

In other words, the amount of grain produced is overwhelmingly large.

Among potatoes, sweet potatoes weigh about 1.7 million tons, but potatoes weigh about 950,000, which is relatively large. As for beans, broad beans weigh about 1 million tons, followed by dried beans, coffee beans, and chickpeas, which weigh less than 500,000 tons.

In addition, among horticultural crops, bananas are produced in large quantities at over 500,000 tons, and cabbage is produced in vegetables at over 400,000 tons.

Furthermore, spices and onions are also major crops produced annually, weighing approximately 300,000 tons each.

Table 3.1.5 Top 25 Ethiopian crop producers

ID	Name of Crops	Production Volume (t)
1	Maize	10,081,258
2	Teff	5,200,487
3	Sorghum	5,153,067
4	Wheat	4,932,103
5	Barley	2,029,069
6	Sweet potatoes	1,689,117
7	Roots and tubers nes	1,584,733
8	Sugar cane	1,309,745
9	Millet	1,064,137
10	Broad beans, horse beans, dry	990,156
11	Potatoes	942,202
12	Beans, dry	624,964
13	Bananas	511,525
14	Coffee, green	475,455
15	Chick peas	464,597
16	Cabbages and other brassicas	414,635
17	Cow peas, dry	373,762
18	Peas, dry	373,298
19	Pepper (piper spp.)	350,179
20	Spices nes	310,594
21	Oilseeds nes	303,768
22	Chillies and peppers, dry	295,098
23	Vetches	286,566
24	Onions, dry	276,742
25	Sesame seed	240,074

Source: JICA Research Team based on Source: FAOSTAT from the data for the last 3 years

Note) Regarding Teff, "Teff, A Rising Global Crop: Current Status of Teff Production and Value Chain" Hyejin Lee (2018) has data on production volume in 2017, which is used as data on FAO's "Cereal nes. Since about 95% were "Teff", 95% of FAO's "Cereals nes" data is included in the abovfrom data for the last 3 years

3) Trade and Distribution

The production volume of each crop in Ethiopia, amount of exports and imports, and imports and export destinations are mainly divided into three patterns.

1) Domestic consumption type: teff, wheat, sweet potato, broad beans, onion
2) Intraregional distribution type: Spices
3) Extra-external distribution type: coffee

Table 3.1.6 Import / export volume and value of major Ethiopian crops

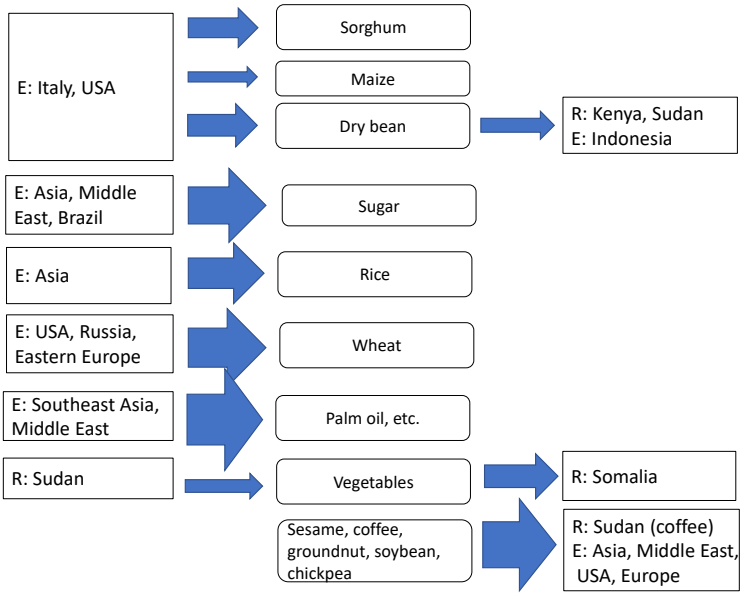
Kinds of Crops	Crop Name	Production Volume (ton)	Harvest Area (ha)	Export Amount (1000US$)	Export Volume (ton)	Main Exporting Countries	Import Amount (1000US$)	Import Volume (ton)	Main Importing Countries	Source(Year)	Defenition	Consumpption per capita (kg/capita/yr)	Source (Year)
grain	Wheat	4,932,103	1,744,739	0	0	(Sweden)	392,107	1,174,648	USA, Romania, Russia, Ukraine	FAO STAT (2017-2019)		37.0	FAO STAT (2016-18)
	Rice	164,501	58,015	16	143	Djibouti, Yemen	1,020	1,732	India, Pakistan, Korea	FAO STAT (2017-2019)	Rice Paddy	3.5	FAO STAT (2016-18)
	Teff	5,474,197								JICA Survey Team by fitting the numbers of FAO-STAT (2017-2019) to the numbers of "Teff, A Rising Global Crop: Current Status of Teff Production and Value Chain" Hy-ejin Lee (2018)	95& of "Cereal nes"	35.4	FAO STAT (2016-18)
	Broad Beans	990,156	465,359	12,656	24,197	Sudan, Egypt, Djibouti,	6	8	UAE。 China	FAO STAT (2017-2019)		2.3	FAO STAT (2016-18)
Horticultural crops	Onion	276,742	32,077	3,110	18,219	Djibouti,,Somalia	17,158	73,203	Sudan	FAO STAT (2017-2019)	Onions Dry	3.1	FAO STAT (2016-18)
	Swwet Potatoes	1,689,117	50,492	3	12	Djibouti,	3	1	China	FAO STAT (2017-2018)		12.2	FAO STAT (2016-18)
Craft crops	Spice(Chili etc.)	310,594	340,426	5,919	6,157	India, Egypt, Sudan	705	307	UAE, India, China	FAO STAT (2017-2019)	Spice Nes	0.4	FAO STAT (2016-18)
	Coffee	475,455	749,782	629,902	181,073	Saudi Arabia, USA, Germany, Japan, Korea	245	78	UK, Malaysia, UAE	FAO STAT (2017-2019)		2.4	FAO STAT (2016-18)

Source: JICA Research Team Base on FAOSTAT

Imports of crops from countries outside the region from China, Russia and Central European countries are increasing. Overall, facilitation of distribution, that is, expansion of exports, is considered to be the key to the future resilience of FVC in Ethiopia.

The above distribution structure can be summarized as follows. Most of the imported crops are imported from outside the region, but vegetables are also imported from Sudan within the region.

As export crops, coffee, spices, sesame seeds, beans, etc. are partially exported to Sudan, Somalia, Djibouti, etc.



Source: JICA Research Team based on FAOSTAT

Figure 3.1.4 Ethiopia's major trading (import / export) countries

4) Distribution Structure

In the capital, Addis Ababa also offers modern retailers such as supermarkets, hypermarkets and CVS (called Modern Trade: MT), the expansion is limited, and traditional retail (called Traditional Trade: TT) accounts for about 95% or more. The proportion of modern retail, based on the number of stores, is 5% less than that[6].

Basically, the FVC structure in Ethiopia is often associated with multiple layers and multiple enemy players.

In cases where transportation from the producer to the processing business is necessary, the producer rents a truck from the agricultural production association or other organization to send the crops of several producers to the processing business, but sometimes the agricultural production association does not have enough means to transport the crops, and in that case, they ask a logistics company to do it for them. In such cases, they take measures such as having logistics companies act on their behalf. In addition, even in the case of transportation from producers to wholesalers, wholesalers often do not have warehouses, but do not have the means of distribution, and in many cases, middlemen or logistics companies act as intermediaries when transporting crops to wholesalers.

In Ethiopia's distribution structure, the retail business often comes to the wholesaler's warehouse to pick up the goods.

The Ethiopian distribution structure can be summarized as follows: multiple players are often involved in the delivery of the product from the producer to the consumer, and as the number of stakeholders increases, including middlemen, wholesalers, logistics companies, etc., the selling price of the retail business is often passed on to the consumer, so the organization of these traditional distribution structures will be necessary in the future. It is thought that the organization of these traditional distribution structures will become necessary in the future.

(2) Selecting Crops to Study

In Ethiopia, under COVID-19 influence, agricultural materials such as seedlings, fertilizers, agricultural machinery, etc. were not introduced due to distribution (import) problems, and the problem that the price of some crops such as onions soared became apparent. Therefore, the vulnerability of distribution-retail (import > retail > export) is considered to be one of the biggest development issues on FVC.

In addition, when import and procurement of agricultural materials in the input process became a bottleneck, the vulnerability of the most river-related processes was also found to be the least productive and processing processes that could not be sufficiently processed in the production and processing processes of the next process.

In addition, since the country has a population of about 100 million, it is expected that the construction of resilient FVC of nutritious grains will continue to be essential.

Based on the above assumptions, the following perspectives will also be taken into account in the selection of crops for this study.

1. Selection of crops that are likely to have importance and added value in production volume and export value in the future
2. Selection of crops with a view to utilizing Djibouti corridors, i.e., expanding imports and exports
3. Selection of crops that balance domestic, intra-regional, and extra-regional distribution
4. Relevance to JICA projects

[Cereal Crop Selection - draft]

According to FAO (2018) data, grain production is the largest in the production of mace, followed by sorghum and wheat in third place.

However, in the export value, wheat is the top at 4,000 t in grains, and then more than 1,000 t of rice, 1,000

[6] JICA Research Team based on Euromonitor (https://www.2merkato.com/directory/550/) etc.

t of mace, sorghum, and millet.

Choosing wheat with the potential for future expansion of extra-region distribution is consistent with the Ethiopian government's policy of promoting irrigation projects, and future exports using the Djibouti Corridor can be expected, so wheat will be selected first.

Secondly, rice self-sufficiency in Ethiopia is low at about 33% in FY2018 and is currently dependent on imports, but the crop is expected to provide high nutritional value in the future, and "National Rice Research and Training Center Strengthening Project 2" is scheduled to be implemented in JICA projects, so rice will be selected from the aspect of strengthening the nutrition of citizens.

Finally, we will select "Tef", which has penetrated as Ethiopia's unique food culture, not only for domestic consumption but also for the possibility of foreign consumption.

[Horticultural Crops - draft]

If you look at garden crops, we think that it is appropriate to select broad beans because they produce a lot of domestic production and exports about 22% of domestic production compared to other garden crops.

Although domestic production is not so large, it is the next ranking of coffee when converted to the amount of money, and the spices will be selected because of the high added value and the expectation of future extra-external expansion.

Finally, in the fruit and vegetable field, it is reasonable from the perspective of potatoes production, but in fiscal 2020, prices will soar, and the current situation of FVC will be grasped and rebuilt, and onions with higher production volumes than tomatoes will be selected as selected crops.

However, sweet potatoes, which have a large production volume but are still at the stage of domestic consumption and have a high room for export, are also considered as candidates for selection.

[Industrial Crops - draft]

Ethiopia's typical craft crops include coffee and sesame. Sesame is a developing cash crop that has already allocated less than 80% of its domestic production to exports, but already about 50% of coffee is exported, but we consider coffee, which still has room for cash crops as an overseas distribution, as a selected crop.

(3) Setting Initial Hypothesis

Up to now, FVC in Ethiopia under the influence of COVID-19 has been outlined.

The paper, "Impacts COVID-19 Pandemic Diseases on Ethiopian Agriculture, Food Systems, And Mitigation and Adaptation Strategy" (August 2020, Suleyman Abdureman and Nuradin Absi Hassen, Haramaya University), which discusses how these diseases will change under the impact of COVID-19. The source of the data is a review of various sources published in Lessons Learned from Previous Pandemics, i.e., expert opinions published by various reliable sources such as the International Food Policy Research Institute (IFPRI), Food and Agriculture Organization of the United Nations (FAO), International Livestock Research Institute (ILRI), World Bank (IFPRI), expert opinions published by various credible sources such as Food and Agriculture Organization (FAO), International Livestock Research Institute (ILRI), World Bank (World Bank), Office for the Coordination of Humanitarian Affairs (OCHA), World Health Organization (WHO) and Ethiopian Economic Association (EEA).

Since the above paper is multifaceted in its analysis, the following is a summary of the changes in the agricultural and food supply chain under the impact of COVID-19, based mainly on this paper.

The major changes in the agricultural and food supply chain described in the above paper are as follows

- Imbalance in the supply and distribution of inputs: vulnerability of "input" and some "distribution (import)" processes
- Shortage and temporary dismissal of agricultural workers: vulnerability of the "production" process
- Fragmentation of value chain processes such as harvest losses (sorting, delivery, storage): vulnerability of "distribution" processes
- Potential impacts on food processing and packaging: vulnerability of the "processing" process

(4) Overview of FVC

This section provides an overview of the food value chain of each crop, mainly in Ethiopia. In the future, we will deepen our analysis and discussion of the impact of COVID-19 through field surveys.

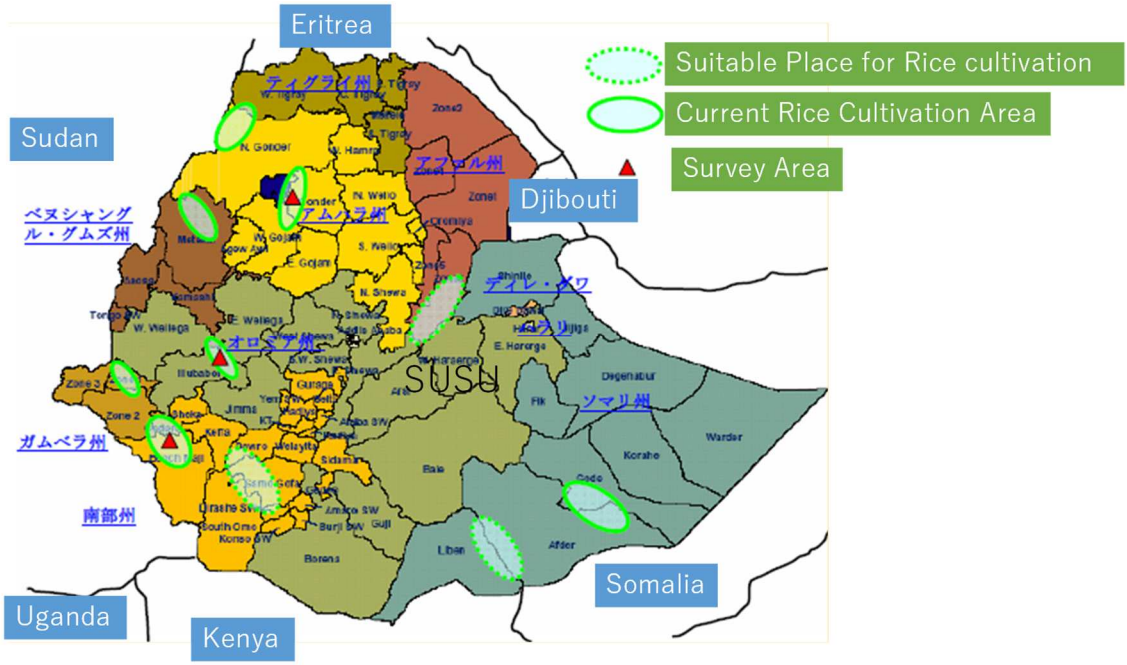
1) Rice

a. Crop Season (cropping calendar)

Ethiopia			cropping type					cropping calendar											
	production volume of major crops (t/yr) 2016-2018 average		Planting period - onset	Planting period - end	Harvesting period - onset	Harvesting period - end	Length of the cropping cycle	1	2	3	4	5	6	7	8	9	10	11	12	note
1	Rice	164,501	1/1	12/31	1/1	12/31	67-115 days													all-year harvesting is possible
			6/1	6/20	9/25	11/15	67-115 days													June sowing, Sept.-Nov. harvesting (Amhara Region)
			4/25	6/5	8/25	12/25	67-115 days													May sowing, Sept.-Nov. harvesting (Amhara Region)
								: sowing												
								: harvesting (all-year harvesting is not shown)												

b. Production Area

Rice is produced in northern, western, and southern provinces (Amhara, Benishangur, Gambella, Somali, and parts of Oromia) according to the Ethiopian Rice Development Master Plan, and is cultivated mainly in areas rich in water resources and fully expected annual rainfall, such as around Lake Tana and Fogala wetlands in Amhara Province.



Source: "Ethiopia Rice Cultivation Development Master Plan Project Finding Survey Report" (March 2009, Overseas Agricultural Development Consulting Association)

Figure 3.1.5 Current Location of Rice Cultivation Areas and Suitable Areas for Rice Cultivation in Ethiopia

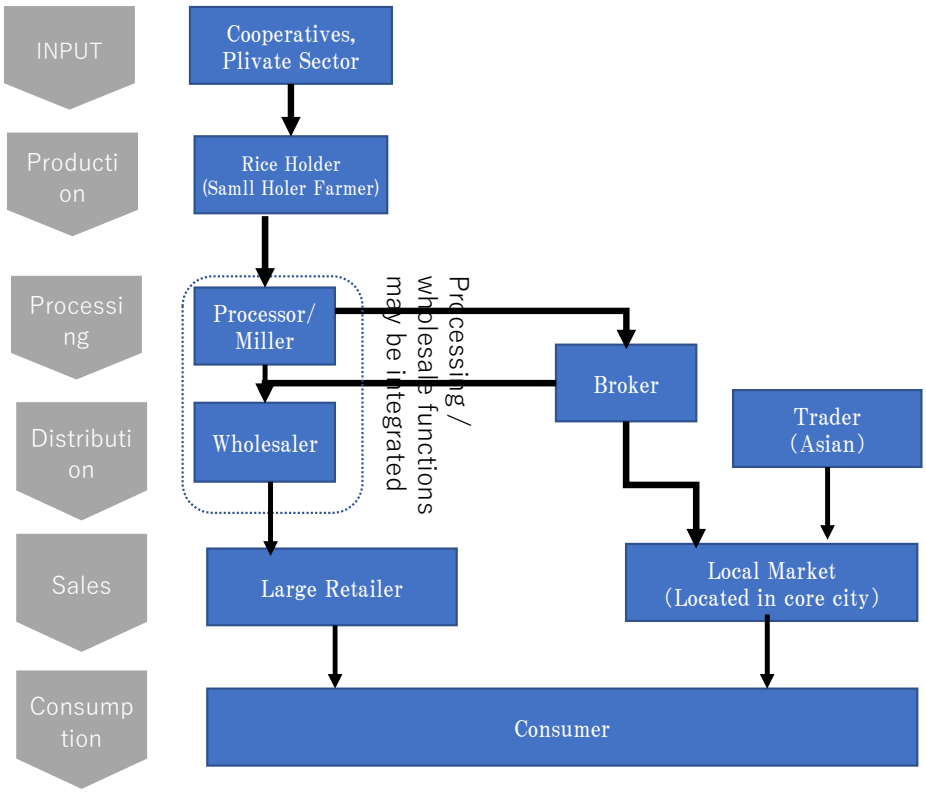
In view of the above information and security information, Bemshangl Gums state in the surrounding states, mainly in Amhara province, will judge and consider information on security and infectious diseases, aling it is considered appropriate for the target area.

c. Value Chain

The majority of rice farmers in Ethiopia are small-scale farmers who grow their own rice for subsistence and sell the surplus to processors. As a result, domestic production is not plentiful, and rice imports are on the rise every year.

In both cases, rice processors buy the rice from farmers, process it, and then sell it to wholesalers through brokers. It could be said that brokers play a role in bringing the rice produced and processed both domestically

and internationally to the market due to the lack of transportation means. In the downstream process of those players, it is sold by retailers to consumers. In the Ethiopian rice market, it could be said that brokers are in the market and control the price of rice.



Source: JICA research team based on Meron Abebe, 2016, Dawit et al., 2018, EIAR rice value chain baseline survey, 2019

Figure 3.1.6 Rice Value Chain in Ethiopia

d. Key Stakeholders

Key stakeholders are rice producers, importers, processors, brokers (intermediaries), transporters, wholesalers in rural and urban areas, and retailers.

2) Wheat

a. Crop Season (cropping calendar)

Ethiopia			cropping type					cropping calendar											
production volume of major crops (t/yr) 2016-2018 average			Planting period - onset	Planting period - end	Harvesting period - onset	Harvesting period - end	Length of the cropping cycle	1	2	3	4	5	6	7	8	9	10	11	12	note
2	Wheat	4,932,103	6/7	7/25	9/25	12/25	104-170 days													1st season (Amhara Region)
			3/15	4/30	6/10	7/31	104-170 days													2nd season (Amhara Region)
								: sowing												
								: harvesting (all-year harvesting is not shown)												

b. Production Area

Domestic wheat production is concentrated in Oromia and Amhara, with a large number of small holders it is characteristic of Ethiopian wheat producers[7].

Therefore, as a candidate region for crop survey, Oromia and Amhara provinces are considered to be reasonable production areas, and it is considered that it is valuable to investigate distribution to Addis Ababa, the capital of a large consumption area.

[7] Wheat production and marketing in Ethiopia: Review study" (2020) (Full article: Wheat production and marketing in Ethiopia: Review study (tandfonline.com))

c. Value Chain

In Ethiopia, it is common for wheat produced by wheat farmers to be distributed through agricultural cooperatives to the market, wholesale businesses. The purpose of the farmers' cooperatives is to improve the business environment for the farmers by providing information, access, distribution, and credit to the market.

On the other hand, there are cases where distribution is done to wholesalers without going through agricultural cooperatives, and collectors play an intermediary role. Collectors are either part-time producers or unlicensed trading companies that harvest wheat from producers in the village or town, and are paid money in advance by the wholesaler. If the wheat is sold as a raw material, it is sold to retail businesses. If the final product is a food product made from wheat, primary processing (flour milling companies) and secondary processing companies (food and bakeries, etc.) are also in charge of sales, and the system directly sells end consumers.

In Ethiopia, it is common for wheat produced by wheat farmers to be distributed through agricultural cooperatives to the market, i.e. to wholesale businesses. The purpose of the farmers' cooperatives is to improve the business environment for the farmers by providing information, access, distribution, and credit to the market.

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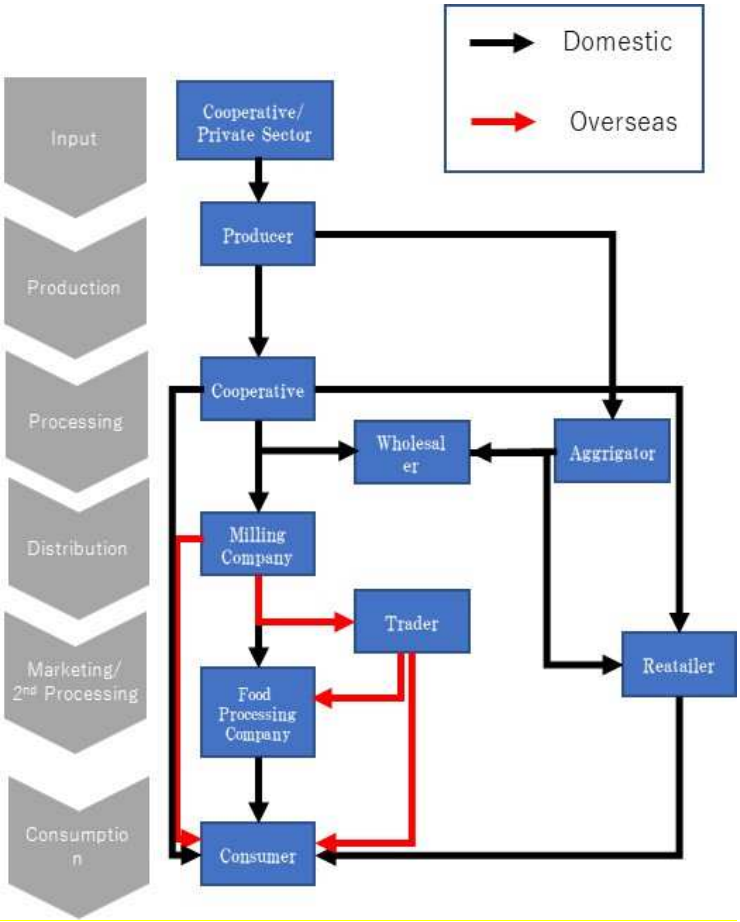


Source: JICA Research Team based on Tadesse Kenea et al., 2017, Adugnaw Anteneh & Dagninet Asrat, 2020

Figure 3.1.7 Wheat Value Chain in Ethiopia

d. Key Stakeholders

Key stakeholders include producers, cooperatives, collectors, trading companies, processing companies, urban wholesalers, and retailers. Flour milling and food manufacturing companies are also major consumption stakeholders in terms of secondary processing of wheat as raw material.

3) Teff

a. Crop Season (cropping calendar)

Ethiopia			cropping type					cropping calendar											
production volume of major crops (t/yr)		2016-2018 average	Planting period - onset	Planting period - end	Harvesting period - onset	Harvesting period - end	Length of the cropping cycle	1	2	3	4	5	6	7	8	9	10	11	12	note
3	Teff	5,756,547	6/20	7/31	10/15	12/12	78-123 days										⟷	⟷		Amhara Region
								: sowing ⟷ : harvesting (all-year harvesting is not shown)												

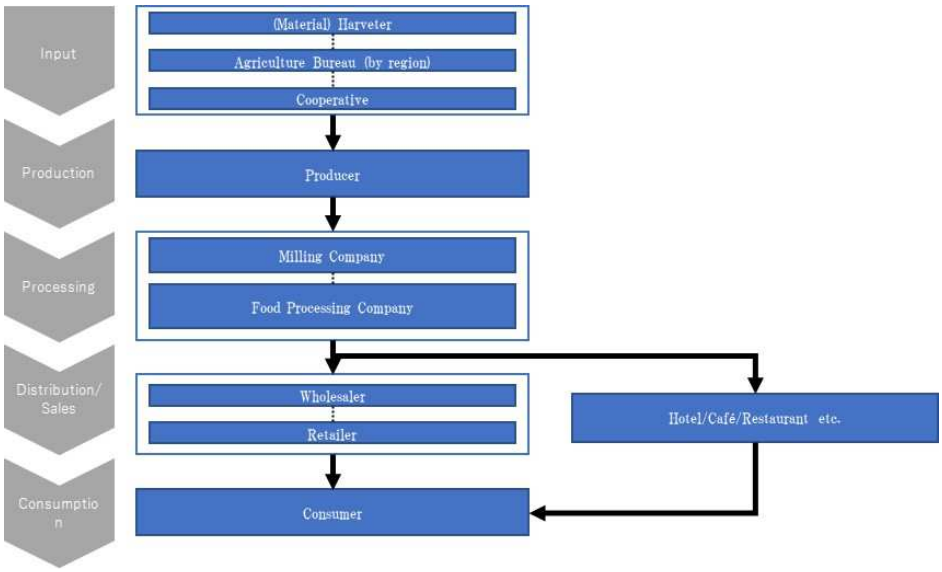
b. Production Area

Tef (teff) is a crop of Eragrostis in Poaceae. It is a unique crop grown mainly in Ethiopia, and seeds are often served as grains as a main food, and in Ethiopia, a dish called "injera" processed with tef is recognized as a national dish. Not only is it a traditional Ethiopian ingredient, but it is nutritious and gluten-free, so consumption is increasing in Europe, the United States, and Japan as one of the so-called "superfoods".

The main producers of teff are now mainly the Maro people in the northern Amhara and southern ethnic states. Thus, Amhara, followed by the southern ethnic states, is the major producer[8].

c. Value Chain

Cultivated tef is generally transported from the grower to the market, , through a cooperative or regional agricultural bureau. Grower cooperatives are established to improve the agribusiness environment by providing information, access, distribution, and credit to the market through the cooperative. The teff is then milled or processed and consumed through wholesalers, retailers, or food service providers such as hotels, cafes, and restaurants.



Source: JICA Research Team based on ”Journal of Stored Products and Postharvest Research Exploring value chain and post-harvest losses of Teff in Bacho and Dawo districts of central Ethiopia”

Figure 3.1.8 Tef' Value Chain in Ethiopia

[8] Major Onion (Allium cepa L.) Production Challenges in Ethiopia:A Review” Muluneh Bekele Etana Department of Horticulture, College of Agriculture and Veterinary Science, Ambo University, Ambo, Ethiopia etc. (2019)

d. Key Stakeholders

Key stakeholders include Teff producers, regional agricultural bureaus, agricultural cooperatives, brokers, local traders, processors, urban wholesalers, and retailers. Schools, hotels, cafes, and other food service establishments that serve processed teff are also major consumption stakeholders.

4) Onion

a. Crop Season (cropping calendar)

Ethiopia			cropping type					cropping calendar											
	production volume of major crops (t/yr)	2016-2018 average	Planting period - onset	Planting period - end	Harvesting period - onset	Harvesting period - end	Length of the cropping cycle	1	2	3	4	5	6	7	8	9	10	11	12	note
4	Onion	276,742	6/25	7/31	9/25	12/12	100-140 days													Oromia Region

: sowing

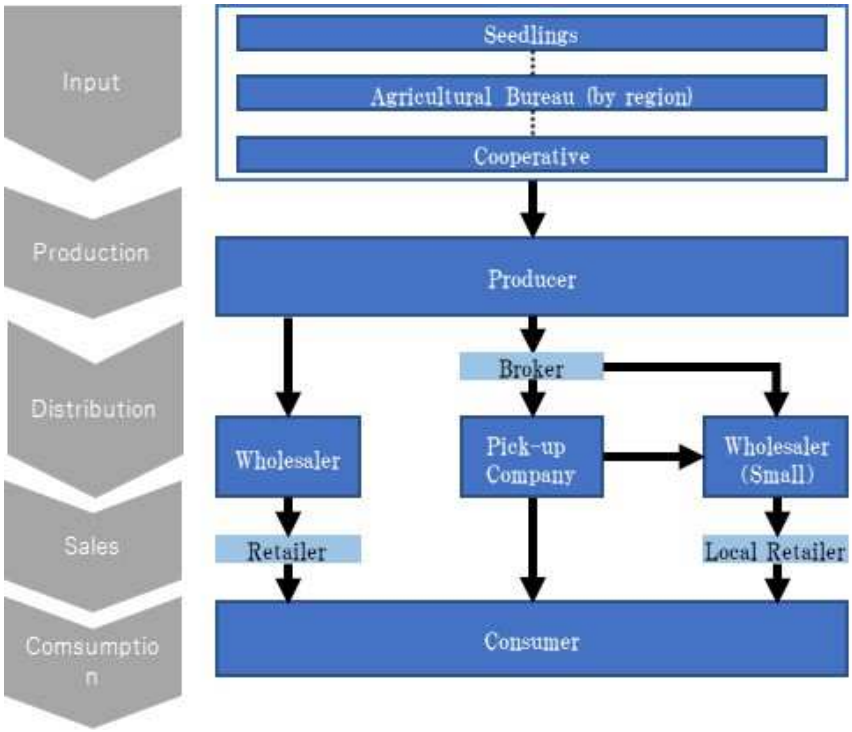
: harvesting (all-year harvesting is not shown)

b. Production Area

Onions are also a very important crop in Ethiopia as a domestic consumption food and export crop. The main production area is particularly wash of the upper reaches of the river Ziway.

c. Value Chain

Onions are generally grown and harvested through local agricultural bureaus or cooperatives, and then distributed to markets or wholesale dealers. The high cost of transportation and the small size of the onion brokers and collectors make it difficult for farmers to bring their onions directly to the market (Mahilet Yewendwesen Bikila, (2012)). Therefore, wholesale companies and brokers often act as intermediaries, which makes it difficult for farmers and cooperatives to obtain market information.



Source: JICA Research Team based on Reddy and Kanna 2016

Figure 3.1.9 Onion Value Chain in Ethiopia

d. Key Stakeholders

Key stakeholders are producers, brokers, collectors (collectors and logistics companies), regional wholesalers, urban wholesalers, and retailers, and the crop has a strong presence of players on the distribution side, such as wholesalers and logistics companies.

5) Broad beans

a. Crop Season (cropping calendar)

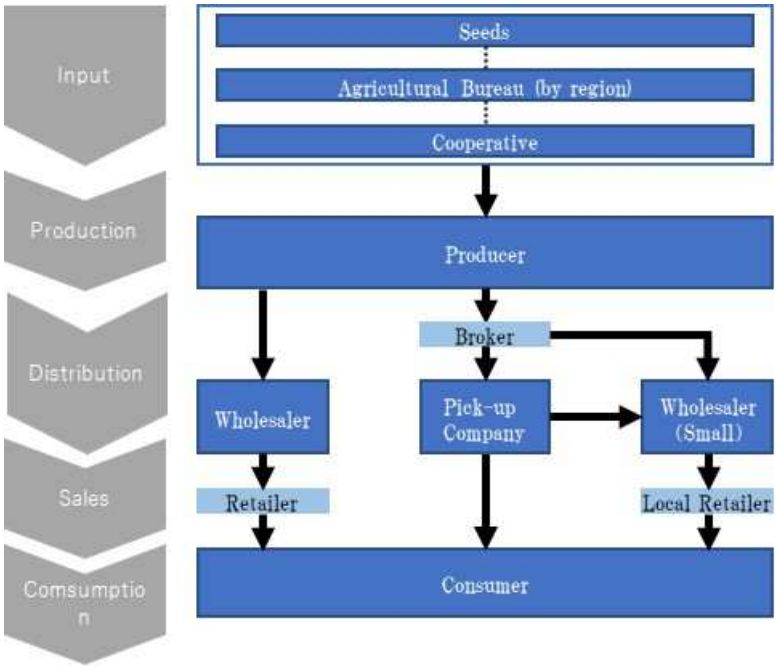
Ethiopia			cropping type					cropping calendar											
production volume of major crops (t/yr) 2016-2018 average			Planting period - onset	Planting period - end	Harvesting period - onset	Harvesting period - end	Length of the cropping cycle	1	2	3	4	5	6	7	8	9	10	11	12	note
5	Broad Beans	990,156	6/7	8/31	10/5	1/31	103-170 days	⟷									⟷			Oromia Region
								: sowing												
								⟷ : harvesting (all-year harvesting is not shown)												

b. Production Area

Ethiopia is one of the world's leading producers of broad beans, and its main production area is Shoa Prefecture, Wello Prefecture Tigrai Prefecture Begumdir Prefectures and Gojam It is concentrated in the plateau in northern Ethiopia such as the prefecture. Therefore, amhara state, Benishangur Gums state, Afar state, etc., where these prefectures are located, are considered desirable as candidate areas for the survey.

c. Value Chain

It is common that the broad beans grown and harvested through agricultural bureaus and cooperatives belonging to the region are distributed to markets, or wholesale businesses. In the process of transportation, there are high transportation costs involved in bringing them to the market from rural areas where roads are not paved. In addition, since there are no legally binding contracts with traders, producers are trading with no guarantee of income. Small-scale farmers are forced to trade through informal distribution. (Food and agriculture organization of the United Nations, (2019)). Although there is some intermediation by wholesalers and brokers, market information is highly opaque and is largely influenced by verbal sales contracts and other forms of settlement, and there is a lack of price coordination by public and private organizations (including a lack of coordination by cooperatives). Lack of price coordination by public and private organizations (including lack of coordination by cooperatives). Weak price negotiation power results in low prices for farmers.



Source: JICA Research Team based on Reddy and Kanna 2016

Figure 3.1.10 Broad Beans Value Chain in Ethiopia

d. Key Stakeholders

The main stakeholders are producers, brokers (brokers), collectors (pick-up operators), local traders (small wholesale operators), processors, relatively large-scale book wholesalers in urban areas, and retailers, etc.

6) Spices (mainly chili)

a. Crop Season (cropping calendar)

Ethiopia			cropping type					cropping calendar											
	production volume of major crops (t/yr) 2016-2018 average		Planting period - onset	Planting period - end	Harvesting period - onset	Harvesting period - end	Length of the cropping cycle	1	2	3	4	5	6	7	8	9	10	11	12	note
6	Spice (Pepper Sweet)	310,594	6/25	7/31	9/25	12/10	100-150 days									↔	↔	↔		Oromia Region

: sowing

↔ : harvesting (all-year harvesting is not shown)

b. Production Area

Ethiopia produces a lot of spices, and it is the main export crop, and India, Sudan, Yemen, Saudi Arabia, etc. are the main exporters.

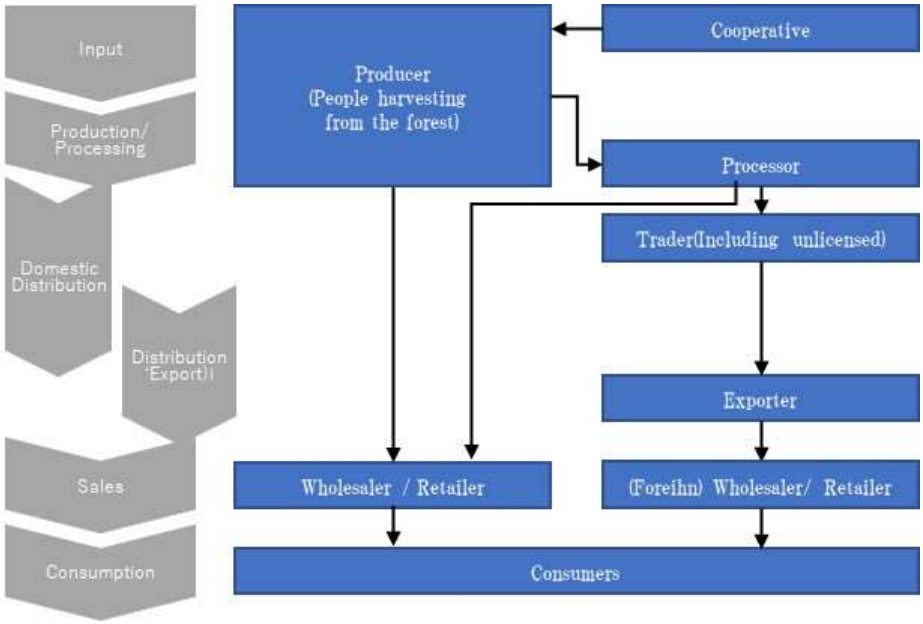
Spices include ginger, black cumin, coriander, turmeric, chili pepper, and the like.

The main producers of chili peppers are produced in the highly advanced southern multiethne (SNNP) states, mainly Oromia. Ginger and turmeric are also produced in low-earth southern multiethic states, Oromia and Afar.

Therefore, it is thought that the investigation of the southern multieth ethnic state and Oromia state where production is active in the highlands and lowlands is suitable, and the meaning of grasping the export route is also high.

c. Value Chain

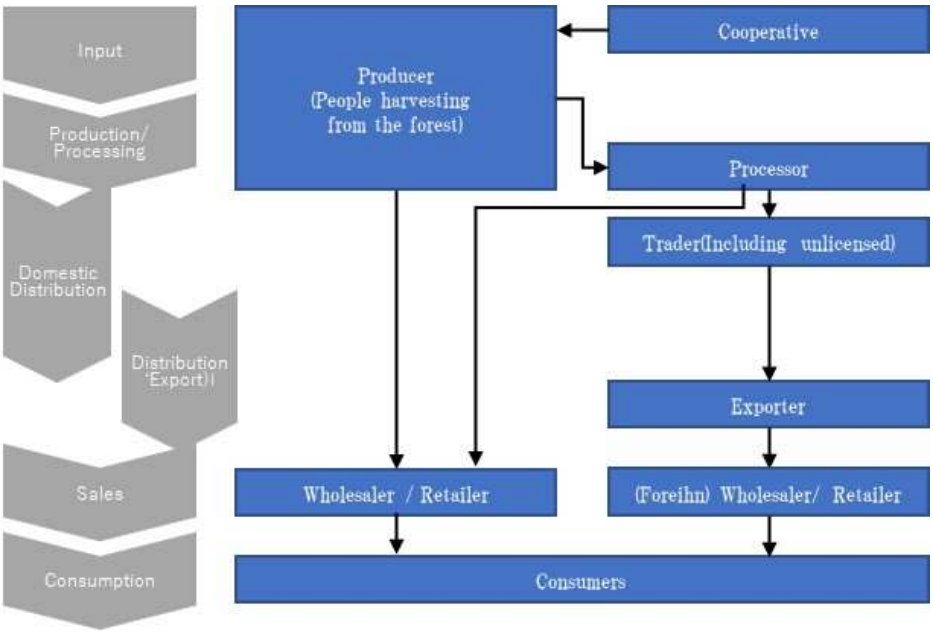
In Ethiopia, there are no cooperatives for spices, and producers generally distribute their products directly to brokers, traders, and markets, or wholesalers. Many of the traders are unlicensed, and while licensed traders are treated as taxable, unlicensed traders have the advantage of not being taxed, which allows them to lower their prices, creating uncertainty in business practices. There are also many traders who are short of funds, and from this situation, producers are at risk of trading with no income guarantee (Wubalem Gobie, (2019)).



Source: JICA Research Team based on A report on value chain analysis of turmeric, HVAP, (2011), Sileshi (2011), Dessie et al. Economic Structures (2019)

Figure 3.1.11 Spice Value Chain in Ethiopia

As for Ethiopian spices, there is no union, etc., and it is common for each producer to distribute directly to brokers, traders, markets, or wholesalers. Traders are often unlicensed, and licensed traders are treated as taxable, while unlicensed traders have the advantage of lowering the price of buying and selling that is not subject to taxation, which is distorted. There are also many underfunded traders, and under these circumstances, producers cannot get income guarantees. risk of (Wubalem Gobie, (2019))。



source: JICA Research Team based on A report on value chain analysis of turmeric, HVAP, (2011), Sileshi (2011), Dessie et al. Economic Structures (2019)

Figure 3.1.12 Spice Value Chain in Ethiopia

d. Key Stakeholders

Key stakeholders include producers, local traders, processors, urban wholesalers, retailers, and exporters to foreign markets.

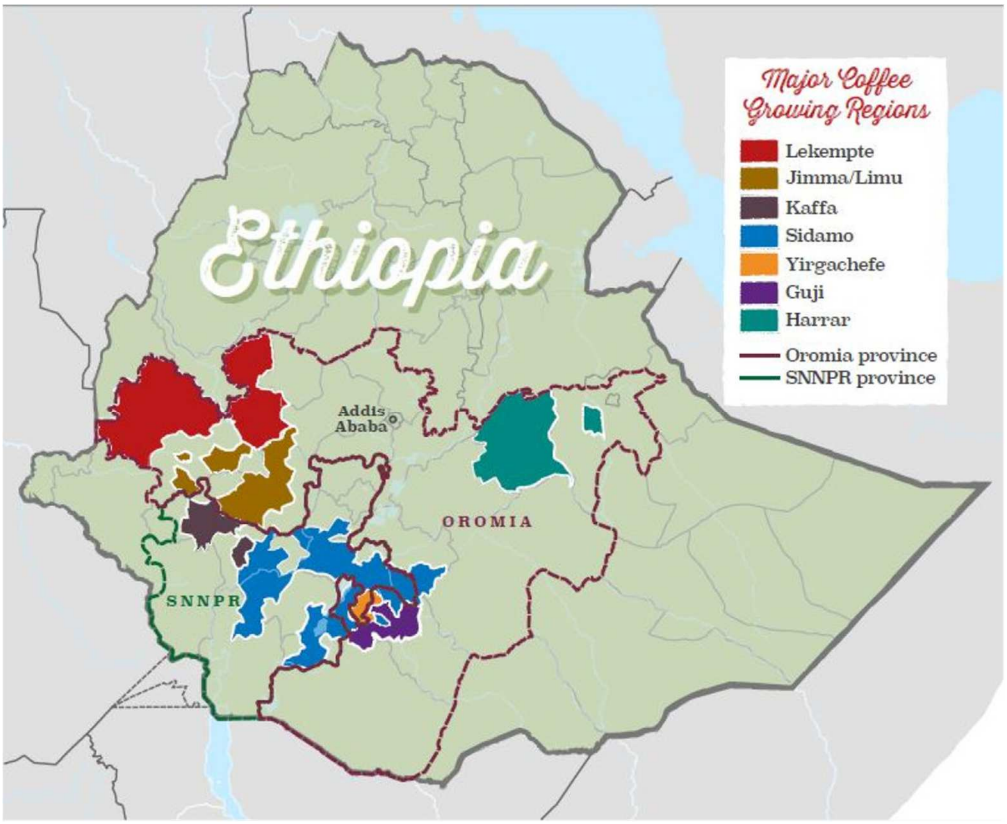
7) Coffee

a. Crop Season (cropping calendar)

Ethiopia			cropping type					cropping calendar											
production volume of major crops (t/yr) 2016-2018 average			Planting period - onset	Planting period - end	Harvesting period - onset	Harvesting period - end	Length of the cropping cycle	1	2	3	4	5	6	7	8	9	10	11	12	note
7	Coffee	475,455	July - August		winter		a few months	↔	↔										↔	Oromia Region
								: sowing												
								↔ : harvesting (all-year harvesting is not shown)												

b. Production Area

Coffee is native to Ethiopia and has six famous production areas as follows.



Source: https://jonesbrotherscoffee.com/en/blog/ethiopia-a-whole-world-of-coffee-in-one-country-pt-2

Figure 3.1.13 Ethiopia's Leading Coffee Producing Regions

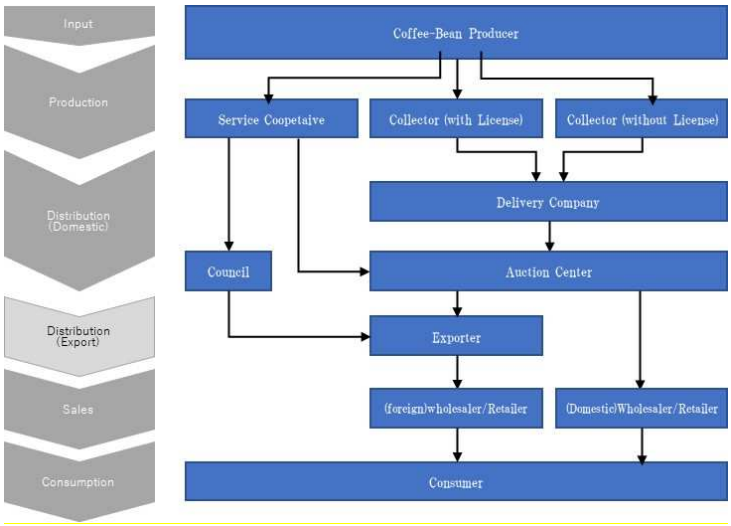
Among these production areas, especially worldwide, varieties ilgachefe and fern mo are prominent, and oromia is considered appropriate as a survey subject. In particular, it is valuable to clarify FVC including processing, distribution, sales, and export routes.

c. Value Chain

There are two main distribution structures for the coffee produced.

The first is for sale in overseas markets through export businesses via coffee service unions and councils, and the second is for transport to markets (auction centers) in the capital city of Addis Ababa via collectors (there are unlicensed businesses as well as license holders), domestic wholesale businesses, and then to export businesses for The products are then sold to overseas consumers.

In addition, there is a tendency for coffee beans that have not reached export quality at the market (auction center) to be distributed domestically (the United States Agency for International Development, (2010)).



Source: JICA Research Team based on the United States Agency for International Development, (2010), Jima Degaga (2020)

Figure 3.1.14 Coffee Value Chain in Ethiopia

d. Key Stakeholders

Key stakeholders include producers, cooperatives, brokers, local traders (relatively small wholesalers), collectors (pickup operators), processing operators, large urban wholesalers, retailers, local markets, central markets, and exporters.

3.1.3 Impacts of COVID-19 on FVC and Underlying Factors

Value chain of each target crop in Ethiopia is studied and analyzed in terms of its overall impact on FVC, its context and factors, and changes in FVC. First, an overview of the impact of COVID-19 on FVC based on the literature review is presented.

Impact of COVID-19 on FVC and its literature review

A questionnaire survey has already been conducted in the JICA's "Information Collection and Confirmation Survey on the Construction of Agricultural Digitalization Infrastructure in Africa", mainly regarding agriculture-related governmental and public organizations, international aid agencies, and agriculture-related start-up companies.

The most important question is "What are the major impacts and challenges of COVID-19 on agriculture and food value chains? The biggest impact was on distribution (logistics and storage), followed by price instability of produced agricultural products, shortage of inputs (including financial system), malfunctioning of retail outlets, and difficulties in concluding long-term supply contracts.

The following sections describe the overall impact of each crop on FVC, its background and factors, and the changes in each VC.

(1) Impacts on Respective Crop FVC: Rice[9]

1) Impacts on FVC of Respective Crop

The impact of rice on the overall VC is high in the input process, the processing and sales process.

Production declined because of delays in fertilizer supply due to traffic restrictions and behavioral restrictions. Production is not keeping up with demand, and as a result, distribution and sales prices are skyrocketing. On the other hand, some retailers have reduced their sales revenue by 16.7% year-on-year.

[9] Analysis based on field surveys (results of field interviews from 20 rice-related entities (20 persons). (Same for Section 3.1.4 below)

In addition, as a consumption trend, in response to the soaring price of Teff, which is a crop mixed with Ethiopian staple food "Injera," there is a change in substituting rice for Teff.

Table 3.1.7 Effects of Rice on each VC stage

VC stage	2020		2021		Background and Factors	Season
	Degree of Influence	Influence	Degree of Influence	Influence		
Input	Large	Decrease in sales volume and supply volume	Large	Decrease in sales volume and supply volume	Due to restrictions on movement and activities, there are delays in the supply of fertilizers, making it impossible to grow rice at the right time. In addition, it has become difficult for growers to purchase seeds and other products.	2020 2nd season - Present
Production	Medium	・ Slight decrease in production volume ・Increase in production cost	Small	Slight decrease in production volume	The transportation restrictions caused by COVID-19 caused market inflation, which increased the cost of production, but by 2021, the market was returning to its pre-COVID-19 level (as of August 2021).	2020 2nd season - 2020 3rd season
Processing	Large	Decrease in processing volume and sales volume	Medium	Decrease in processing volume and sales volume	Due to the COVID-19 shock, the supply of raw materials was not sufficient in both 2020 and 2021, resulting in a decline in both processing and sales volumes, but the processing volume is on a recovery trend in 2021.	2020 2nd season - 2021 1st season
Distribution	Large	Decrease in domestic distribution	Large	Decrease in domestic distribution	COVID-19 Distribution volume temporarily decreased due to the blockade and movement restrictions around the beginning of the spread of the epidemic (March and April 2020), and distribution volume was not sufficient until June 2021.	2020 2nd season - 2021 2nd season
Sales	Medium	Decrease in sales volume	Small	Decrease in impact as noted on the left	Movement restrictions and lockdowns forced dealers, who are wholesalers of rice, to temporarily close their doors, leading to a decrease in sales (assessment limited to the impact of COVID-19).	2020 2nd season - 2020 4th season
Consumption	Medium	Decrease in consumption	Small	Decrease in consumption	As in the case of sales, the temporary closure of dealers (retail/restaurants) made it temporarily impossible to purchase rice, in addition to the impact of rising prices, leading to a decrease in consumption (assessment limited to the impact of COVID-19).	2020 2nd season - 2020 4th season

Note: Large: major negative impact; Medium: negative impact; Small: no or small impact; -: not applicable.
The degree of impact was rated based on the results of the key informant survey and the questionnaire survey, taking into account the results of the field survey.
Source: JICA research team based on Results of Key Informant Interview, Results of VC Study.

2) Change of VC Flow

As a change in the flow of the rice value chain, the supply of fertilizers and pesticides became insufficient during the rice cultivation period, which led to a decrease in rice cultivation due to the influence of traffic restrictions and behavior restrictions due to the influence of COVID-19. It can be mentioned that there was inflation in Ethiopia is increasing, the distribution volume is limited, and some point out that the cost of rice cultivation will increase. The prices of imported fertilizers and pesticides are also rising, and domestic rice production costs continue to increase. On the other hand, domestic demand for rice is increasing year by year, and supply is not catching up. The price of imported rice is also rising because of inflation and other factors. Along with the slight decrease in production, the overall VC process that followed has also been affected.

In addition, there are voices pointing out the impact on rice milling machines and other products purchased from overseas due to overall market inflation and foreign exchange restrictions.

While some respondents saw the distribution and wholesale of domestic rice as an opportunity due to the impact of rising prices of imported rice, movement restrictions and lockdown forced the retailers of rice to be temporarily closed for sale. There was also a time when the amount decreased.

In the consumption process, rice prices have risen, but are still cheaper than imported rice, and rising prices for Teff and other crops have led consumers to prefer rice that is simply mixed to make injera. Changes were seen.

Rice Growing Environment in Northern Ethiopia (Amhara Region)

Rice processing plant (rice mill) and processing (milling) process in Ethiopia.

(2) Impacts on Respective Crop FVC: Wheat[10]

1) Impacts on FVC of Respective Crop

The impact of wheat on VC is high in the input process, production, and processing / sales process.

Production declined, especially in the second season of 2020, because of delays in fertilizer supply due to traffic restrictions and behavioral restrictions, as well as natural disasters. As a result, the amount of processing has decreased, but it has not caught up with demand, and as a result, distribution and sales prices have skyrocketed. In addition, the wholesale market and retail stores were temporarily closed due to the impact of COVID-19. On the other hand, sales revenue has decreased by 20% to 40% from the previous year. Additionally, as for the consumption form, in response to the soaring price of Teff mixed with "Injera", which is the staple food of Ethiopia, there is a change in the consumption form such as replacing it with wheat.

[10] Analysis based on field surveys (results of field interviews from 24 wheat-related entities (24 persons). (Same for Section 3.1.4 below)

Table 3.1.8 Effects of wheat on each VC

VC stage	2020		2021		Background and Factors	Season
	Degree of Influence	Influence	Degree of Influence	Influence		
Input	Large	Decrease in sales volume	Large	Decrease in sales volume	Restrictions on action to prevent the spread of COVID-19 resulted in the lack of fertilizers, pesticides, and seeds, and inadequate sowing in some areas.	2020 2nd season- preset
Production	Large	decrease in production volume	Medium	decrease in production volume (Slight recovery from 2020)	As in the background above, the impact of inadequate sowing conditions, coupled with unfavorable weather conditions, led to a decline in production; by 2021, the impact was somewhat contained.	2020 2nd season- 2020 4th season
Processing	Large	Decrease in processing volume and sales volume	Large	Decrease in processing volume and sales volume	As in the background above, in addition to the impact of insufficient supply of raw materials, unfavorable weather conditions resulted in a decrease in processing and sales volume.	2020 4th season – 2021 1st season
Distribution	Large	・Decrease in domestic distribution ・Soaring wholesale prices	Large	・Decrease in domestic distribution ・ Soaring wholesale prices	- In addition to a decrease in the supply of wheat due to a decline in production and processing, distribution volume decreased due to logistical restrictions. - On the other hand, the growing demand for grains led to a sharp rise in wholesale prices.	2020 2nd season – 2021 2nd season
Sales	Medium	Decrease in sales volume	Small	Decrease in impact as noted on the left	Sales volume declined due to the impact of market closures and lower wheat production (assessment limited to the impact of COVID-19).	2020 2nd season- 2020 4th season
Consumption	Medium	Increase in demand	Medium	Increase in demand	Consumer demand has increased relative to the decline in production, causing prices to spike (assessment limited to COVID-19 impacts).	2020 2ndseason - present

Note: Large: major negative impact; Medium: negative impact; Small: no or small impact; -: not applicable.
The degree of impact was rated based on the results of the key informant survey and the questionnaire survey, taking into account the results of the field survey.
Source: JICA research team based on Results of Key Informant Interview, Results of VC Study.

2) Change of VC Flow

Changes in the flow of the wheat value chain include traffic restrictions and behavioral restrictions due to the effects of COVID-19, especially in the early stages of COVID-19 and after the beginning of 2021 when sowing, due to a shortage of fertilizers and pesticides. Since it happened, the seeding amount tended to decrease. Inflation is progressing throughout Ethiopia, and some have pointed out rising prices for fertilizers, pesticides, and seeds.

Apart from the impact of COVID-19, in terms of production, the occurrence of a natural disaster (flood due to heavy rain) in the first seeds of 2020 also caused a decrease in production, in addition to the same background as the introduction in the previous stage. This also applies to processing stage.

For distributors and wholesalers, in addition to the decrease in production volume, traffic restrictions restricted transactions, resulting in a decrease in distribution volume. On the other hand, due to rising demand, prices have risen, especially in the third and fourth seasons of 2020, according to several business interviews.

As for consumption, supply continues to be unable to keep up with ever-increasing demand, and prices are rising. Some interviews said that behavioral restrictions reduced eating out, increased self-catering, and increased household costs for wheat, teff, rice, and broad beans due to market inflation.

Wheat distribution (warehouse) operators and wheat millers

(3) Impacts on Respective Crop FVC: Teff[11]

1) Impacts on FVC of Respective Crop

The impact of rice on the overall VC is high in the input process, the processing and sales process.

Production declined because of delays in fertilizer supply due to traffic restrictions and behavioral restrictions. Production is not keeping up with demand, and as a result, distribution and sales prices are skyrocketing. On the other hand, some retailers have reduced their sales revenue by 16.7% year-on-year. In addition, as a consumption trend, in response to the soaring price of Teff, which is a crop mixed with Ethiopian staple food "Injera," there is a change in substituting rice for Teff.

Table 3.1.9 Effects of Teff on each VC stage

VC stage	2020		2021		Background and Factors	Season
	Degree of Influence	Influence	Degree of Influence	Influence		
Input	Medium	-Little impact on domestic businesses - Import businesses will be hit by inventory shortages due to import regulation	Medium	-Little impact on domestic businesses - Import businesses will be hit by inventory shortages due to import regulation	- The Farmer'scooperative experienced a 20% price increase in fertilizers and pesticides, but the price has since settled down. The Cooperatives Union, a group of agricultural cooperatives, is in charge of the distribution of inputs, and due to government restrictions on imports and exports, there has been a shortage of agricultural inputs such as fertilizers and agricultural chemicals since March 2020. - As an alternative, the purchase of inexpensive domestic agricultural materials is on the rise.	2020 2nd season-2020 4th season
Production	Small	No Impact	Small	No Impact	There is no impact of COVID-19, and inflation of 10-20% is occurring, but it is being passed on in prices.	-
Processing	Medium	Temporary decrease in processing volume	Small	Almost no Impact	Government policy has led to a temporary shutdown of operations, but other than that, the impact has been minimal. In fact, sales and profits in 2020 and 2021 are expected to be higher than in 2019.	2020 2nd season - 2020 3rdh season
Distribution	Large	Increase in wholesale	Large	Increase in wholesale	- Due to internal conflicts and movement restrictions in major teff producing regions,	2020 2nd season -

[11] Analysis based on field surveys (results of field interviews from 2' Teff-related entities (27 persons).Same for Section 3.1.4 below)

		price of teff (approximately doubled in the last two years)		price of teff (approximately doubled in the last two years)	- teff can only be sold in markets within each region, and the volume of teff distributed is not keeping pace with consumer demand. - There are reports that some wholesalers are stocking up on inventory, causing market prices to soar. - Some wholesalers are stocking up, and we have heard that market prices are rising..	2021 1st season
Sales	Medium	- Sales of raw material teff flour - Soaring retail prices	Medium	- Sales of raw material teff flour - Soaring retail prices	As the supply of teff has decreased, the raw material teff flour has been sold at retail stores. The retail price of teff flour has increased by more than 25% due to rising material costs, inflation and other factors.	2020 season 2nd - 2021 season 2nd
Consumption	Large	Increase in consumption of other grains	Large	Increase in consumption of other grains	Ethiopian farmers began to substitute wheat, maize and rice for the teff used to make injera, a staple food in Ethiopia.	2020 season 2nd - present

Note: Large: major negative impact; Medium: negative impact; Small: no or small impact; -: not applicable.
The degree of impact was rated based on the results of the key informant survey and the questionnaire survey, taking into account the results of the field survey.
Source: JICA research team based on Results of Key Informant Interview, Results of VC Study.

2) Change of VC Flow

Changes in the flow of Teff value chain, fertilizers and pesticides that previously depended on imports were affected by import and export restrictions due to the influence of COVID-19, leading to supply shortages and soaring prices in Japan. First, it has come to use agricultural materials such as fertilizers and pesticides with low quality in Japan.

Moreover, although it is not related to COVID-19, internal conflicts are occurring in Teff's main production areas, Teff is only available in local markets and supply is in short supply, and inflation in Ethiopia is spurred. It can be mentioned that the distribution volume is limited. Some major trading companies have a large inventory, and some say that they may have inventory in anticipation of high-priced sales due to their rarity (not confirmed).

Under these circumstances, distribution / wholesale businesses were also able to obtain sales from multiple business interviews through measures to develop new suppliers.

Furthermore, in the consumption process, the main dish of Ethiopia, "Injera," has undergone changes in consumption and cooking methods, such as replacing Teff mixed with Injera with wheat, rice, etc., due to soaring Teff prices. It was seen.

Ingredients of teff and the dish "injera" made from teff[12]

[12] https://lourand.com/magazine/superfood-teff/

(4) Impacts on Respective Crop FVC: Onion[13]

1) Impacts on FVC of Respective Crop

Onions are highly affected throughout the VC.

The decrease in input materials has led to a decrease in production. On the other hand, after the period of movement restrictions, consumers passed onions to grains, which are staple foods, due to their relative high prices, resulting in a decrease in purchases, and a decrease in domestic demand on the consumer side, resulting in production. It is greatly linked to the reduction of the surface.

Export demand is also limited, and wholesalers and then distributors such as retailers have been hit hard.

Table 3.1.10 Effects of onions on each VC stage

VC stage	2020		2021		Background and Factors	Season
	Degree of Influence	Influence	Degree of Influence	Influence		
Input	Large	- Decrease in the amount of agricultural materials purchased - Change in the situation to purchase cheaper agricultural materials	Medium	- Decrease in the amount of agricultural materials purchased - Change in the situation to purchase cheaper agricultural materials	- The 2020 movement restrictions have made it physically difficult for many farmers to buy agricultural materials, and the volume of purchases has decreased. - Even after the movement restrictions were lifted, the amount of agricultural materials (e.g., pesticides) purchased and the needs for them have gradually decreased. - On the other hand, the demand for purchasing inexpensive agricultural materials is increasing."	2020 2nd season - 2021 1st season
Production	Large	Drastic decrease in production volume	Medium	Decrease in production volume	- As a result of the shortage of agricultural materials, the price of onions had to be raised, but as a result of decreased demand from consumers, onions are no longer sold. - However, the price of onions is still falling, and many small farmers are trying to make a living by switching their crops to tomatoes, cabbages, and papayas, according to this serious situation.	2020 2nd season - 2020 4th season (The effects continue after that)
Processing	-	No Processing	-	No Processing	-	-
Distribution	Large	- Decrease in distribution volume due to decrease in production - Decreased demand from retailers and consumers due to decreased purchase volume by domestic consumers - The resulting pressure on management (sales and profits)	Large	- Decrease in distribution volume due to decrease in production - Decreased demand from retailers and consumers due to decreased purchase volume by domestic consumers - The resulting pressure on management (sales and profits)	- As a result of the restrictions on movement, the distribution of onions has been limited to the region, and consumer demand for onions has declined. As a result, some onion farmers have switched to other crops. - As a result of the decline in supply and the number of customers, there were many wholesale businesses that saw their sales and profits drop by one-half and even one-fifth compared to 2019. - Logistics costs have also risen (economies of scale), although it used to be common to use animal cargo to transport crops due to their heavy nature.	2020 2nd season - present
Sales	Medium	-Decreased sales volume and product lineups due to insufficient supply of agricultural products -Decline in sales and	Medium	-Decreased sales volume and product lineups due to insufficient supply of agricultural products -Decline in sales and	- At retail stores, procurement of agricultural products has become difficult due to the decrease in production volume, and the sales volume has decreased (by about 30% to 50%) due to the decline in consumer needs. - In the case of restaurants, the number of users disappeared when movement was restricted, and the business was hit hard for a while.	2020 2nd season - 2021 1st season

[13] Analysis based on field surveys (results of field interviews from 38 onion-related entities (38 persons).Same for Section 3.1.4 below)

		profits		profits		
Consumption	Large	tendency to purchase low-priced products	Medium	Slight tendency to purchase low-priced products	A temporary decrease in household income was seen as people were forced to take a leave of absence. There were also people who lost their jobs.	2020 2nd season -2020 3rd season

Note: Large: major negative impact; Medium: negative impact; Small: no or small impact; -: not applicable.
The degree of impact was rated based on the results of the key informant survey and the questionnaire survey, taking into account the results of the field survey.
Source: JICA research team based on Results of Key Informant Interview, Results of VC Study.

2) Change of VC Flow

Changes in the flow of onion value chain were prominent in Ethiopia. Due to movement restrictions and import / export bans around April 2020, imports of pesticides and seedlings were cut off, and producers could no longer secure their production volumes.

Simultaneously, consumer tastes due to movement restrictions shifted to cereals, consumer needs for onions became lower, and prices at retail stores began to fall.

Due to the above-mentioned impact on production on the upstream side and the situation on the consumer / retail side on the downstream side, distributors also suffered management damage such as a large decline in sales and profits. Twice

Onions may be shifting from onions to other vegetables and fruits (tomatoes, cabbage, papaya, etc.), and onion exports to neighboring countries such as Sudan and Jibuchi may be stagnant. Therefore, it is expected that the decrease in domestic demand for onions will continue for the time being.

Onion collection sites and onion retailers

(5) Impacts on Respective Crop FVC: Broad Beans[14]

1) Impacts on FVC of Respective Crop

It can be said that the impact of broad beans on VC is increasing at all VC stages. Demand for consumption is also declining.

Due to delays in fertilizer supply due to traffic restrictions and behavioral restrictions, production has declined from the second season of 2020 to the third season of 2021. In addition, due to this effect, the amount of processing has decreased, but it has not caught up with demand, and as a result, distribution

[14] Analysis based on field surveys (results of field interviews from 21 broad bean elated entities (21 persons). (Same for Section 3.1.4 below)

and sales prices have skyrocketed.

Due to the temporary closure of wholesale markets and retail stores due to the influence of COVID-19, the distribution volume decreased. The selling price is about 1.8 to 2 times. In addition, due to the impact of rising prices of broad beans, changes in people's tastes have emerged, and demand has flowed to other crops, leading to a tendency for demand to decline.

Table 3.1.11 Effects of broad beans on each VC stage

VC stage	2020		2021		Background and Factors	Season
	Degree of Influence	Influence	Degree of Influence	Influence		
Input	Large	Decrease in sales volume	Medium	Decrease in sales volume	The supply of seedlings, fertilizers and pesticides has been reduced by the transportation and movement regulations, and the transportation cost has been increased.	2020 2nd season - 2020 4tt season (The effects continue after that)
Production	Medium	Decrease in production volume	Medium	Decrease in production volume	The combination of the operational restrictions, inadequate financial support for agriculture, and the situation that the amount of inputs is not enough and the weather is not enough to reduce the production volume.	2020 2nd season - 2020 4th season (The effects continue after that)
Processing	Medium	Decrease in processing volume	Medium	Decrease in processing volume	The period when the logistics and trade are closed by the logistic and operational restrictions and the additive processors are closed to the business and the business and market are stopped is a period of time.	2020 2nd season - 2021 1st season
Distribution	Large	Decrease in distribution volume due to reduced consumer demand	Large	Decrease in distribution volume due to reduced consumer demand	In the same context, the closed market of logistics and trade with the above-mentioned logistic and operational restrictions has been stopped, and the volume of distribution has been reduced and the quantity in stock has been increased by the decrease in demand (nowadays, it is in progress).	2020 2nd season - 2020 4th season (The effects continue after that)
Sales	Medium	Decrease in sales volume	Medium	Decrease in sales volume	In the same context, the market is closed and the sales volume is reduced due to the lockdown of the market and movement regulation.	2020 2nd season - 2021 1st season
Consumption	Large	Decrease in domestic consumption	Large	Decrease in domestic consumption	In addition, the demand for broad beans are decreasing due to the change in consumer preferences and the decrease in demand for broad beans.	2020 2nd season – present

Note: Large: major negative impact; Medium: negative impact; Small: no or small impact; -: not applicable.
The degree of impact was rated based on the results of the key informant survey and the questionnaire survey, taking into account the results of the field survey.
Source: JICA research team based on Results of Key Informant Interview, Results of VC Study.

2) Change of VC Flow

As for changes in the flow of the broad bean value chain, there was a tendency for the supply of fertilizers and pesticides to be delayed and the amount of agricultural input to decrease due to the effects of traffic restrictions and behavioral restrictions due to the effects of COVID-19. Inflation is progressing throughout Ethiopia, and many voices have pointed out that prices of fertilizers, pesticides and seeds are rising through interviews with multiple businesses.

In terms of production, in addition to the same background as the input in the previous stage, the occurrence of a natural disaster (flood due to heavy rain) in the first seeds of 2020 is also a major cause of the decrease in production. This also applies to processing. In addition, import / export restrictions due to the impact of COVID-19 and temporary closure of logistics and trade due to lockdown made it difficult to obtain additives for processing, leading to a decrease in processing volume.

For distributors and wholesalers, transactions were limited due to traffic restrictions in addition to the

decrease in production volume, resulting in a decrease in distribution volume. However, as inflation progressed, demand also decreased, and distribution volume and sales Both quantities decreased.

According to an interview survey, consumers' necessities have changed due to rising prices of broad beans and changes in lifestyles of refraining from going out, and demand for broad beans is declining.

(6) Impacts on Respective Crop FVC: Spices (Chili Sauce)[15]

1) Impacts on FVC of Respective Crop

Various spices are produced in Ethiopia. Among them, chili sauce is expected as a craft crop for export in the future, that is, a cash crop for obtaining foreign currency.

The impact of COVID-19 on VC is limited, and the decrease in temporary processed products due to the suspension of factory operations by the government in the processing process, and the sales of wholesalers in the distribution process affected by the decrease. There were effects of a provisional decrease and soaring distribution costs.

Table 3.1.12 Effects of chili sauce on each VC stage

VC stage	2020		2021		Background and Factors	Season
	Degree of Influence	Influence	Degree of Influence	Influence		
Input	Small	Almost No Impact	Small	No Impact	Seeds and seedlings were slightly more difficult to obtain when there was an import/export ban.	2020 2nd season
Production	Small	No Impact	Small	No Impact	There was no particular impact of COVID-19 on production.	-
Processing	Medium	Gradual decrease in processing volume (annual income)	Medium	Gradual decrease in processing volume (annual income)	- Restrictions on movement caused temporary shutdowns of factories, which reduced sales for the entire year. - Processed finished products were temporarily difficult to obtain, and during this time, wholesale operations were delayed, resulting in a decrease in sales.	2020 2nd season
Distribution	Large	- Decrease in volume of processed food distribution - Increase in logistics costs - Decrease in export volume	Medium	- Decrease in volume of processed food distribution - Increase in logistics costs	- Logistics costs became higher during the period of movement restrictions. - There was a time when we could not sell to overseas markets due to import and export restrictions.	2020 2nd season - 2020 3rd season
Sales	Small	No Impact	Small	No Impact	During the lockdown, cafes and restaurants were closed and domestic demand temporarily decreased, but export demand increased.	-
Consumption	Small	Temporary difficulty in obtaining products for domestic (and foreign) consumers	Small	Temporary difficulty in obtaining products for domestic (and foreign) consumers	- Although the coffee is sold domestically, consumers had difficulty buying the product due to distribution problems. - The final product is also sold for export, but exports gradually decreased when import/export restrictions were imposed.	2020 2nd season – 2020 3rd season

Note: Large: major negative impact; Medium: negative impact; Small: no or small impact; -: not applicable.
The degree of impact was rated based on the results of the key informant survey and the questionnaire survey, taking into account the results of the field survey.
Source: JICA research team based on Results of Key Informant Interview, Results of VC Study.

2) Change of VC Flow

As for changes in the flow of chili sauce has not seen in much between before the outbreak of COVID-19 and the time when the infection spread.

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[15] Analysis based on field surveys (results of field interviews from 18 Chili Sauce elated entities (18 persons).Same for Section 3.1.4 below)

However, chili sauce requires processing, and in response to the order to suspend factory operations and the order to ban imports and exports as a government measure during the spread of COVID-19 infection from April to June 2020, the processing process It has been affected by the suspension of operations, the resulting stagnation of distribution processes, and the increase in distribution costs due to movement restrictions.

(7) Impacts on Respective Crop FVC: Coffee[16]

1) Impacts on FVC of Respective Crop

Demand for Ethiopian coffee beans is increasing year by year from home and abroad. Although the handling volume temporarily decreased in processing and distribution due to behavioral restrictions and labor restrictions due to the influence of COVID-19, it is increasing at a rate higher than the previous level at all VC stages, and overall It can be said that it is a crop that has little effect on.

Table 3.1.13 Effects of coffee on each VC stage

VC stage	2020		2021		Background and Factors	Season
	Degree of Influence	Influence	Degree of Influence	Influence		
Input	Small	No Impact	Small	No Impact	No increase or decrease in inputs due to the impact of COVID-19 was observed.	-
Production	Small	Almost No Impact	Small	No Impact	There was a slight decrease in the production area due to movement restrictions and consequent labor restrictions.	-
Processing	Small	Slight decrease in processing volume	Small	Slight decrease in processing volume	The amount of processing has gradually decreased due to restrictions on raw materials such as packaging materials, and due to labor and movement restrictions that forced businesses to temporarily suspend operations.	2020 1st season - 2020 2nd season
Distribution	Medium	Decrease in export volume	Small	Almost No Impact	Due to reduced imports/exports and movement restrictions, trading and distribution businesses were temporarily suspended, resulting in a decrease compared to pre-Corona levels, but have since recovered from the impact as they are above previous levels.	2020 1std season - 2020 3rd season
Sales	Small	-Decrease in domestic/ foreign sales volume -Increase in domestic/foreign consumers' demand	Small	-Decrease in domestic/ foreign sales volume -Increase in domestic/foreign consumers' demand	The lockdown caused a temporary drop in domestic coffee demand as cafes and restaurants were closed, but export demand has since increased.	2020 1st season – present
Consumption	Small		Small		No increase or decrease in domestic or international consumer consumption was observed.	-

Note: Large: major negative impact; Medium: negative impact; Small: no or small impact; -: not applicable.
The degree of impact was rated based on the results of the key informant survey and the questionnaire survey, taking into account the results of the field survey.
Source: JICA research team based on Results of Key Informant Interview, Results of VC Study.

2) Change of VC Flow

Regarding coffee, the change in VC has not seen much between before the outbreak of COVID-19 and the time when the infection spread.

However, at the processing stage, the operation of the processing process will be suspended due to the effects of orders to suspend factory operations and restrictions on people's actions as a government measure during the period of COVID-19 infection spread from January to March 2020. It is also affected by the temporary closure of wholesalers and the temporary decrease in demand due to the closure of restaurants and cafes to which it sells. Both are temporary effects and have recovered and expanded to

[16] Analysis based on field surveys (results of field interviews from 17 coffee related entities (17 persons).Same for Section 3.1.4 below)

the previous level or higher since April 2020.

Collection sites and packaging of coffee beans

3.1.4 Influence on each VC Stage

(1) Overview of Influence on FVC

The impact of the spread of COVID-19 infection, its background, and the timing of the impact were analyzed for each of the six processes from input to consumption in the value chain of agricultural products in Ethiopia. Focus on each process to deepen analysis and consideration with following summary table.

Table 3.1.14 Overview of Influence by each FVC stage

VC	influence	background	Season
Investment	Decrease in supply of agrochemicals, seeds and seedlings (decrease in imports from overseas) and decrease in domestic sales	・ Smooth import and inhibition of agricultural materials due to government import and export restrictions ・ Increase in production costs due to price transfer to agricultural materials due to rising prices	・ Mainly the second and third seasons of 2020 (some agricultural materials continue until September 2021) 2021 1st season - present
Production	Decrease in yield and yield Crop conversion Loss after harvest	・ As mentioned above, production volume decline due to insufficient input Agricultural resources for inflation	・ The first to second seasons of 2020
Processing	Reduced plant utilization rate in the machining process	Decrease in production due to lack of input goods, overall decline in supply of agricultural products due to domestic inflation, etc.	From the second season in 2020 to the third season in 2021 (current)
Distribution	Sharp decline in the volume of agricultural products and foods handled	Due to movement restrictions, import and export restrictions, etc., the absolute amount of distribution of agricultural products, etc. decreased, butCOVID-19 Although it is not related to the company, the multilayered distribution structure has made it difficult to secure suppliers and to develop new sales destinations.	・ As a direct impact, the second season of 2020 to the third season (indirectly, distribution vulnerabilities continue)
Sale	Decrease in sales volumes	・ Due to the above-mentioned similar background and the influence of the VC front stage, the amount of crops that can be sold decreased ・ Opportunity loss due to temporary closure of retail	2nd season 2020 3rd season 2020
Consumption	Consumption declines	・Decrease in household income ・ Consumption decreased due to the influence	2021 1st season – present

	Increase in low-cost crop consumption	of the price increase of crops due to inflation ・Expenditures increased	2021 1st season – present 2021 1st season – present

Source: JICA research team based on Results of Key Informant Interview, Results of VC Study.

S/N	Value Chain Process	Crops/# of respondents							Total
		Rice	Teff	Wheat	Broad bean	Coffee	Onion	Chili Sause(Chilli)	
A	**VC Survey**								
1	Inputs	1	1	1	1	1	1	1	**7**
		3	3	4	3	2	6	1	**22**
		300%	300%	400%	300%	200%	600%	100%	314%
2	Production	10	10	10	10	10	10	10	**70**
		8	9	12	10	3	12	3	**57**
		80%	90%	120%	100%	30%	120%	30%	81%
3	Processing	2	2	2	2	2	2	2	**14**
		3	3	2	2	2	0	2	**14**
		150%	150%	100%	100%	100%	0%	100%	100%
4	Distribution	2	2	2	2	2	2	2	**14**
		4	5	4	0	3	7	1	**24**
		200%	250%	200%	0%	150%	350%	50%	171%
5	Retailing/Sales	1	1	1	1	1	1	1	**7**
		2	4	2	2	3	4	7	**24**
		200%	400%	200%	200%	300%	400%	700%	343%
6	Consumption	3	3	3	3	3	3	3	**21**
		0	3		4	4	9	4	**24**
		0%	100%	0%	133%	133%	300%	133%	114%
	Grand Total	**20**	**27**	**24**	**21**	**17**	**38**	**18**	**165**
B	**Key Informant Survey**								
1	Financial Institution	1	-	1	2	-	-	-	**4**
2	Government Office	-	-	2	3	5	2	5	**17**
3	Government Institution	-	-	-	-	1	-	-	**1**
4	Business Association	-	-	-	-	-	-	1	**1**
5	NGOs	-	-	-	-	-	-	-	**-**
6	Research Institution	-	-	-	-	-	-	-	**-**
7	Logistic/Warehouse	-	-	1	-	-	-	-	**1**
8	Technology Center	-	-	-	-	-	-	-	**-**
9	Farmers' Organization	-	-	1	-	-	1	-	**2**
	Total	**1**	**-**	**5**	**5**	**6**	**3**	**6**	**26**
	Grand Total	**21**	**27**	**29**	**26**	**23**	**41**	**24**	**191**

Note: The % for "A Value Chain Survey" represents the achievement of the originally intended survey sample size, and the number for "B Key Informant Survey" represents the number of survey sample.

Source: JICA Research Team

Figure 3.1.15 Number of survey samples for each crop

(2) Impacts on Input Stage and Underlying Factors

1) Overview

The input process is procuring and selling pesticides, fertilizers, agricultural machinery, seeds/ seeds, seeds, etc.

Due to the influence of COVID-19, especially high-quality pesticides (grains such as Teff) and seeds / seedlings (rice, onions, etc.) are imported from overseas countries.

A major factor in the impact of COVID-19 is that high-quality pesticides and seeds cannot be imported

due to import / export restrictions. As a result, it became difficult to import pesticides and seeds from April to September 2020, leading to a decline in the production and productivity of various agricultural products, but it has recovered temporarily from 2021.

However, inflation in Ethiopia has brought about soaring prices of agricultural materials from the latter half of 2020, and until September 2021, the number of farmers who do not purchase cheap agricultural materials in Ethiopia or agricultural materials is increasing.

2) Change of sales

According to the field survey, the sales volume of agricultural materials has decreased from at least 20% to 50%, but this is largely due to inflation of the domestic economy, and the price is not necessarily due to the influence of COVID-19 such as import restrictions. The period of soaring is limited to the period around April-September 2020.

The main sales destinations are agricultural production associations (Farmer Cooperative), agricultural production federations (Cooperative Union), and independent farmers, but there is no change in this either. However, there was also a tendency for farmers to try to reduce production costs by not using agricultural materials.

3) Change of procurement

First, agricultural materials that depended on imports from overseas such as pesticides and high-quality seeds and seedlings became extremely difficult to procure in mid-2020, and there were signs of improvement in import procurement in 2021.

However, farmers who are suppliers tend to procure imported agricultural materials from high-quality materials (e.g. European countries) to cheaper agricultural materials (e.g. China), and some agricultural production from the beginning of 2021. It is seen in federations. In other words, the current situation is that they are trying to purchase agricultural materials that depended on imports at a lower price, and quality is less important than before the spread of COVID-19 infection.

Inflation in Ethiopia was cited as the biggest problem as this factor, and the survey results showed that there was no direct relationship with COVID-19.

Next, the purchase amount of agricultural materials (fertilizer, some seeds, etc.) that can be procured domestically has been decreasing since the latter half of 2020, and small-scale farmers cannot borrow from agricultural finance, so they can purchase agricultural materials. It is a situation that cannot be purchased.

4) Influence on distribution, labor and financing

In logistics, imported agricultural materials are basically handled by importers and exporters, and domestic agricultural materials are handled by the Cooperative Union. Public transportation and trucks are the most common means of transportation.

Regarding the labor force, the absolute number of retail stores that procure and sell agricultural materials decreased as the sales volume of agricultural materials decreased, and some of them went bankrupt.

Regarding securing funds, especially small farmers are having a hard time operating because it is difficult to receive loans from agricultural finance and the Cooperative Union.

5) Measures taken against COVID-19

Due to the spread of COVID-19 infection, the government's movement restrictions were taken from April to September 2020, so farmers can only use agricultural materials from nearby agricultural material retailers and the Cooperative Union. The number of small-scale farmers who cannot buy agricultural materials and do not buy agricultural materials is increasing.

Exporters selling seeds / seedlings and pesticides that maintain high quality even after the import / export restrictions are lifted are struggling to sell to Ethiopia, and federations and businesses that purchase agricultural materials of poor quality. Is increasing.

6) Change of business environment

As mentioned above, distribution including imports of agricultural materials has stalled, and it is a clause

that changes the behavior of buyers, that is, 1) purchasing materials with low domestic quality, and 2) maintaining livelihoods by purchasing materials, and agricultural material operators are currently struggling to sell.

7) Support

Farmers has not received a loan from the Agricultural Production Federation (Cooperative Union), with some exception.

8) Challenges, Needs and Perspective

The biggest challenge in the input process is that the decrease in the quality of pesticides, seeds, and seeds and seedlings has a significant impact on production volume and productivity in the production process of the post-process.

There are many opinions that this trend will continue if inflation in the domestic economy continues, and domestic production of low-cost, high-quality agricultural materials will be considered as a measure.

(3) Impacts on Production Stage and Underlying Factors

1) Overview

As a general trend, the impact of COVID-19 is clearly, and specifically, due to traffic and transportation restrictions, the supply of agricultural materials required for rice cultivation and sowing, such as fertilizers and pesticides, is insufficient at the time of the season. Many businesses responded that the amount of cultivation was also decreasing due to the inability to secure and utilize enough agricultural materials due to this effect. Inflation, which continues to rise in Ethiopia, is also affecting production costs.

2) Change of Production

The production volume has been declining due to the delay in the supply of fertilizers and pesticides due to the transportation restrictions and behavioral restrictions imposed by COVID-19, which was below the level of the input volume before COVID-19. Another cause is the flood caused by heavy rains that hit the whole of Ethiopia in the first seeds of 2020.

Against this background, production costs are on the rise due to the fact that supply cannot keep up with demand, domestic inflation is increasing, and transportation costs are higher than before. As a result, it was found from the responses of multiple businesses that profits are declining.

On the other hand, spices and coffee were not particularly affected by COVID-19, and the response was that the production volume, production cost and profit were the same as the previous levels.

3) Change of Sales

The point affected by COVID-19 is mainly the unit sales price, which is like all crops. This can be said to be the result of market inflation reflected in prices. Next, the sales volume is also on a downward trend, and onions and broad beans have an impact compared to other crops and have been on a downward trend until now, but especially from the first season to the second season of 2020. Is related to the temporary closure of the market due to behavioral restrictions such as lockdown, and this tendency was strongly manifested. Chile and coffee are reported to be less affected.

On the other hand, there are no changes in the sales destinations and payment methods for all crops, and face-to-face direct sales and cash payment methods are the mainstream.

4) Change of procurement

Fertilizers and pesticides, as well as seed procurement in some crops (wheat, onions, broad beans) have been affected, and prices are rising for all of them, except for chili and coffee. It has been affected to date, but it seems that procurement was difficult, especially in the first and second seasons of 2020.

On the other hand, there is no change in the suppliers, which is common to all crops.

5) Measures taken against COVID-19

No response to COVID-19 has been made so far. As the amount of agricultural materials procured decreases, the amount of agricultural products produced and productivity is decreasing, and it is

presumed that it is necessary to take measures to overcome the current situation where demand is not keeping up with supply.

6) Support

Many businesses responded that they did not receive support for all crops except coffee. The reason for not receiving support is "because of ignorance." Coffee dries coffee beans by the United States Agency for International Development (USAID) under the "Feed the Future" program for all companies interviewed. Received equipment support.

7) Challenges, Needs and Perspective

Crops with new challenges under the influence of COVID-19 were particularly prominent in onions and broad beans. Income is declining as production is declining, which makes it difficult to maintain households, and rising prices and restrictions on behavior are affecting the entire domestic economy, increasing the unemployment rate and infectious diseases. The stress caused by anxiety about the disease has become an issue. In the cultivation of onions, some people said that the quality of onions was uncertain because the domestic seeds changed depending on the imported seeds. It has also been pointed out how to eliminate the negative effects of CODI V-19 by expanding the new cultivation area.

On the other hand, regarding Teff, there were many voices regarding political instability as an issue, regardless of COVID-19.

(4) Impacts on Processing Stage and Underlying Factors

1) Overview

Although the processing process is immature overall in Ethiopia, in recent years the development of processing industrial parks has been promoted as a national policy.

Additionally, of the seven crops targeted this time, there is no single onion processing company.

Rice polishing is maintained in terms of grains, and processing efforts for some per-boiled rice and the like are also being implemented. In addition, there are relatively large factories such as wheat flour. In addition, teff is also processed into teff powder or the like as a raw material for "Injera".

Broad beans are also produced in a paste-like processed food.

Spices (chili sauce, etc.) and coffee beans are packaged not only for domestic use but also for export.

A common issue in the processing process is that the utilization rate of factory equipment has been declining since 2020 due to the shortage of supply of agricultural products. In addition, the immaturity of packaging technology is also cited as a problem in many agricultural products.

2) Change of sales

Sales volumes of processed products of each crop are decreasing due to a shortage of raw materials. The unit price of the factory cannot help setting it high when the processing amount is small, and it is comparatively soaring to pass it on to the price. Wholesalers are the main sellers, but some retailers and some companies sell directly to local markets in the town. Cash is almost all the way to pay for processed goods, and e-commerce (online transactions) is not yet widespread. The shortage of raw materials continues to September 2021, mainly in grains such as tef, wheat, and rice, and the distribution of broad beans as processed products is decreasing due to the lack of raw material supply in response to consumer needs.

On the other hand, from the second half of 2020, production of spices such as chili sauce and coffee has increased, and exports of processed products not only in Ethiopia but also to foreign countries are on an increasing trend.

3) Change of procurement

The impact of COVID-19 from a procurement perspective is indirect, but due to the decrease in the input of agricultural materials, the supply of agricultural products as raw materials continues to be insufficient for all crops except spices such as coffee and chili resources. Production stopped in the middle of 2020, and even after production resumed after October 2020, the supply of raw materials

continues to be in short supply due to productivity problems. I am still struggling to procure. Due to the high demand for agricultural products, the unit price is high.

4) Influence on distribution, labor and financing

Logistics functions are basically not performed by processors, but logistics costs are particularly high from the latter half of 2020.

Since it is passed on to the price, it is currently being procured at a high price.

Regarding securing a labor force, after the government's movement restrictions in 2020 and the measures to suspend factory operations as a related measure, there have been no particular difficulties, but the utilization rate has decreased compared to before the spread of COVID-19 infection. There are many businesses (results of a survey of a 30% to 50% decrease in occupancy rate on average).

Although not related to COVID-19, securing highly skilled workers is also an issue.

5) Measures taken against COVID-19

Regarding the shortage of raw materials due to the spread of COVID-19 infection, it cannot be said that it has recovered even now.

The price of grains such as Teff remains high, which is about twice the price before the spread of COVID-19 infection.

This is still putting pressure on consumers' livelihoods.

In terms of hygiene in the factory, only businesses that oblige to wear masks, wash hands, and use disinfectant before work can be obtained by the survey, and hygiene measures in the processing factory are thorough.

6) Change of business environment

Processors are struggling to reduce the utilization rate currently, however, on the other hand, exports of spices such as coffee and chili sauce and sales to central Ethiopia are expanding.

In the future, it is speculated that the processing and packaging of cereals and horticultural crops will become more sophisticated and value-added, as the supply of raw materials continues to be in short supply.

7) Support

The equipment was supported by an international aid agency for some businesses, but basically there is no support from the Ethiopian government.

8) Challenges, Needs and Perspective

In September 2021, the biggest challenge is the lack of supply of domestic raw materials. Since there is a high need for both the public and private sectors to enhance and add value to agricultural products through processing and packaging, it is thought that human resource development in the soft side of processing technology and supply of equipment in terms of hardware will be necessary in the future.

(5) Impacts on Distribution Stage and Underlying Factors

1) Overview

Regarding distribution, the government's restrictions on movement and import / export from April to September 2020 became a major bottleneck, and as a result, the distribution and sales areas of agricultural products and food were limited to the city level. Even after that, although it is not affected by COVID-19, since most of the traditional micro-wholesale is traditional, it is not possible to expect an expansion of the distribution range.

Regarding imports and exports, as mentioned in the input process, imports of agricultural materials have been stagnant, and although it has calmed down compared to the middle of 2020, it has become a problem until September 2021, including lead times. On the export side, after the temporary border closure and import / export restrictions, many spices such as coffee and chili sauce have been exported to European countries, Turkey, etc., and it can be said that they have recovered in 2021.

2) Change of sales

The absolute shortage of agricultural products and food supplies has significantly reduced the amount of products handled by wholesalers, and both sales and profits are 30% to 60% of wholesale before the spread of COVID-19 infection. There are also many businesses. In addition to selling to traditional retailers in the neighborhood, there are a small number of businesses that have begun selling directly to the local market and consumers to expand their sales destinations. The payment method is cash only.

Many businesses have warehouses, but for agricultural products such as onions, many wholesale businesses use a storage method in which agricultural products are displayed in the shade.

Many of the exporters are large-scale companies with 50 or more employees, and after the latter half of 2020, many companies have strong overall sales and profits. On the other hand, the import and export of wheat, onions, etc., which had been previously imported and exported, has been stagnant until September 2021.

3) Change of procurement

Absolute shortages of agricultural crops and horticultural crops have continued from the middle of 2020 to the present, and the influence of Teff and others is still continuing. Prices have also risen up to twice as much as before the spread of COVID-19, which is also a major factor in inflation.

Although there are direct transactions from farmers and processors, suppliers often purchase through middlemen.

a. Changes in Imports

Regarding imports, agricultural materials fell sharply from April 2020 due to import and export restrictions, and then recovered from the latter half of 2020, but due to factors such as a sharp drop in the income of wholesalers, imports of agricultural products also It has remained small and has reached the present.

b. Changes in Exports

Exports were temporarily delayed due to import / export restrictions in mid-2020, but exports of spices such as coffee and chili sauce have been strong since the latter half of 2020. On the other hand, as of September 2021, exports of onions, which were export items to Sudan and Djibouti before the spread of COVID-19 infection, have not yet recovered.

4) Influence on distribution, labor and financing

From the point of view of logistics, wholesalers often did not have a logistics function. Logistics costs have increased by more than 20% due to the decrease in logistics companies, not only during the period when movement restrictions were imposed due to the spread of COVID-19 infection (mid-2020), but also after the restrictions were lifted. And this is still going on.

As for securing labor force, there is no big problem in securing human resources of wholesalers because the number of products currently handled is small.

On the other hand, in terms of securing funds, there were many businesses in 2020 whose sales and profits dropped significantly by 30 to 70% compared to 2019, so there are concerns about the bankruptcy of wholesale businesses in the future.

5) Measures taken against COVID-19

It is probable that the import / export restrictions and movement restrictions imposed by COVID-19 have revealed the weaknesses of Ethiopian distributors (wholesale). Specifically, weak ties with lower-level wholesalers, lack of logistics functions, and a small trade area have been highlighted as major issues for wholesalers.

6) Change of business environment

Many distribution (wholesale) businesses operate in small trade areas, and the indirect effects of COVID-19 are low procurement capabilities and diversification of logistics capabilities and sales channels. Rice field. As a result, it has spurred a multi-layered distribution structure through an intermediary, which is presumed to be a major issue in terms of distribution in the future.

7) Support

None.

8) Challenges, Needs and Perspective

Major distribution issues include low procurement capacity due to low supply of agricultural products from producers, low sales capacity to retail stores, and inadequate networks even after the movement restrictions in mid-2020. Can be mentioned. The organization of distribution on a regional basis, and by extension on a national basis, has been derived from the results of the field survey, and it is thought that the modernization and efficiency improvement of distribution will be essential for the resilience of FVC in Ethiopia.

(6) Impacts on Sales Stage and Underlying Factors

1) Overview

Due to behavioral restrictions and lockdowns caused by COVID-19, retailers were forced to temporarily close (April-September 2020). In addition, the average number of visitors per day is declining due to the fact that it is recommended to stay at home from the viewpoint of preventing the spread, and retail is greatly affected.

2) Change of sales

Sales volume has been on a downward trend because of behavioral restrictions and lockdowns, and has been on a downward trend, especially from April to September 2020. In addition, the number of visitors was restrained by the government's regulation not to open more than two or three stores in a specific area. Furthermore, the number of visitors to the store decreased because consumers themselves tended to hesitate to eat out from the viewpoint of preventing COVID-19 infection.

Selling prices are rising due to the impact of infrastructure in Ethiopia.

3) Change of procurement

Supplier has not seen any changes because of COVID-19 on all crops. However, in the supplier areas, it is reported that the number of suppliers is decreasing for some crops such as wheat, teff, and broad beans due to behavioral restrictions and soaring procurement prices. This is the period when changes were mainly seen from around April to September 2020, including the period when the lockdown was implemented.

Procurement prices have risen because of rising inflation in the country, while retailers' sales have also declined as food consumption in restaurants has declined due to the impact of COVID-19. Some respondents said that the transaction amount did not change much.

4) Influence on distribution, labor and financing

No impact on logistics means was seen, and public transportation is mainly used for crops except onions and broad beans. Onions are often used in livestock carts or trucks, and broad beans are transported by suppliers.

Regarding retail business hours, from April to September 2020, including the period when the lockdown was implemented, all crops were affected by the impact of the temporary closure. In addition, several respondents said that Teff had an impact in about one year from the first season to the fourth seeds of 2020 due to the suspension of business. It is assumed that it is necessary to provide products and eating out services in the price range and quality that meet consumer needs.

5) Measures taken against COVID-19

No response has been made so far regarding the decrease in sales and product lineup for COVID-19.

6) Change of business environment

Regarding changes in the competitive situation and the market environment such as products, no changes were observed due to the influence of COVID-19, which is common to all crops.

As prices have risen overall, consumers have begun to buy cheaper commodities. In addition, some respondents said that the rise in prices was due to inflation, but some pointed out that it was the effect

of political conflict.

Consumer behavior includes the fact that COVID-19 has led to more purchases of hygiene products than before, and behavioral restrictions have reduced eating out and increased opportunities to eat at home.

7) Support

It has been reported that there is no government support for wheat, onions, broad beans, spices and coffee. On the other hand, some businesses said that rice has protection of the market through government intervention, support for the small food market, tax reduction / exemption measures, and compensation for market closure. Similarly, for Teff, many businesses say they have government intervention to protect the market, support the small food market and provide tax breaks / exemptions.

8) Challenges, Needs and Perspective

The concern for retailers is that consumers will not buy crops due to rising domestic inflation and rising crop prices due to rising incidental costs such as transportation costs due to the impact of COVID-19. Many respondents urgently called for policy and regulation to stabilize the market to avoid concerns.

(7) Impacts on Consumption Stage and Underlying Factors

Retailer

1) Overview

Due to the impact of COVID-19, the breakdown of crop consumption is changing due to the increase in crop costs such as soaring prices of agricultural materials and the increase in transportation costs, and the acceleration of infrastructure in Ethiopia. Consumption is declining more than before, but overall consumption spending is also on the rise as crop prices soar.

On the other hand, household income is declining due to the effects of temporary business leave due to behavioral restrictions.

2) Change of Consumption of respective crops

Regarding crop consumption, 30% of the companies interviewed answered that there was a change. The main changes are from the first seeds to the second season of 2020, and from the first season to the second season of 2021.

In addition, the period when the change appeared includes the period of behavioral restrictions such as lockdown and coincides with the period when the production and sales volumes of rice, wheat, teff, onions, and broad beans decreased.

Regarding consumption, several respondents said that consumption of rice and wheat increased and broad beans decreased.

On the other hand, spending on rice, wheat and beans is increasing, indicating that inflation is having an impact.

3) Change of consumer

Approximately 54% of all interviewed businesses answered that their household income had changed, and the most common responses were rice (about 33.3%), spice (about 26.7%), and onions (16.6%).), Broad beans (about 13.3%), and Teff (about 10.0%).

Approximately 63.3% of businesses responded that there was a change due to a decrease in household income, and approximately 20% answered that it was a change due to a decrease in household income and an increase in spending, due to an increase in spending. About 16.7% answered that there was a change.

Among the businesses that answered that there was a change in household income, the number of respondents with a change rate of “25% to 50%” was the largest, accounting for about 60.0%, and “51% to 74%” was about 16.6%, “75”. About 10.0% answered “% or more” and about 6.7% answered “0-24%” (6.7% of non-responders).

The most frequent changes were in the first season of 2021 in rice, the entire season of 2020 and the first season of 2021 in Spice, the second and third seasons of onions, and 2021 in Broad bean. In the

first season of the year, Tef, the most common answer was all seasons in 2020.

4) Measures taken against COVID-19

The impact on COVID-19 is the soaring prices of commodities and changes in consumer needs, specifically the shift to a food culture that mainly consumes grains. Improving the livelihood of consumer households is an issue for the future.

5) Support

It has been reported that there is no government support for all crops. Although it is not support, measures such as postponing the tax payment period and making loans at banks without interest are being taken.

6) Challenges, Needs and Perspective

Business and production are stagnant, and income is declining with COVID-19, while living and business spending are increasing due to ongoing inflation, and households and employment are in an unstable situation. Political conflicts in Ethiopia are also affecting the economic downturn, and the government is likely to need to come up with policies to stabilize the economy.

In addition, the government should support tax reduction measures for businesses and employees whose income is declining and to improve the online business environment so that consumers can operate under COVID-19.

(8) Impacts on the relationship between VC Stages and Factors

In this section, we have investigated the general situation and issues of each process of FVC in Ethiopia.The major effects between processes are summarized in the following two.

1) High-quality agricultural materials (especially pesticides / seeds / seedlings) in the input process could not be purchased due to import / export restrictions and movement restrictions, which led to a decrease in the supply of agricultural products in the production process. In addition, the decrease in the supply of agricultural products, which are raw materials, led to a decrease in the operating rate due to the shortage of raw materials in the processing process, which also spread to the decrease in sales of processing companies.

2) In the consumption process, due to movement restrictions, consumers' work from home and waiting at home increased from April to September 2020. As a result, the income of consumer households has decreased, consumers have a preference for food, and they have purchased more nutritious grains, and the number of horticultural crops purchased has decreased. Therefore, reflecting the consumer needs in the sales process, the variety of foods sold to retailers decreased and the income gradually decreased. Furthermore, as a result, the number of wholesalers and sales destinations in the distribution process was limited, resulting in a significant decrease in sales and profits.

In other words, the upstream side caused a significant decrease in sales and profits of wholesalers who distribute agricultural products and foods, causing a decrease in production volume due to a decrease in production volume and a decrease in the utilization rate of processing companies using agricultural products as raw materials due to the difficulty of accessing agricultural materials in the input process. In addition, the downstream side was forced to narrow down retailers' products based on consumer needs, sell low-quality products with some products at low prices due to a decrease in consumer household income due to consumer movement and behavior restrictions, etc., and it also led to a decrease in agricultural products and foods purchased from distributors, which is related to the tight management of wholesalers.

In summary, the production and sales processes are directly affected by the relationship between demand and supply, specifically the shortage of agricultural material supply on the upstream side of the FVC, and changes in demand due to the decline in income of the downstream consumption process. After that, sales and income were greatly squeezed in the subsequent processes, especially in the distribution process and processing process in the middle of the river.

3.1.5 Impacts on FVC in the Country

(1) Common and Differentiated Effects by Crops and Underlying Factors

In this section, we will analyze the similarities and differences between each crop, and the presence or absence of the magnitude of the impact of COVID-19 and its background and factors. Based on the results of the field survey so far, we interviewed local stakeholders about the magnitude of the impact of COVID-19 in three levels. The results are shown in the table below.

The largest impact of the spread of COVID-19 infection is the inability to import quality agricultural materials such as pesticides, seeds/seedlings, etc. due to import/export restrictions, as well as the problem of insufficient supply on the upstream side due to the resulting decrease in production.

In addition, consumer households' disposable incomes have decreased due to restrictions on movement and the associated stay-at-home and work stoppage measures, and consumer needs have shifted to purchasing mainly nutritious food grains. Retailers and restaurants also began to sell and serve grains as a result, which changed the downstream demand and needs, resulting in an imbalance between supply and demand. This was mainly during the period from April to September 2020, but even now, the supply-demand balance, especially for grains and horticultural crops, is not as balanced as it was before COVID-19.

The similarities and differences among the crops and their background are described in detail below, but a summary of the distribution types and the magnitude of the impact of COVID-19 is shown below.

Table 3.1.15 Distribution types of target crops and magnitude of impact of COVID-19 in Ethiopia(2020)

VC Process	Kinds of Crops						
	Domestic Distribution	Domestic Distribution	Domestic Distribution	Intra-regional Distribution	Intra-regional Distribution	Intra-regional Distribution	Extra-Regional Distribution
	Grains	Grains /Staple foods	Grains/Staple foods	Horticultural crops	Horticultural crops	Craft crops	Craft crops / Export Crops
	Rice	Wheat	Teff	Onion	Broad Bean	Chili Sause (Spices)	Coffee
Input	**Large**	**Large**	Medium	**Large**	**Large**	Small	Small
Production	Medium	**Large**	Small	**Large**	Medium	Small	Small
Processing	**Large**	**Large**	Medium	-	Medium	Medium	Small
Distribution	**Large**	**Large**	**Large**	**Large**	**Large**	**Large**	Medium
Sales	Medium	Medium	Medium	Medium	Medium	Small	Small
Consumption	Medium	Medium	**Large**	**Large**	Large	Small	Small

Note 1: Explanation of distribution types: 1) Domestic distribution: crops whose production and distribution are mainly confined to the domestic market. (2) Intra-regional distribution: crops whose trade (import/export) to neighboring countries (Sudan, Djibouti, Egypt, etc.) accounts for a large proportion in addition to domestic production and distribution; (3) Extra-regional distribution: crops whose import/export is mainly to third countries such as Western countries and Asian countries.

Note 2: Large: major negative impact; Medium: negative impact; Small: no or small impact; -: not applicable. The degree of impact is based on the results of the key informant survey and the questionnaire survey.
The degree of impact was rated based on the results of the key informant survey and the questionnaire survey, taking into account the results of the field survey.

Source: JICA research team from key informant surveys for various crops and VC surveys.

1) Common Effects across Crops

Basically, the loss of imports of quality pesticides, which have a significant impact on crop production, and quality seeds/seeds, which have a significant impact on production quality, is a common impact of all crop categories: cereals, horticultural crops, and craft crops. This is largely due to the government's measures to restrict imports and exports.

The next common factor is that grains such as rice, wheat, and teff, as well as horticultural crops (lentils) have seen a significant drop in sales and profits due to the shortage of raw materials in production, which

has reduced the operating rate of processing companies' plants by about half.

In terms of the sales process, retailers, restaurants, and other food service companies reduced the sales volume of horticultural crops, and the sales volume of rice and wheat, especially teff, also decreased. This is due to the fact that labor stopped in mid-2020 due to mobility and behavioral restrictions among households, resulting in lower incomes for consumer households over the course of the year, and as a result, consumers purchased mainly nutritious grains, resulting in a gradual decline in the sales volume of onions and beans.

Finally, wholesalers, which handle distribution between producers/processors and retailers, are caught between a shortage of agricultural and food products and changes in consumer demand, and wholesalers that handle grains and horticultural crops, which are the mainstay of domestic and intra-regional distribution, have suffered significant declines in sales and profits. The same is true not only for mid-2020, but also for the present.

By process, in terms of securing agricultural inputs, craft crops were only slightly affected in mid-2020, but once export restrictions were lifted, the need for Ethiopian industrial crops from countries outside the region, such as the US, Europe, and Asia, as well as from countries inside the region, such as Sudan, Djibouti, and Egypt, grew, and the need for Ethiopian industrial crops grew from the upstream processes of production and processing, to distribution (export), sales, and consumption. As a result, the upstream processes of production and processing, as well as the downstream processes of distribution (export), sales, and consumption, began to expand. This was due to the fact that foreign consumers wanted to be the first to purchase Ethiopian industrial crops that were difficult to import due to export restrictions.

In terms of the consumption process, there was a decline in consumption of onions and beans, and also a decline in consumption of teff, but the former was due to a decline in consumer demand, while teff was due to a significant decline in supply. Among cereals, there were some crops whose consumption increased as a result of COVID-19, such as rice, whose production was relatively maintained, and "injera" which was mixed with rice instead of teff.

2) Differentiate Effects across Crops

In terms of crop types, cereals and horticultural crops were the most severely affected by COVID-19 in the overall FVC. On the other hand, craft crops such as coffee and chili sauce (spices, etc.), which are mainly for export, were hardly affected by COVID-19.In mid-2020, when import and export restrictions were imposed, craft crops experienced a temporary decline, but production of coffee, spices, and other crops, which, unlike grains and horticultural crops, originally produce good seeds domestically, recovered quickly, and processing companies resumed operations.

In the downstream distribution process (including export) and sales process, grain and horticultural crops suffered from a shortage of supply and a change in consumer preference for grain, and wholesale businesses in the distribution process, which act as a valve between supply and demand for production and consumption, suffered particularly large declines in sales and profits.

Finally, in the consumption process, consumers in the extraterritorial markets to Western and Asian countries, as well as in the intraregional markets such as Sudan, Djibouti, and Egypt, had a period of stagnant exports of craft crops, and conversely, the needs of overseas consumers expanded already in the second half of 2020 and are still strong as of September 2021. On the other hand, the consumption of onions and solanaceous legumes has been significantly reduced, mostly due to a change in consumer households' desire to eat more nutritious grains. The consumption of teff was drastically reduced because the supply shortage was more serious than that of other cereals, while the consumption of rice, which was not so serious, gradually increased due to the shortage of teff supply, as more and more people ate rice mixed with the staple food "injera" instead of teff. For the time being, the production, processing and distribution processes of cereal and horticultural crops make FVC vulnerable among the crop types in Ethiopia.

(2) Trends and Underlying Factors in the Country

1) Trends by Crop types

As for the impact of the spread of COVID-19 infection by crop type, in the case of cereals, the decrease in production, reduction in production of processed products, and decrease in distribution continues to be seen to varying degrees due to the shortage of pesticides and seeds in the input process.

In the case of horticultural crops, the decline in consumer household income and the resulting tendency to buy more nutritious grains has led to a sharp decline in the purchase and consumption of onions and beans by 30-70%. It is likely that informal distribution of Ethiopian horticultural crops is on the rise and formal import and export is low due to the cause of uncertainty in distribution.

On the other hand, chili sauces (spices) and other craft crops are in high demand mainly in neighboring Sudan, Djibouti, and Arabian countries, and exports are growing steadily, except during short-term lockdowns. Another craft crop, coffee, is in high demand from consumers in Europe, the United States, and Asia, and is currently in the process of increasing its exports, except in the case of a short-term lockdown.

Table 3.1.16 Distribution Pattern by Crop Type in Ethiopia

VC	grain/staple food	Horticultural crops	Craft crops (many exports)
Domestic distribution type	Rice, Wheat, Tef **(Impact=Large)**		
Intraregional distribution type			
Distribution type in neighboring countries		Onion, broad beans **(Impact = Large)**	Spices (chili sauce) **(Impact = Medium)**
Distribution type in the corridor			
Inter-corridor distribution type			
Extraterritorial distribution type			Coffee **(Impact = Small)**

Source: JICA research team from key informant surveys for various crops and VC surveys.

2) Change of Crop Flow

In terms of changes in the supply chain of each crop due to COVID-19 in Ethiopia, the production of cereals and horticultural crops has not changed significantly, although production has decreased significantly. If anything, distribution (wholesale) businesses, which are greatly affected by both supply and demand sides, have been looking for new sources (farmers) in the neighborhood, and some businesses have started to sell directly to local markets and consumers, rather than just retail, since early 2021.

In addition, horticultural crops such as onions and beans, which used to be actively imported and exported to neighboring countries, have not resumed formal imports and exports since the second half of 2020 when the import/export restrictions were lifted, and many wholesale businesses without warehouses have been storing unsold onions in the shade, and informal imports and exports to Sudan and other countries have been increasing.

As for craft crops, the flow of crops has not changed, with exports already resuming in late 2020, except for a temporary movement restriction in mid-2020.

(3) Underlying Factors of Vulnerability in FVC in the Country

In this section, we summarize where the vulnerability of Ethiopia's FVC lies based on the analysis and discussion so far, especially considering the factors that are likely to have a long-term impact.

As has been mentioned, the spread of COVID-19 infection in Ethiopia has been seen in all stages of FVC of cereal and horticultural crops. Due to supply side problems caused by restrictions on imports of quality pesticides and seeds/seedlings, and demand side problems of reduced income and changes in crops to be purchased (increased need for nutritional value, especially cereals) due to restrictions on movement and behavior, the direct impact was the production process following the input process and the marketing process before the consumption process.

The production process has responded by changing the agricultural products produced, while the retail

businesses in the sales process have taken measures such as reducing their product lineups and increasing the number of products with lower prices.

Under these circumstances, the businesses that have seen the most decline in sales and profits are the processing and wholesale businesses, which have been hit hard by the imbalance between supply and demand that has led to a decline in the production and handling of processed products, and many of them have seen their sales and profits decline by more than half compared to 2019.Therefore, it could be seen that it is the distribution and processing processes, followed by production and sales processes that have been most exposed to vulnerability in Ethiopia's FVC.

(4) How Resilient FVC Should be in the Country

In Ethiopia, the distribution structure is multi-layered, and most of the distribution is traditional, i.e., most of the small wholesale businesses only distribute agricultural and food products to nearby retail stores. This is a major distribution challenge in Ethiopia, which is three times the size of Japan, and there is a need to modernize the scope of distribution and distribution.

In order to do so, referring to the modern distribution model, the first step is to expand the service functions of the wholesalers. Currently, most wholesale businesses do not possess distribution functions, and there are also wholesale businesses that do not have warehouses. They also do not possess procurement and management functions from the subordinate wholesale businesses they procure from, and sales promotion functions are also scarce. Therefore, it is thought that (1) implementation of logistics functions, (2) construction of an extensive procurement and wholesaling network, (3) construction of warehouses and establishment of warehouse management and shipping systems, and (4) strengthening of sales promotion and marketing functions, the development of modern, relatively large wholesale businesses to have these functions, and the construction of distribution networks through the construction of organic networks by these large wholesale businesses in each region and city will strengthen the FVC.

Next is the weakness of Ethiopia's processing process. Currently, the system is dependent on production which if the supply of agricultural products falls, they will see a significant drop in improved utilization and sales. However, there are some businesses that have their own rice milling and parboiled rice processing technologies, solanaceous bean paste and other processing technologies, and chili sauce and coffee processing businesses are expanding their processed products to overseas markets as cash crops.

Rather than relying on production, we believe that there is potential to produce cash crops for export next to coffee and chili sauce by raising the level of processing technology by adding processing technology and know-how in-house, learning clean packaging techniques, adding value, and devising a business model that reduces losses by processing substandard agricultural products.

These are in line with the government's agricultural and industrial policies, and for the medium- to long-term resilience of FVC, it is inferred that the organic linkage of distribution and processing processes will lead to an increase in the number of cash crops for export, which in turn will drive the sophistication of FVC in terms of peripheral inputs, production, sales, and consumption processes.

Some ongoing projects in Ethiopia toward resilient FVC are presented below.

Table 3.1.17 (Reference) Ongoing/completed projects/measures in Ethiopia toward resilient FVC

Good Practices	Implementer (VC stage)	Content, background, and factors, which is referred to as good practices
Establishment of Agro-Food Processing Park	GIZ (VC:Processing and Distribution)	Ethiopia has an abundance of agricultural products, but most cormorant products are distributed, sold and exported as raw materials, and the lack of know-how in food processing makes it difficult to create value-added in the food itself. The processing of wheat, for example, is limited to bread, cookies and wheat flour, and the processing of sole is also limited. While Ethiopia itself lacks the knowledge and modern technology to process these products profitably, there is a great need in the country's factories, and there are market creation opportunities for European and other companies with the right expertise.

		Therefore, in "high-potential areas where the agricultural sector plays an important role in the economic sector," productivity could be significantly increased, and the program aims to utilize these food processing complexes to supply other parts of the country and make Ethiopia an exporter of food in the future. The project period is expected to be from 2021 to 2025. The project period is expected to be from 2021 to 2025. Specific representative measures are as follows - Introduction of machinery for coffee roasting and processing - Introduction of machinery for juice extraction and processing. - Introduction of machinery for processing of tomatoes and potatoes. - Technology transfer and introduction of machinery for wheat flour processing, bakery, pasta and macaroni production - Introduction of machinery for extraction, filtration and processing of edible oil - Support for the introduction of sugar processing technology and various machines. In addition, support is planned for distribution, specifically cold chain development, mobile preservative technology, and provision of storage facilities. (https://www.trade.gov/country-commercial-guides/ethiopia-agro-processing)
Facilitation of distribution by laying a railroad line from Addis Ababa to the Port of Djibouti	China Civil Engineering Construction Corporation (CCECC) (VC:Distribution)	The project is to facilitate and expedite imports and exports by constructing a railroad between Addis Ababa, the capital of Ethiopia, and Djibouti, as well as the Awash-Comvorcha-Woldia railroad in northern Ethiopia. The Addis Ababa Djibouti Railway, as an electrified multinational railroad, has been contracted by two Chinese companies, China Railway Group and CCECC, and has the potential to provide a variety of freight services to the local population, including transportation of fresh food, grain, fertilizer, etc. In 2016-2017 The Addis Ababa-Gibbuti railroad was opened to traffic. The Addis Ababa-Djibouti railway was opened in 2016-2017. However, its initial purpose was mainly to transport oil, and it is not fully utilized for the import and export of food and agricultural materials. (https://www.trade.gov/country-commercial-guides/ethiopia-distribution-and-sales-channels)
Sustainable Supply Chain Building Program	IAS (Instituto de Agricultura Sostenible) (VC: Distribution, (Production, Processing))	"The Sustainable Agricultural Supply Chains and Standards program" is a multidisciplinary team that aims to increase farmers' income, protect forests, and enable international distribution and marketing of coffee, honey, and spices in Ethiopia. The goal is to enable international distribution and marketing of coffee, honey and spices. Specifically, the program aims to develop sustainable growing areas and improve the livelihoods of the local population, in combination with quality improvement training and other similar measures. Since the summer of 2019, the program has been focusing on honey as an agricultural raw material. In the region of Nono Sale and the Oromia Region, coffee and spices were originally grown, and many small-scale farmers cultivate honey in parallel. Since organic quality honey is a popular raw material in the global market, new sales markets can be created, and small farmers can generate income from the sale of various raw materials, including the development of export capacity, i.e., improved production and processing capacity and distribution to meet the requirements of international markets. At the same time, the project aims to improve the traceability of these raw materials through digital solutions. (https://www.nachhaltige-agrarlieferketten.org/en/in-practice/ina-in-ethiopia-pilot-project-isase-innovations-for-sustainable-agricultural-supply-chains-in-ethiopia/)

(5) Adaptation and Counter Measures in the Country and Potential Cooperation

In order to make FVC in Ethiopia more resilient, it was proposed that it would be better to upgrade the midstream portion of the distribution and processing processes, and then aim to upgrade the entire surrounding FVC, referring to the business model of export cash crops of chili sauce and coffee, and that the value chain in processing and distribution is crucial.

The following is a rough draft of measures to overcome the vulnerabilities of FVC and support measures in the short, medium and long term.

Table 3.1.18 Short-term, medium- and long-term measures to overcome vulnerabilities of FVC and draft support measures

Factors of impact/VC vulnerability	objective	period	policy	Required actions	Target crops	Target VC	Subject (as long as you know)
Overseas dependence on investments	Domestic production of input materials (or import of inexpensive and high-quality materials)	Long Term	Domestic production of agricultural materials such as fertilizers, including agricultural chemicals, seeds, and seeds and seedlings	Joint research and development of agrochemicals, seeds, seeds, seedlings, etc. with public research institutes and universities in Ethiopia	Tef, onion, etc.	Input	Foreign input material researchers, local researchers at public research institutes and universities
Machining at a lower level	Upgrading and adding value to processing and packaging	Long Term	Transfer of processing and packaging technology in foreign-style human resource development for domestic industries ・ Provision (loan) of necessary equipment	・ Dispatch and conduct research by technical experts in processing and packaging ・ Loan of equipment and equipment deemed necessary in Ethiopia (or local development and production)	Rice, teff, onion, broad beans	processing	Processing technical expert, Ethiopian industrial processing park
Pre-modern multilayered distribution structure	Modernization of distribution by region and city	Long Term	Implementation of distribution human resource development and training that contributes to the organization of distribution after selecting model regions and cities	We selected model regions and cities for distribution modernization, with the vicinity of a large number of agricultural products and processing housing complexes as candidates, and long-term implementation of training for human resource development of distribution and horizontal development to another region	Rice, wheat and broad beans	distribution	Local government, distribution and foreign logistics expert
Unorganized traditional retail stores	The spread of modern retail in the field	Long Term	・ Since there are no logistics warehouses and freezers, we cannot handle many products, so we can establish and operate a collection warehouse (freezer) including fresh products	In relation to the above, demonstration experiments at model retail stores for hard maintenance and inventory management and collection systems such as transportation means (refrigeration trucks) and refrigeration warehouses necessary for distribution from regions and cities to metropolitan areas	Chili sauce, coffee, rice, tef	Sales	Ministry of Industry and Trade, Ministry of Finance

3.2 Kenya

3.2.1 Status of COVID-19 and Development Partners' Initiatives

(1) Status of COVID-19

In Kenya, the fifth wave occurred from the middle of December 2021, and the number of newly infected people increased mainly in Nairobi, reaching a maximum of 3,749 people / day (25 December 2021), and the positive rate of PCR tests has exceeded 30%. It has been decreasing sharply in January 2022. In the fifth wave, the government does not prohibit curfew or lock down, encourages compliance with COVID-19 measures (Protocols) in order to prioritize economic activities such as tourism, and promotes vaccination (18 years old and over twice vaccinated at 56.7 %, 10 January 2022) and booster inoculation. Furthermore, in November 2021, the president announced in the Diet that vaccine production would be outsourced to Kenya Biovax Institute Ltd., a government-affiliated company under the umbrella of KEMRI, by March 2024.

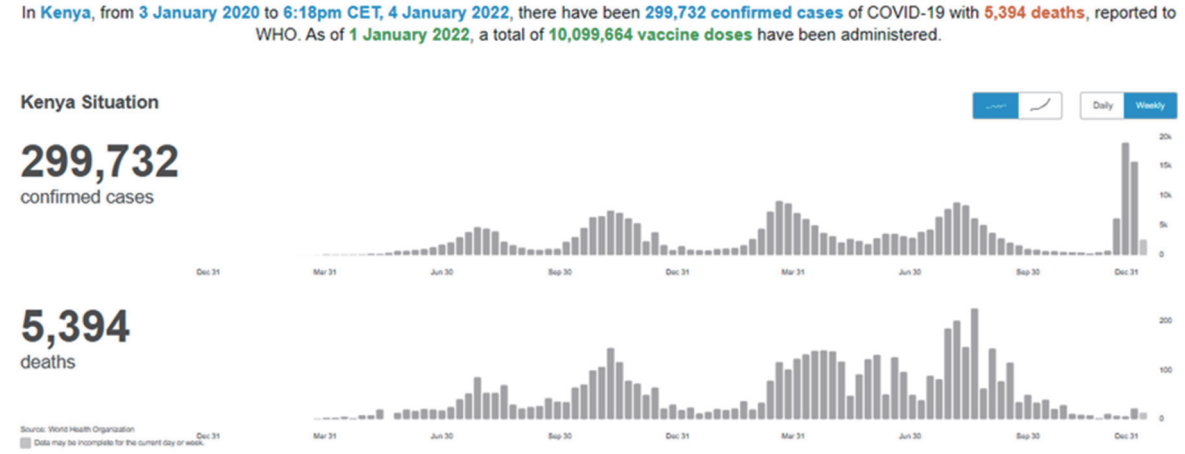


Figure 3.2.1 Process of infected people and number of deaths

Source: WHO Coronavirus (COVID-19) Dashboard

Table 3.2.1 Trend of infection and measures

Time	Spread	Preventive Measures against COVID-19
March 13, 2020	13th March 2020, First COVID-19 case in Nairobi confirmed.	• Suspension of all public gatherings. • Travel restrictions outside the country and disease pandemic countries.
March 25, 2020	28 cases	• Daily Curfew from 7 p.m. to 5 a.m. imposed.
April 6, 2020	158 cases	• Cessation of all movement by road, rail, or air in and out of the Nairobi Metropolitan Area and Kilifi, Kwale and Mombasa counties.
April 25, 2020	343 cases	• Extended the cessation of movement into and out of the Nairobi Metropolitan Area and the Counties of Kilifi, Kwale and Mombasa • Extended the nationwide dusk-to-dawn curfew for 21 days.
May 16, 2020	830 cases, 50 deaths	• Cessation of movement through the Kenya-Tanzania and Kenya-Somalia border. • All drivers of cargo vehicles are required to be tested for COVID-19 PCR and will be granted entry if they test negative. • Till 6 June, the curfew was extended in nation-wide.
June 6, 2020	First Wave: 2,600 cases, 83 deaths	• Extended suspension of all gatherings in any kind for 30 days. • Extended travel restrictions outside the country for 30 days. • Extended cessation of movement into and out of the Nairobi Metropolitan Area, Mombasa and Mandera and the nationwide dusk-to-dawn curfew • Extended the Nationwide 9pm to 4am daily curfew by a further 30 days.
July 6, 2020	First Wave	• Extended the Nationwide 9pm to 4am daily curfew by a further 30 days. • Allowed religious meetings of less than 100 people within 1 hour. • Local and International Air Travel resumed from 15th July, and 1st August 2020. • Extended suspension of social and political gatherings • Extended limitation of bars and restaurants opening time.

July 27, 2020	First Wave: 17,603 cases	• The Nationwide Curfew remained in force for a further 30 days. • Prohibition against the sale of alcohol and beverages by licensed hotels and food shops, and closing by 7 p.m. • Closure of bar until permission given.
August 26, 2020	First Wave: 33,016 cases	• Closure of bars and nightclubs is sustained for a further 30 days. • Prohibition against the sale of alcohol by licensed hotels with residence is vacated. • Revised ceremonial occasions. • Extended curfew from 9 p.m. to 4 a.m. for further 30 days.
September 28, 2020	End of First Wave	• Nationwide Curfew is extended for a further 60 days. • Ended the prohibition against the operation of bars and against the sale of alcoholic drinks and beverages by ordinary restaurants and eateries;
November 4, 2020	Second Wave	• Scale-down of all in-person engagements within Government. • All State and Public Officers aged above 58 years or who are immunocompromised directed to work remotely. • All Political Gatherings and rallies are suspended for a period of 60 days.
March 12, 2021	Third Wave	• All forms of political gatherings are prohibited for a period of 30 days. • Funerals, cremations and other interment ceremonies to be conducted strictly within 72 hours of confirmation of death. • An Inter-Governmental Co-ordination Framework is established in all Counties;
March 26, 2021	Third Wave	• Counties of Nairobi, Kajiado, Machakos, Kiambu and Nakuru, where 70% of cases of COVID-19 have been recorded are declared a disease infected area. • All sporting activities are suspended, • People 58 years shall be vaccinated as a priority during the 1st vaccination phase.
June 29, 2021	Third Wave to Fourth Wave: Inflow of Delta variant	• Hours of curfew are maintained in the COVID-19 hotspot zone - Kisumu, Siaya, Homa-Bay, Migori, Busia, Kakamega, Vihiga, Bungoma, Kisii, Nyamira, Kericho, Bomet, and Trans-Nzoia counties. • Nationwide curfew continues to be 10:00 p.m. to 4:00 a.m. for further 60 days. • Clouser of border points • Limited in 1 person to meet a hospitalized patient.
October 20, 2021	Fourth Wave	• Ended curfew.
December 16, 2021 to January 2022	Fifth Wave: Largest peak 3,749 in new infected cases at December 25	• Huge pandemic by Omicron variant • Suspending international air flights such as Kenya Airways, Emirates, etc. • Mandatory presentation of vaccination certificate at public places

Source: Office of the President

(2) Government Polices and Measures against COVID-19

The government policies and measures of Rwanda are as follows.

Table 3.2.2 The government policies and measures

Policies and Measures (Target, VC process, Time)	Results	Policies and Measures (Target, VC process, Time)
The National Treasury and Planning - Central Bank of Kenya (CBK)	CBK lowered lending rate from 8.25% to 7.25% March 18, 2020	The Central Bank of Kenya (CBK) set the stage for borrowers to access cheaper loans after it lowered the Central Bank Rate (CBR) lending rate. The decision by the Monetary Policy Committee (MPC) was aimed at easing access to credit and stimulating the economy following the COVID-19 crisis.
CBK	Suspension of all listing for all persons including companies at Credit Reference Bureau (CRB)	Listing of loan defaulters with Credit Reference Bureaus (CRB) cushioned distressed borrowers from the harsh economic environment occasioned by the coronavirus pandemic
CBK	Lowering of Cash Reserve Ratio (CRR) to 4.2%	Lowering of CRR provided additional liquidity of Ksh.35.2 billion to commercial banks.
CBK	Central Bank of Kenya to offer flexibility to banks on loans that were active as of March 2020 to maintain liquidity levels	Kenyan banks restructured loans amounting to KSh1.63 trillion. This offered relief to borrowers affected by the pandemic. By end of 2020, repayment period of personal and household loans worth to KSh 333 billion were extended, and loans worth KSh 1.29 trillion to trade, manufacturing, agriculture, and real estate sectors were restructured.
CBK	Set up a fund to which players in the Public and Private Sector can contribute to support of Government efforts	The COVID-19 Emergency Fund prioritised the purchase of personal protective equipment (PPE), for the support and protection of health workers dealing with COVID-19 patients in public hospitals in Kenya. The locally manufactured PPE's were

		distributed to all the 47 counties.
CBK	CBK announced measures that facilitated increased use of mobile money transactions instead of cash.	While the immediate objective was to reduce the risk of transmission of Coronavirus by handling banknotes, it also reduced the use of cash in the economy over the medium term. It also shielded Kenyans from the adverse effects of COVID-19 pandemic and alleviated their' economic constraints
Kenya Revenue Authority (KRA)	The Government reduced Personal Income Tax, 100 % Tax Relief for persons earning up to Ksh. 24,000, reduced Resident Corporate Income Tax rate, Turnover Tax rate for SMEs and VAT rate, expedited the roll-out of the credit guarantee scheme and allocated a special fund to KRA in reimbursing VAT refunds. April 1, 2020	This gave Kenyans more purchasing power and kept more businesses afloat by increasing production rate to meet market demands. Companies saved administration costs and minimized staff layoffs. Prices of basic commodities decreased, and consumption of fast-moving consumer goods increased, and this protected businesses from closure. Rolled out on 8/12/2020, the credit guarantee scheme afforded enterprises access to credit and increased the amount that could be lend to this sector by an additional 100 billion shillings. KRA paid out $100 Million in VAT refunds to businesses, which offered financial relief to businesses hit by the COVID-19 pandemic especially the horticulture, transport and hospitality sectors.
Ministries of State department for Social Services, Health and Interior Ministries.	The government provided a weekly stipend of Ksh.1,000 to vulnerable households in the country.	Each household received a weekly stipend of Ksh1,000. 71,298 households in 21 counties were identified and reached. The programme was upscaled nationwide with a focus on vulnerable households in the urban slums.
Ministry of Agriculture, Livestock, Fisheries and Cooperatives	The roll out of the National Value Chain Support Programme (e-voucher digital programme) was fast-tracked in the light of the effects of covid pandemic.	Over 200,000 farmers from 12 counties will access farm inputs (seeds, fertilizer, agrochemicals and insurance from dealers) at affordable prices through the e-voucher system. The government subsidizes the inputs by 40 per cent while the farmer pays the remaining 60 per cent.
Ministry of Interior and Coordination of National Government, State Department of Interior and Citizen Services	The Directorate of Immigration Services (Kenya) offered an amnesty on stay in the country beyond the stipulated six (6) months.	This affected all international travellers in Kenya whose passes expired. Foreign nationals who were currently in Kenya, enjoyed the amnesty until 28 September 2020 after the amnesty was lifted on 14 September. The amnesty had allowed the foreigners with expired Visas to extend their stay without legal consequences.

Source: Each ministry's website

Source: Oxford University

Figure 3.2.2 COVID-19 Stringency index

(3) Initiatives by Development Partners

The cooperation regarding FVC of development partners is as follows.

Table 3.2.3 Contents and results of cooperation by development partners

Partner	Contents of support (Target, VC stage, scale, period)	Contents
World Bank	June 28, 2021: The World Bank approved $130 million additional	This additional financing will enable Kenya to procure more vaccines via the African Vaccine Acquisition Task Team (AVATT) initiative and the

	financing for the Kenya COVID-19 Health Emergency Response Project	COVID-19 Vaccines Global Access (COVAX) facilities. It will also support the deployment of those vaccines.
	March 16: 2020: Kenya received KSh 6.1 billion from World Bank to help combat the viral disease.	The funds were to be used for mobilizing response capacity, strengthening multi-sector platforms and helping in monitoring and evaluation of prevention and preparedness.
	April 2, 2020: The World Bank Group approved $50 million in funding to support the Kenya COVID-19 Emergency Response Project.	The project will provide emergency funding for medical diagnostic services, surveillance and response, capacity building, quarantine, isolation and treatment centers, medical waste disposal, risk communications and community engagement.
	May 20, 2020: The bank approved KSh 106.8 billion loan to close the fiscal financing gap generated by the impact of COVID-19	Preparation of this DPF preceded the COVID-19 pandemic, but its approval was timely, since it helped to fill the financing gap generated by the severe, ongoing shock to Kenya's economy.
The African Development Bank	May-22, 2020: The African Development Bank approved €188 million (KSh 22 billion) loan to support the response to COVID-19 and mitigate its impacts.	The Bank's support will strengthen the national health system to effectively respond to the pandemic, build economic resilience and ensure quick recovery. The Bank's intervention will also be used to support the poor and vulnerable people who have been negatively affected by the pandemic
International Monetary Fund	April 2, 2021: IMF Board approved SDR 1.655 billion (US$2.34 billion) arrangements for Kenya.	The three-year financing package will support the next phase of the authorities' COVID-19 response and their plan to reduce debt vulnerabilities while safeguarding resources to protect vulnerable groups
	May 7, 2020: IMF approved US$739 million loan to be drawn under the Rapid Credit Facility (RCF);	The RCF will help Kenya to address the sudden shock of the impact of COVID-19 that left Kenya with significant fiscal and external financing needs.
European Union	June 9, 2020: The European Union (EU) granted Kenya an Ksh.7.8 billion to address the impact of COVID-19	The amount of Ksh.3.6 billion was for containing the spread and impact of COVID-19; Ksh.1.2 billion for direct support to vulnerable families; Ksh.2.4-3 billion was to SMEs, and Ksh.600 million for the Safe Trade.
JICA	JICA provided water treatment chemicals to nine water service providers (WSPs)	Provision of Water Treatment Chemicals to Nine Water Service Providers involved the procurement of chemicals for a period of three months to lessen the plight of 2.2 million people served by the nine WSPs.
	19 May 2021: Japan donated Ksh 212 million to improve the cold chain capacity for COVID-19 vaccines roll out	The funding will support the Government of Kenya in its COVID-19 vaccination efforts, especially through the procurement of equipment for vaccine storage, distribution, and continuous temperature monitoring, including storage for vaccines that require "ultra-cold" temperatures.
	Aug 27, 2021: Japan donated 500 kits to Kenya Medical Research Institute	The donation will enable KEMRI conducts 50,000 PCR tests.
UNDP	The UNDP-led Consolidating Gains and Deepening Devolution in Kenya project remobilized $3.1 million towards mitigating the impact and spread of COVID-19	The rapid response will include interventions such as messaging campaigns targeting vulnerable populations, provision of personal protective equipment (PPE), deployment of personnel with medical experience, and engagement of quarantine centres.
USAID	1 July 2020: The US government granted Ksh5.3 billion ($50 million) to support response and recovery efforts during COVID-19 pandemic.	About Ksh1.5 billion Kenyan Shillings ($15 million) will be used to strengthen health and water systems, Ksh2.5 billion will be used to ensure small businesses stay afloat, and Ksh610 million will ensure children keep learning through distance learning.
World Food Programme (WFP)	July 2020: the WFP launched a three-month cash transfer and nutrition support for 279,000 underprivileged families affected by COVID-19	The cash distributions will support people struggling to survive from the impact of COVID-19 on informal settlements in Nairobi and Mombasa. Each family received 4,000 Kenyan shillings each month.
COVID-19 vaccines from UK, Denmark, US, Poland, France, Germany, Slovakia and COVAX, through UNICEF	**31 July, 2021** – 410,000 doses of the AstraZeneca-Oxford COVID-19 vaccine donated by the UK Government. **21 June, 2021** – 358,700 doses of AstraZeneca-Oxford COVID-19 vaccine donated by the Government of Denmark. **August 23, 2021** - 880,460 doses of the Moderna COVID-19 vaccine, donated by the United States government. **September 17, 2021** - 795,600 doses of Pfizer-BioNTech COVID-19 vaccine from the US government **August 17, 2021** - 407,000 doses of the AstraZeneca-Oxford COVID-19 vaccine from the United Kingdom **13 September, 2021** - 210,000 doses of the AstraZeneca vaccine from the government of Poland **26 May, 2021** - 72,000 COVID-19 vaccines from the COVAX facility, which were re-distributed from South Sudan. **28 Sept, 2021** - 210,600 doses of Pfizer vaccines from the United States Government. **8 July, 2021** - 182,400 doses of AstraZeneca coronavirus vaccine from France under the UN COVAX facility. **9 October, 2021** - 860,000 doses of AstraZeneca vaccine from France (300,000), German (401,900) and Slovakia (160,000).	

Source: Each organisation's website

3.2.2 Agriculture and Crops to Study

(1) Production and Trade

1) State of Agriculture

a. Main Crops and Dietary Life

Maize is the staple food crop in the country and its production is tied to food security. Given its significance at a national level, it is grown in almost all parts of the country except in northern and North-eastern Kenya which are arid. The crop is mostly produced in the North Rift with Trans Nzoia and Uasin Gishu counties producing large surplus on medium and large-scale farms. Import volume is equivalent to domestic production. Maize is milled to flours as *Ugali.*

Wheat is the second most important cereal grain in Kenya, after maize. The country produces an average of 300,000 metric tons annually. The crop is mainly grown on medium and large farms at 1,500m above sea level, accounting for 75% of planted area. Although the demand for the crop has continued to rise, production has fluctuated mainly due to rainfall variability. Kenya's wheat production can meet about 40% of its annual demand, which leads to imports from Russia (32%), Argentina (27%), Ukraine (20%), USA (11%) and other countries (10%). Wheat flours are processed to breads or chapati.

Rice is the fourth most important staple food in Kenya after maize, beans and wheat. The crop is mainly produced in irrigation schemes of Mwea, Ahero, Bunyala and West Kano managed by the National Irrigation Authority (NIA). Rice production from these schemes accounts for 95% of the total national production. Mwea accounts for 78% of the irrigated areas and 88% of production. The remaining 5% is cultivated under rain-fed conditions in Kwale, Kilifi and Tana River Counties in the Coast region.

Sorghum and millet have progressively increased in the recent past. These are drought tolerant crops that have thrived in marginal areas of South-Eastern region (Machakos, Makueni, Kitui, Embu and Meru counties) and Nyanza region, which accounts for 42.5% and 40.5% of the total national production of sorghum. Similarly, Eastern region is the lead producer of millet, accounting for more than 50% of national production. For both, millet and sorghum, production remains well below the consumption. The Agricultural Sector Transformation and Growth Strategy (ASTGS) classifies sorghum as one of Kenya's major food crops and implements strategies to improve productivity and marketing. In addition to serving as a staple food, millet is fermented to produce *uji* (liquid food) and *chibuku* (alcoholic beverages).

Irish potato is the second most important food item after maize in calory base, with its importance growing along with urbanization and expansion of fast food chains. It is grown mainly by small-scale farmers as a cash and a food crop. Potatoes are typically produced under rainfed conditions during two seasons. Farmers cultivate potatoes with maize and beans, and some farmers plant potatoes after maize, wheat, and wheat. In the areas with an average field size of less than 1 ha such as the counties of Meru, Kiambu, and Nyeri, farmers grow potatoes on up to 40% of the cultivated land without crop rotation, which resulting in frequent outbreaks of pest damages. According to MoALFC statistics, potato production has grown by nearly 260 percent since 1990, while yields have more than doubled (115 percent). However, the expansion of crop area and yield is hampered by insufficient availability of high-quality planting seeds. Irish potatoes can be cooked mashing, in soup, and fried in households.

Banana is Kenya's most important crop in fruit sub-sector in value. It accounts for 37.6% of the total fruit production. The crops are mainly cultivated by smallholders under rain-fed conditions. According to Africa Harvest, there are about 390,000 banana farmers in Kenya, of which about 84% are smallholders. Cooking banana is a variety belonging to East African Highland Banana and has a triploid gene structure. The way to cook is steaming, mashing, and frying.

Legume crops grown in Kenya are including beans, cowpeas, pigeon peas and green grams. Beans are the staple dietary food taking protein and boasts of 28 cultivated varieties. The crop is mainly grown in Eastern, Western and Central regions of the country. Although production areas have increased since the 1990's, the yields have fluctuated. Cowpea is the second most cultivated legume crop in Kenya; with 85% of the area under cultivation and 91% of the total production in the semi-arid of Eastern region. Pigeon peas and green grams are the other legume common crops cultivated. Like the cowpeas, pigeon

peas and green grams are mainly grown in the semi-arid areas in the lowlands. Beans are eaten by boiling, mashing, or simmering in soup.

Fruit crops such as mangoes (Eastern and Coast regions), bananas (Meru and Kisii) and oranges (Eastern and Coast regions) are significant cash crops at household levels. The country is also a producer of **oil crops** (mainly for the local market) – notably sunflower and coconuts. Sunflower farming is commonly practiced in Western region, while coconut is commonly found in the Coastal region.

Vegetables account for nearly half (47 percent) of total production value. The leading vegetables by production volume and value are Irish potatoes, tomatoes, and cabbage, all of which are widely consumed by rural and urban households. The bulk of vegetables are produced by small-scale farmers. Vegetables are grown in a wider range of areas across the country than any other horticultural subgroup.

Roots and tuber crops are an increasing demand and popularity for sweet potatoes in Kenya as a healthy food. The crop is mostly grown by small scale farmers in most parts of the country – namely North Rift, Western, Nyanza and Eastern regions. Cassava is another important tuber that is grown in the marginal low fertility soils of Western, Nyanza and Coast regions. Although there is no strong market for cassava, farmers set a side cultural and dietary preference (for cereal) and grow the crop. Its complimentary role to cereals and farmer perception that cassava can 'rests' the soil presents the entry point for sustainable agriculture and food security.

Tea is Kenya's principal agricultural sub-sector. The crop is cultivated in the highland areas of the country – mainly in Central, Rift Valley and Western regions. It is estimated that 62% of the total productions comes from the west side of the Great Rift Valley (Kericho, Nandi, Bomet and Nyamira), while the remaining 38% is grown in the east side of the Great Rift Valley (Kiambu, Nyeri, Embu, Meru and Kirinyaga). The tea industry in the country is dominated by two types of producers - small scale growers and large-scale plantations. Support for tea leave producers (expansion of cultivated land, export marketing, regulation) has historically been led by the private sector. The government is supporting this sub-sector through the Tea Board of Kenya and the Kenyan Tea Development Corporation (KTDA Holding Ltd.), supplying inputs, disseminating services to small farmers, and improving tea processing technology. It aims to improve marketing and curb unfair competition. It is sold under different brands from exporting brands for domestic consumption, but 95% is directed to export.

Coffee, like tea, is a highland crop - grown in regions that receive more than 1,000mm rainfall annually and at an altitude of 600-1,800 m ASL (Above Sea Level). Thus, the crop is grown in Central, Eastern (Meru, Machakos, Tharaka Nithi, Makueni), Western and Nyanza (Kisii and Nyamira). Coffee is regarded as the fourth leading foreign exchange earner after tourism, tea and horticulture.

Production of coffee has increased in the recent past and this is attributed to better management of the institutions in the sectors. Although the cultivation area of coffee has expanded in recent years to 119,700 ha (2019/20, KNBS), the yields have fluctuated between 27.9 and 35.1 ton/ha for smallholders and 42.1 to 59.5 ton/ha for large plantations in the past five years, and production fell 18% from all fiscal years in 2019/20. Quality control is graded by private companies and coffee associations under the guidance of regulators, priced by Nairobi Auctions, and shipped to international markets. Domestic consumption is limited.

Sugarcane farming is predominantly carried out in Western and Nyanza regions, and most recently in Kwale in the Coast region. The crop was recognized as a cash crop in the country in the 1970's for two main reasons. First as an import substitution to the country's refined sugar needs; and secondly a response to political pressure to introduce a cash crop in Western region. Although sugarcane farming has remained the main source of livelihood to cultivating farmers, it is bedeviled with numerous challenges – bringing to question its viability as an economic venture. Nevertheless, sugar production is closely linked to government and is strongly influenced by national and international policies. Kenya's sugar industry continues to be sluggish due to high production costs, while some private companies are trying to operate more efficiently through privatization.

b. Eating habits

Maze is Kenya's most important grain and supplies more than one-third of its caloric intake. In terms of

land use, maize occupies about 56% of arable lands. Most Kenyans prefer white maize to consume as *Ugali*. Ugali is usually eaten with stewed vegetables and meats or mixed with fermented milk as part of the morning meal to eat porridge. The average annual consumption of maze is 70 kg/person (2018). Wheat is the second most important staple food and accounts for 17% of staple food consumption. Beans follow third. It accounts for 9% of staple food calories and 5% of total food calories. The increase in rice consumption far exceeds that of wheat (4%) and maize (1%), and is increasing by 12% annually (MAFAP, 2013). In 2018, the annual consumption of rice on a weight basis will be about 1/3 of that of maize. It is equivalent to about half of wheat. Other staple foods consumed by Kenyans are potatoes, cooking bananas and cassava. Due to the lack of food in Kenya, wheat and rice imports are high. According to FAO statistics, Kenya's average food intake is 2,155 kcal /person/day. Of these, 1,183 kcal (55%) is taken from staple foods such as maize, wheat, beans, potatoes, cooking bananas, and rice. Next, the annual food intake per person is shown on a weight basis.

Table 3.2.4 Contents and results of cooperation by development partners

食品	2017	2018	前年比
	（kg/year/person）		(%)
Milk and products (Excluding Butter)	89.4	93.3	4.4
Maize and products	64.2	69.5	8.3
Wheat and products	39.1	41.3	5.6
Vegetables, Other and products	23.6	32.6	38.1
Potatoes and products	26.4	29.9	13.3
Bananas	15.1	27.5	82.1
Rice and products (Milled Equivalent)	22.7	20.6 （25.5 in 2020）	-9.3
Cassava and products	23.1	19.8	-14.3
Sweet potatoes	22.2	18.0	-18.9
Sugar and products (raw equivalent)	13.5	16.3	20.7
Beans, Dry and products	16.1	16.0	-0.6
Meat and products, Bovine	12.6	14.0	11.1
Tomatoes and products	6.0	8.5	41.7
Freshwater fish	3.1	3.1	0.0
Meat and products, Poultry	2.3	2.6	13.0
Sorghum and products	2.2	1.9	-13.6
Eggs and products	1.5	1.6	6.7
Millet and products	1.2	1.0	-16.7
Onions, Dry	0.9	0.8	-11.1
Meat and products, Pig	0.3	0.4	33.3

Source: Kenya - Per Capita Food Consumption - Humanitarian Data Exchange (humdata.org)
Rice consumption rate in 2020 was given by Rice Promotion Programme Unit (RIPP) of MoALFC.

In Kenya, maize is considered food for workers because the proportion of maize in staple food spending tends to be higher in the poor. Maze accounts for about 20% of the poorest total food spending. On the other hand, in recent years, consumption of wheat and rice has been increasing in urban areas. Boiled maize and beans (*gezeri*), maize, beans, vegetables and potatoes (*irio*) are also typical Kenyan meals. Mashed banana (*matoke*) is an alternative food to maize. Other staple foods are cassava and sweet potatoes, and rice in urban. Milk and dairy products are also part of the staple food, especially in grazing communities such as the Masai, Samburu and Turkana.

2) Main Cropping Seasons and Agricultural Zones

Kenya’s climate varies from tropical on the Indian Ocean coast to arid further inside the country, influenced primarily by the inter-tropical convergence zone, by relief (Great Rift Valley and high mountains) and by large water bodies. Long-term average annual precipitation is 630mm, ranging from less than 200mm in Northern region to over 1,800mm on the slopes of Mount Kenya. The rainfall distribution pattern is bimodal with long rains falling from March to May and short rains from October to December for most parts of the country (WRMA, 2013). Agriculture is mainly rainfed and the bimodal rainfall allows two cropping seasons per year except in high altitude areas.

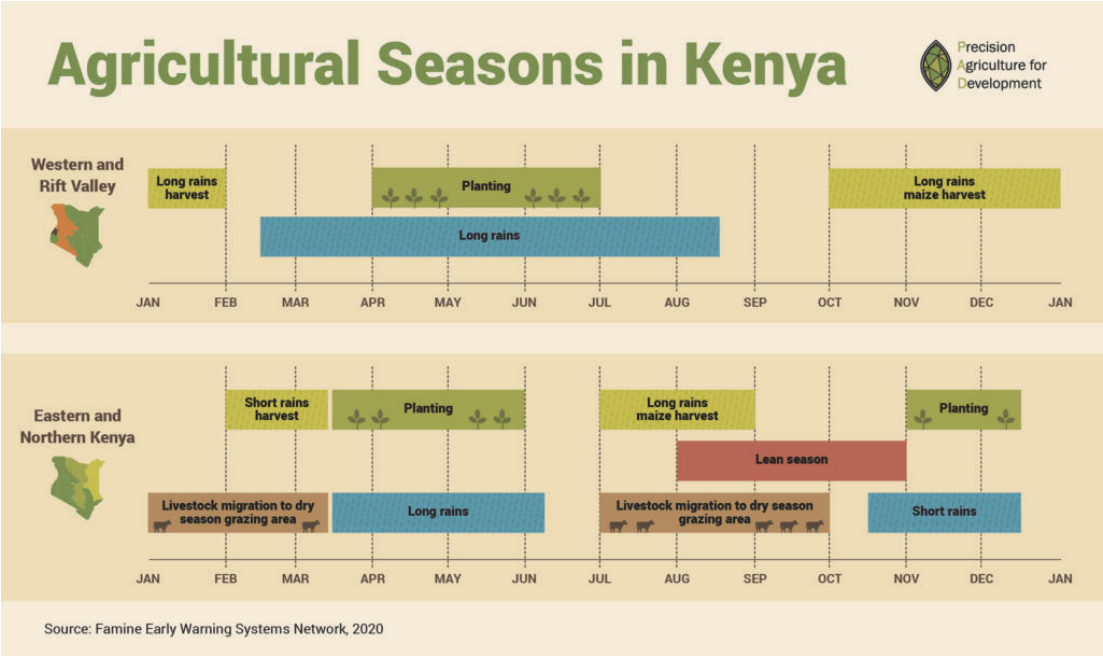


Figure 3.2.3 Agro-ecological zones of Kenya

Agro-ecological Zoning (AEZ) refers to the division of an area of land into smaller units, which have similar characteristics related to land suitability, potential production, and environmental impact. An Agro-ecological Zone is a land resource mapping unit, defined in terms of climate, landform and soils, and/or land cover, and having a specific range of potentials and constraints for land use (FAO 1996). The essential elements in defining an agro-ecological zone are the growing period, temperature regime and soil mapping unit. Kenya has 5 agro-ecological zones for agricultural production.

Table 3.2.5 Agro-ecological zones of Kenya

Agro-ecological zone	Area (km^2)	Percent (%)
I. Agro-Alphine	800	0.1
II. High Potential	53,000	9.2
III. Medium Potential	53,000	9.2
IV. Semi-Arid	48,200	8.5
V. Arid	300,000	52.9
VI. Very arid	112,000	19.8
Water	15,600	2.6

Source: Sombroek, et al., 1982

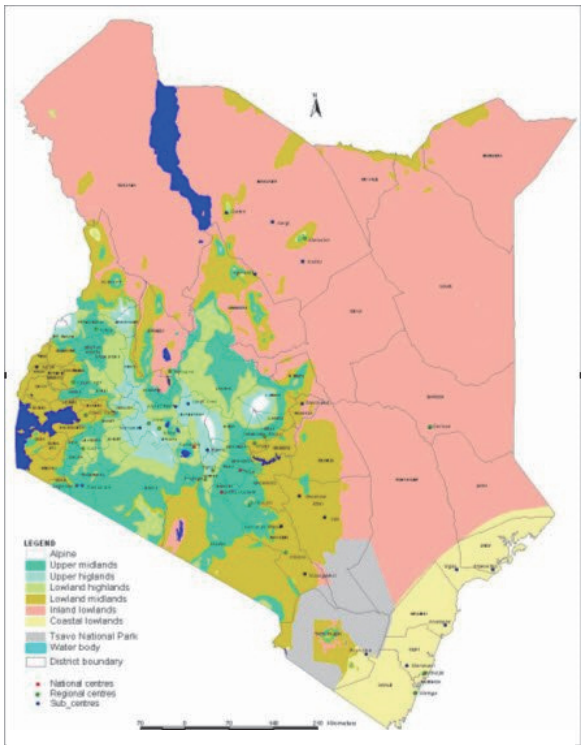


Figure 3.2.4 Agro-ecological zone map

Zone I: This zone has no direct importance in agricultural production other than being the source of rain and some rivers/streams. It is confined to mountains and immediate surrounding such as Mt. Kenya and Mt Elgon.

Zone II: This zone is generally restricted to the highlands of Kenya between 1,980m and 2,700m and occurs as a forest or open grasslands. This zone is found in the surrounding of Mt. Kenya (parts of Meru, Embu, Kirinyaga and Nyeri), isolated parts of the Rift Valley around Mau and Aberdares mountains (e.g around Kericho and Nyahururu respectively) and the surrounding of Mt. Elgon (e.g

around Kitale and Webuye). The minimum rainfall is 1,000mm.

Zone III: This zone occurs mainly at elevations between 900-1,800m with annual rainfall between 950 and 1,500 mm. Trees are numerous here and somewhat of shorter stature than in Zone II. This zone is the most significant for agricultural cultivation and several legume fodders are found here in crop-livestock systems. It is also the most resettled by human. It occurs in the vast parts of Nyanza, Western and Central regions, good proportion of Central Rift-Valley (Nandi, Nakuru, Bomet, Eldoret, Kitale) and a small strip at the Coast region.

Zone IV: This zone occupies more-or-less the same elevation (900-1,800m) as the previous or may be at times lower. However, it has lower rainfall of about 500-1,000mm. This is typically represented in surroundings of Naivasha, vast parts of Laikipia and Machakos counties vast parts of central and southern Coast region. It is the home of most Acacia trees and shrubs.

Zone V: This zone is much drier than Zone IV and occurs at lower elevations. Annual rainfall is 300-600mm. This Zone is prevalent in northern Baringo, Turkana, lower Makueni and vast parts of North Eastern region.

Zone VI: This zone is considered as semi desert and the driest part of Kenya. Annual rainfall is 200-400mm and is quite unreliable. The zone is found in Marsabit, Turkana, Mandera and Wajir counties. Being the most delicate zone, both annual and perennial grasses are dominant.

Zone VII: This is represented by Chalbi desert in Marsabit county. The Chalbi is a salt desert with very sparse salt bushes as the only vegetation found. It is vast and of beautiful scenery. Pastoralists use it as source of mineral lick for livestock, particularly during the rainy season.

3) Agricultural Sector Policy

MoALFC has formulated the Agricultural Sector Transformation and Growth Strategy (ASTGS) 2019-29. The plan emphasizes the shift of small-scale agricultural, livestock and fishery producers from self-sufficiency production to innovative, commercial-oriented modern agriculture. The strategy consists of three anchors and sets goals for the first five years

Anchor 1: Increase the income of farmers, pastures and fishers.

Improve the income of farmers and fishers from 465 Kshs /day to 625 Kshs day.
Direct benefit to 3.3 million farmers.

Anchor 2: Increase agricultural, livestock and fish production to add value.

Expand agricultural GDP from 2.9 trillion Kshs to 3.9 trillion Kshs.
Agricultural processing production value will be increased by 130 billion Kshs from 261 billion Kshs in 2018.

Anchor 3: Strengthen food supply to the people.

Reduce the number of food-insecure Kenyans in the arid and semi-arid lands (ASAL) regions from an average 2.7 million to zero, while reducing the cost of food and improving nutrition.
Protect households against environmental and fiscal shocks

The government will take nine strategies (flagships) to achieve the above goals.

i) Promotion of 1,000 SMEs that deal with 1 million small-scale farmers in 40 locations in 32 counties

ii) Subsidy and support for farm input by E-voucher to 1.4 million small-scale farmers and capacity development of farmers

iii) Installation of 6 agricultural processing complexes (Agro-processing Hub)

iv) Development of 50 large-scale farms with more than 2,500 acres and supply of irrigation water to 150,000 acres

v) Strategic reserve management review of 2 to 3 target crops and food supply to 4 million people with malnutrition

vi) Resilience of food supply to 1.3 million farmers and herders in the ASAL region led by the community

vii) Capacity building of 200 government staff, strategic implementers, and 3,000 young people and achievement of agricultural extension worker with coverage rate of 1: 600

viii) Strengthening research and innovative technology development

ix) Risk monitoring management consisting of obstacles to the sustainability of agricultural production, climate change, disease damage and global price shocks including assistance for soil diagnosis.

2) Main Crop Production

Kenyan agriculture is predominantly carried out on small-scale farmers and mainly in high-potential areas. Average farm sizes are 0.2–3ha. Small-scale production represents roughly 75 percent of the total agricultural output and 70 percent of the marketed agricultural produce. Smallholders account for over 70 percent of maize, 65 percent of coffee, 50 percent of tea, 70 percent of beef, and 80 percent of milk production. Largescale farming is practiced on farms averaging about 50ha for crops and 30,000ha for livestock ranches. The large-scale farming subsector, which accounts for 30 percent of marketed agricultural produce, mainly involves growing commercial crops such as tea, coffee, maize, sugarcane, and wheat.

Agricultural production in Kenya is dominated by maize (38.2 percent) and dry beans (18.7 percent), which together cover well over half of total cropped area in 2012. The remainder comprises more than 150 other food and cereal crops, with sorghum (3.9 percent), cowpea (3.8 percent), tea (3.4 percent), coffee (2.8 percent), wheat, potatoes, pigeon peas, and millet among the most important (FAOSTAT). This crop composition has been stable over time, with the exception of maize and dry beans. Rice is produced in irrigated areas, and upland rice is limited, but production has begun in 24 counties due to rapid growing demands. The production of major crops is shown below. The increase / decrease in production is greatly affected by the amount of rainfall in that year. The 2017 decline in production was caused by drought.

Table 3.2.6 Major Crop Production (ton)

Crop/ Year	2017	2018	2019	2020
Maize	3,186,000	4,013,777	3,963,850	3,820,820
Wheat	165,200	336,600	319,720	374,046
Rice	81,198	112,605	102,925	140,660
Irish Potato			1,978,952	2,396,198
Dry Beans	846,000	837,000	770,177	597,420
Bananas	1,434,162	1,414,176	1,715,770	
Sorghum	144,000	189,000	288,000	253,786
Millet	54,000	72,000	135,000	118,150

Source: FAOSTAT and MoALFC for 2019 and 2020

3) Trade and Distribution

Kenya's total exports amounted to US$ 6.02 billion (2020), with growth of 3.2% in the previous year even under COVID-19 pandemic. Major agricultural products and foods accounted for 51% of the total, but air-transported agricultural products such as flowers, fresh vegetables and fruits were greatly affected by COVID-19, and there were times when the airport was closed and exports were not possible. There was also a refrain from buying in consuming countries such as the Netherlands and UK. On the other hand, tea and coffee were strong, and exports to major exporters Pakistan, UAE and Egypt did not decline. This is largely due to the limited closure of Mombasa Port.

Domestic distribution and imports were affected by lockdowns from April to June 2020, agricultural market facilities were closed, and distribution was stalled due to the ban on border crossing movement. Now, the lobbying activities of the National Agriculture and Food Safety Agency (AFA) have issued special traffic permits to agricultural transporters, and the logistics situation in the Northern corridor and

branch lines have been restored. However, at the border at Busia and Malaba with Uganda, the congestion of freight vehicles has not been resolved, and they are forced to wait for about three days. Logistics via LAPSSET (Port of Lam-South Sudan-Ethiopia Corridor) has not yet started.

Trade with neighboring countries increased with maize, rice, beans and millet after the COVID-19 pandemic. This was partly due to the stagnation of the international grain and legume supply system, and the border trade has served as a buffer to supplement the domestic shortage of supply from neighboring countries.

Table 3.2.7 Import from neighboring countries for staple foods

Crop	Country	2016	2017	2018	2019	2020	2021	Change in COVID-19 pandemic period
Maize	Tanzania	92,845	9,207	37,968	68,453	30,511	195,853	Increased import from Tanzania for maize
	Uganda	57,954	176,029	247,441	61,037	119,234	98,925	
	Ethiopia	1,975	69,668	454	341	37	0	
	Others	0	1,026,820	34,390	500	203,979	222	
Wheat	Tanzania	40	9	0	581	0	0	Decreased import due to scale-down of consumption for wheat
	Uganda	0	0	0	0	0	0	
	Ethiopia	0	927	66	5	154	58	
	Others	1,566,749	2,007,510	1,411,116	4,265,441	1,502,465	1,019,171	
Rice	Tanzania	5,694	1,290	2,452	839	28,172	73,372	Increased import from Tanzania, while decreased from Pakistan and others for rice
	Uganda	357	75	0	494	0	6	
	Ethiopia	1,533	6,174	2,866	0	2	0	
	Others	30,002	174,893	338,176	508,503	241,409	95,790	
Beans	Tanzania	10,620	1,590	1,662	7,608	6,944	9,330	Increased import from Uganda for beans
	Uganda	31,580	81,571	52,074	23,481	23,309	84,482	
	Ethiopia	0	9,279	22,733	0	17,824	5,742	
	Others	0	0	25	72	0	0	
Sorghum	Tanzania	42	1,015	3,392	1,320	11	6,066	Increased import from Tanzania and Uganda for sorghum due to scale-up of consumption
	Uganda	804	3,761	1,656	1,059	1,440	7,838	
	Ethiopia	132	1,872	2,379	57	344	0	
	Others	137,291	101,170	35,220	116,040	11,219	12,450	
Finger Millet	Tanzania	0	840	430	1,176	1,451	4,638	Increased import from Tanzania for finger millet
	Uganda	1,623	3,986	3,307	2,309	2,201	1,468	
	Ethiopia	0	2,974	888	0	0	465	
	Others	0	0	52	0	0	0	

Source: Data of Border Trade Survey, MoALFC, 2022

4) Distribution Structure

In Kenya, “modern distribution” is still in the development stage, and there are many "traditional distribution" with a multi-layered distribution structure in which wholesalers / traders intervene between producers and retailers. In addition, the ratio of "modern distribution" accounts for 30-40% of total sales. Various types of market facilities are existing such as Wakulima wholesale market, Hawkers market, Rental market, Development tenant purchase market, Self-construction market, and open air market. The conventional distribution through the wholesale market in the city has become an inefficient distribution channel due to the influence of traffic congestion in the city, and the traders in the production areas are shifting to direct delivery to retailers in various markets. On the other hand, distribution via the wholesale market is booming in rural areas. The distribution channels of industrial crops (sugarcane, tea, coffee and pyrethrum) are specialized in direct loading to processing factories.

However, the Kenyan market has shown increasing constant growth over the last two decades, with per capita income almost doubling in the last eight years alone. Kenya's retail market is more competitive than many other African countries with growing populations, increasing urbanization rates, growing

middle-income earners, and customers demanding higher levels of service and quality. Is expected to continue to grow at a high rate.

Looking at the Kenyan food retail market in terms of production in the upper reaches of the food value chain, Kenya's agricultural market is still very fragmented. That is, about 70% of agricultural products are produced by small-scale farmers, and local wholesalers procure agricultural products. In addition, especially around Nairobi, where fresh agricultural products are distributed, the modernization of distribution has begun. Specifically, the downstream part of the food value chain is going to integrate retail, wholesale, logistics, finance, and other services such as shopping malls. In particular, Uchumi, which had government capital, and Nakumatt, who was in debt due to the fire, have declined, shopping malls have been built one after another in Nairobi, and international capital Carrefour, Food Plus and local capital Naivas are increasing the number of stores.

Retailers positioned downstream of the food value chain to improve the country's traditional distribution structure, adjust harvest times and improve quality standards for products that are in high demand by middle-income and above consumers. In addition, a platform started in 2021 on a smartphone or website called *Viazi Soko* (meaning Potato Market) to procure potato agricultural materials and receive agricultural services, and 2,000 farmers have registered as of July 2021. DigiFarm, a subsidiary of Safaricom (mobile phone communication company), provides small loans, agricultural information services, and agricultural product sales support services, and has acquired 1 million registrants as of December 2021. In this way, there is a favorable factor that the introduction of ICT in distribution and agricultural services will develop in Post-Corona.

In Kenya, there are chronic food shortages in the north and northeast areas. In arid and semi-arid areas, food transportation will be hindered due to locust plague in 2019-2020, lack of rainfall in the first half of 2021, and sluggish distribution to rural areas due to the influence of COVID-19. The traditional distribution scale has a structure that does not keep up with demand. There is concern about food shortages in the areas shown in brown color in the figure on the right.

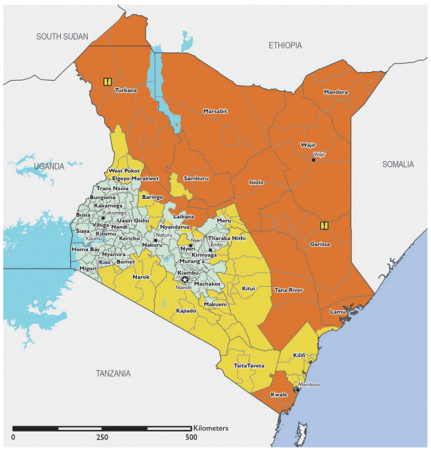


Figure 3.2.5 Food shortage area (Beginning of 2022)

Source: FEWS-USAID

(2) Selecting Crops to Study

The target crops were selected the factors; large quantitative consumption in Kenya and having economic impacts such as domestic distribution and export. However, horticultural crops handled by the Project for Smallholder Empowerment and Agribusiness Promotion (SHEP-BIZ) were excluded. As for the survey area, the priority counties were decided by the result of the remote meeting with the directors of the Crop Resources, Agribusiness and Marketing Development Directorate, MoALRC, and then the survey target areas were adjusted with the Capacity Development Project for Enhancement of Rice Production in Irrigation Schemes (CaDPERP) and the recommendation of Agriculture and Food Authority (AFA) officers at the time of the key informant survey.

Table 3.2.8 Selection of crops and survey area

Target	VC survey area	Reason of selection
1. Maize	• Uasin-Gishu	The largest milling company is located in the area where maize is accumulated.
2. Rice	• Busia (Bunyala Irrigation Scheme)	Avoided CaDPERP sites in Kisumu. Agricultural Mechanization Hub has started in the area.
3. Potato	• Nyandarua	The *shangi* variety, which is popular among farmers, is cultivated. In addition, seed companies are concentrated in the area.
4. Dry Beans	• Makueni	Beans and peas are important crops in semi-arid areas for nutritional improvement.
5. Cooking Banana	• Meru	Cooking banana is a important carbohydrate source with a large production. The crop is an alternative to staple foods such as maize.
6. Sugarcane	• Kwale	While state-owned factories are closing, Kwale is improving VC by the investment of

	• Kisumu	Mauritius private sugar company renewing its plant. Kisumu is located at the KARLO Sugarcane Research Institute.
7. Tea	• Kericho • Meru	Kericho has many Outgrowers and the KARLO Tea Research Fund is located. Meru produces a new variety of Purple Tea.
Urban Consumption	• Nairobi • Mombasa • Kisumu	Majority of workers and office workers whose income sources have decreased due to the COVID-19 pandemic, and possible to survey changes in their food consumption patterns.

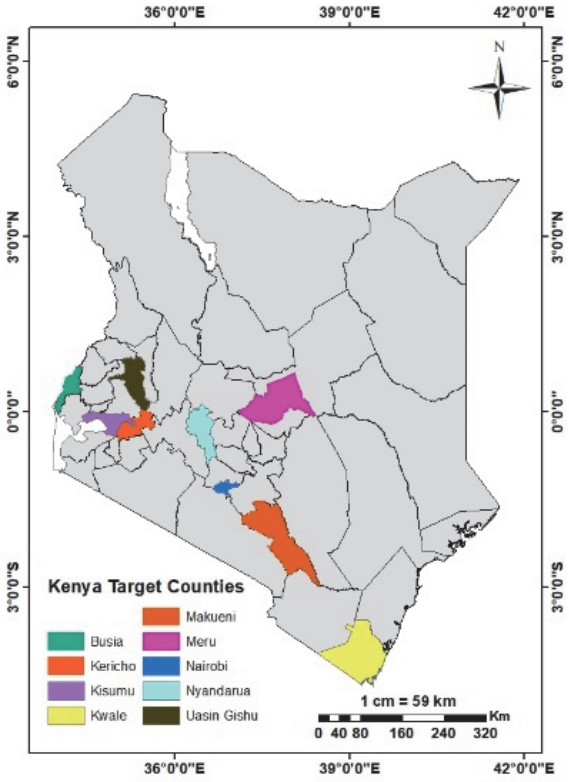


Figure 3.2.6 Survey area

Table 3.2.9 Numbers of surveyed samples

#	Crops	County	Sample Size						Total
			Input Dealers	Producers	Distributors	Processors	Retailers	Consumers	
1	Maize	Uasin Gishu	1	265	5	34	24	0	329
2	Rice	Busia	0	258	0	3	2	0	263
5	Bananas	Meru	0	144	1	2	36	0	183
3	Irish Potatoes	Nyandarua	0	237	0	0	12	0	249
4	Green grams	Makueni	0	237	0	0	21	0	278
6	Sugarcane	Kwale	0	65	0	0	0	0	65
		Kisumu	0	80	0	0	0	0	80
7	Tea	Meru	0	140	0	1	0	0	141
8	Consumers	Nairobi	0	0	0	0	0	439	439
		Mombasa	0	0	0	0	0	394	394
		Kisumu	0	0	0	0	0	111	111
TOTAL			**1**	**1,426**	**6**	**40**	**95**	**944**	**2,532**

Note: There is a bias in the sample numbers, but this is because it was difficult to meet with input goods dealers and processing plant managers due to the influence of COVID-19 pandemic.

(3) Overview of FVC

1) Maize FVC

a. Cropping season

Table 3.2.10 Cropping Calendar

Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maize (Short rain)	Growing		Harvesting							Sowing		
Maize (Long rain)												

b. Production area

Since maize is adaptable to a whole range of climate conditions, it is the single most extensively grown crop. This crop does the best in warm temperature high rainfall areas with loamy well drained soil. However, the chief growing areas are Trans Nzoia, Nakuru, Bungoma, and Uasin Gishu counties and parts of Rift Valley like Nakuru and Molo. In South Nyanza, other parts of the Rift Valley and Western regions, maize is grown alongside other subsistence crops like beans, potatoes and bananas.

c. Supply chain

The most important inputs in the maize value chain are typically land, seeds, fertilizers, agrochemicals, farm equipment, and water. Other services in the pre-production phase include extension services, market information, credit, and certifications for production of e.g., seeds. In Research & Development (R&D), research tends to focus on how to increase productivity, improve seed varieties, adapt existing varieties to local conditions, and improve disease and drought resiliency of crops. Research requirements also extend to other segments, including extending shelf life of products through processing technologies such as drying maize or fortifying maize flour.

Small-scale farmers are dominant at the production level but success often depends on economies of scale of large-scale producers. In processing, initial tasks include cleaning, drying, and grading, while at advanced processing stages, there are two primary milling techniques for maize: dry milling and wet milling. Under marketing and distribution, maize's end uses can be divided into three primary categories: (1) Human consumption; (2) ethanol for fuel; and (3) animal feed. The government regulatory bodies are required to approve the sanitary and phytosanitary (SPS) conditions of outbound products and to ensure food safety and contain the spread of plant and animal diseases domestically. Maize requires large storage facilities

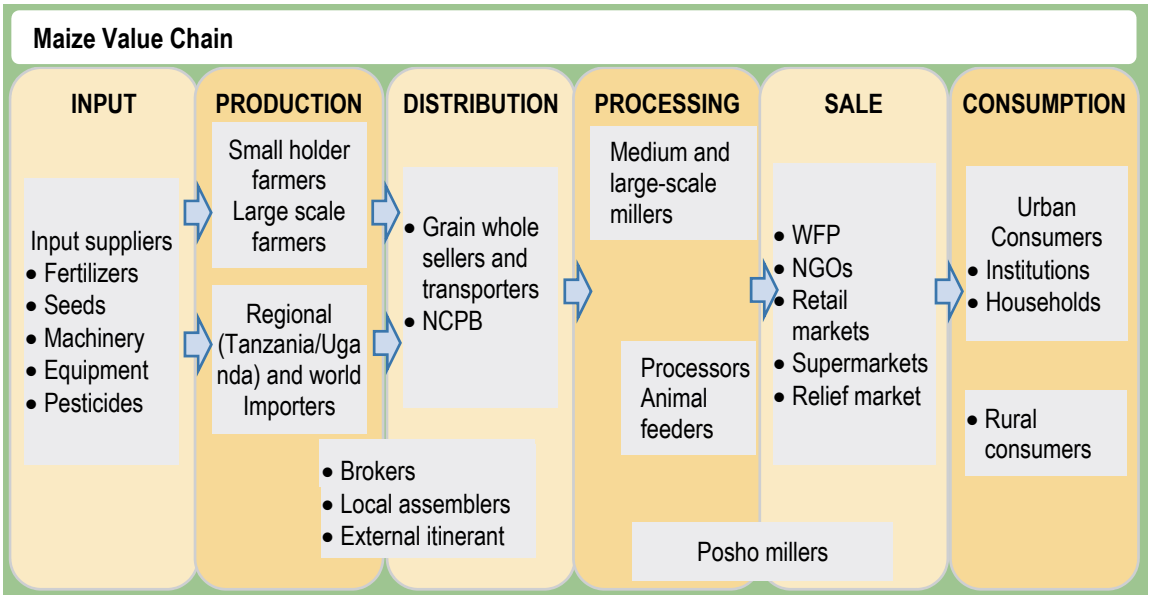


Figure 3.2.7 Maize value chain

d. Stakeholders

The Kenyan maize sector has many actors in the value chain, including farmers, input suppliers (seed companies, fertilizer and pesticide suppliers), traders, millers, retailers and consumers.

Table 3.2.11 Maize value chain stakeholders

Stakeholder	Brief Description	Role
Policy Making Bodies		
1. Ministry of Agriculture, Livestock, Fisheries and Co-operatives (MoALFC)	• Coordinate the formulation and implementation of agricultural policies	• Policy development and implementation • Official release of new varieties • Capacity building of officers, ASTGS implementors and SME operating youths • Technology transfer
2. County Governments Agricultural Office	• Leasing storage space. • Provision of services – commodity handling and management. • Issue licenses to Warehouse operators under WRS programme	• Suggest challenges in County development forums • Strengthen agency business partnerships. • Control exclusive supply of commodities. • Promotion of advance payments for products and services.
Regulatory Bodies		
3. Other Ministries, Departments and Agencies (MDAs), e.g., AFA, KEBS, NEMA, KEPHIS, PCPB, etc	• Regulatory agencies of the government	• Enforcement of policies and standards. • Guidance on policies and regulations. • Government goodwill and support. • Enactment of Legal Framework.
Farmers Organizations		
4. Farmers, farmer groups, co-operative societies, etc	• Kenya Grain Growers Cooperation Union (KGGCU), Kenya Farmers Association (KFA) etc.	• Maize purchase and fertilizer distribution. • Trade in commodities and provision of services. • Support in grain production. • Farmer empowerment.
Maize Traders and Companies		
5. National cereals and Produce Board	• NCPB is a State Corporation that was established in 1985 through an Act of Parliament (Cap 338). It is a Statutory Board under MoALFC	NCPB trades commercially in grains, provides grain post-harvest services, deals in fertilizer and other farm inputs like seeds, and offers clearing and forwarding services.
6. UNGA Limited	• UNGA Limited is an affiliate company of UNGA Holdings and is one of the largest millers in East Africa with a heritage of over a century in grain milling.	UNGA Limited provide a variety of human nutritional products ranging from wheat flour products to maize meal, porridge, pulses, and rice.
7. Kenya Seed Company	• KSC is a state Corporation that produces and markets quality seeds for the country's farming community.	• Seed Research & Development, • Seed Distribution, and • Seed Production
8. The Agricultural Finance Corporation (AFC)	• AFC is a Development Finance Institution (DFI) wholly owned by the Government of Kenya.	• AFC is entrusted with the mandate of assisting in the development of agriculture and agricultural industries by making loans and providing managerial and technical assistance to the loan

		beneficiaries.
9. Agricultural Development Corporation (ADC)	• ADC is a Government Parastatal, which was established in 1965 to promote the production of Kenya's essential agricultural inputs	• In facilitating the multiplication of seed, ADC plays the role of availing sufficient quantities and good quality seed to the Kenyan farmer
Research Institutions		
10. KALRO	• Maize research and development	• Development and dissemination of suitable technologies • Provision of basic seed • Research on pest and disease management • Maintenance and supply of breeder's seed • Capacity building on seed production and marketing • Variety testing/breeding
Development Partners		
11. Development Partners (ASDSP, KCSAP, Kilimo Trust etc)	• Resource mobilization • Technology transfer. • Farmer empowerment. • Optimal utilization of resources. • Compliance with international standards and trade protocols.	• Develop funding proposals. • Practice good governance. • Seek partnerships in farmer empowerment, technology transfer, optimal resource utilization, etc. • Seek technical support for compliance with international standards and trade protocols

2) Rice FVC

a. Cropping season

Table 3.2.12 Cropping Calendar

Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rice (Irrigated, 1st Crop)			Land Preparation			Transplanting/ Growing					Harvesting	
Rice (Ratoon or 2nd Crop)												
Rice (Uplands)												

Note: The crop calendar indicates the works in Mwea Irrigation Scheme, but the works in Western Region are not in pattern due to pumping irrigation.

b. Production area

The rice crop is grown by small-scale farmers for cash and food. In Kenya many areas are suitable for rice growing but low moisture and temperatures limit production. Rice production systems are classified according to ecology in terms of water as: upland, irrigated schemes, rain-fed lowland, and swamps, however 80% of rice production in Kenya comes from the irrigation schemes. The main schemes are Mwea (Central region), West Kano, Ahero, Lower Kuja (Nyanza region), Bunyala/Lower Nzoia (Western region), Hola and Bura (Coast region)

c. Supply chain

The main actors in the rice value chain in Kenya consist of input and service providers, primary producers, logistics centers and industries, traders and final consumers. Pishori rice produced in the Mwea sub-county is consumed domestically, and some of the Sindano rice produced in the western region is sold in paddy to Ugandan middlemen. Of the domestic distribution, in addition to private distribution, supply to the Kenya Domestic Trade Corporation (KNTC) is also the main distribution channel.

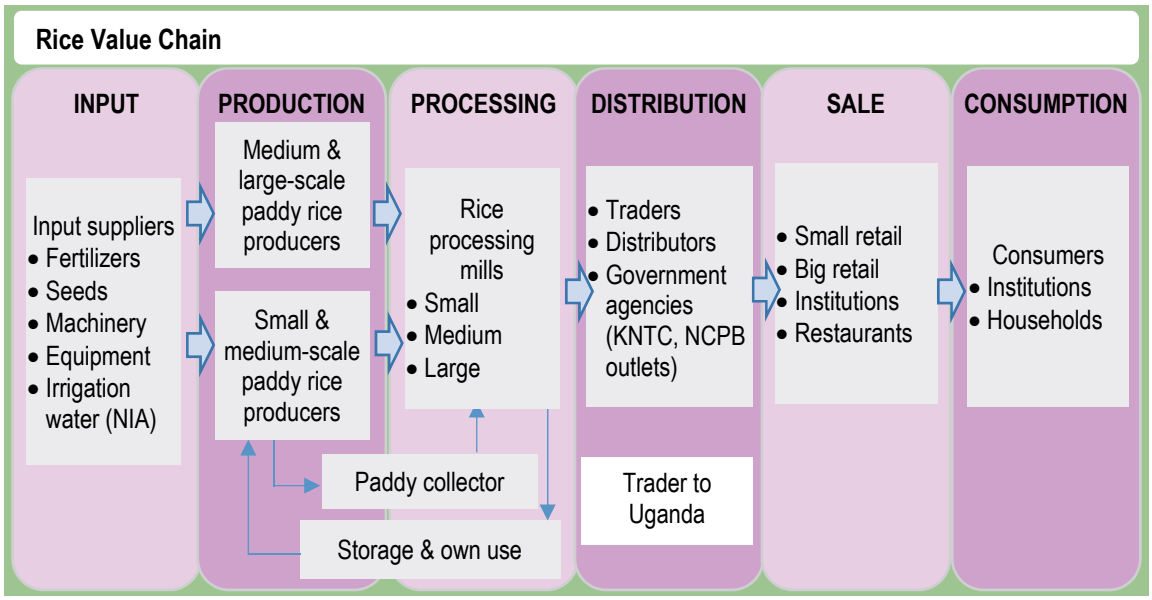


Figure 3.2.8 Rice value chain

d. Stakeholders

The main actors in the rice value chain in Kenya consist of input and service providers, primary producers, rice millers, traders, retailers and final consumers. The Rice Promotion Programme Unit (RIPP) has dominant role to expand production areas. National Irrigation Authority (NIA) is the management body of irrigation facilities.

Table 3.2.13 Rice value chain stakeholders

Stakeholder	Brief Description	Role
Policy Making Bodies		
1. Ministry of Agriculture, Livestock, Fisheries and Co-operatives (MOALFC) RIPP	• Coordinate the formulation and implementation of agricultural policies	• Policy development and implementation • Official release of new varieties • Capacity building of officers, ASTGS implementors and SME operating youths • Technology transfer
2. County Governments Agricultural Office	• Provide quality extension services and participate in the formulation and implementation of agricultural policies	• Suggest challenges in County development forums • Strengthen agency business partnerships. • Control exclusive supply of commodities. • Promotion of advance payments for products and services
Regulatory Bodies		
3. Kenya Plant Health Inspectorate Services (KEPHIS)	• Provide regulatory and advisory services	• Variety testing (NPT & DUS), • Granting of plant breeder's rights • Seed certification, • Phytosanitary and quarantine, soil and irrigation water analysis • Inspection of potatoes for export and import. Technology transfer and capacity building on seed production
4. National Irrigation Authority (NIA)	• The National Irrigation Authority was established on August 16, 2019 by the Irrigation Act No. 14 of 2019 as a successor institution of the	• The objective of the irrigation Act 2019 is to provide for the development, management and regulation of irrigation, to support

	National Irrigation Board.	sustainable food security and socioeconomic development in Kenya, and for connected purposes.
Research Institutions		
5. KALRO	• Rice research and development	• Development and dissemination of suitable technologies • Provision of basic seed • Research on pest and disease management • Maintenance and supply of breeder's seed • Capacity building on seed production and marketing Variety testing/breeding
Farmers Organizations		
6. Mwea Rice Mills Ltd (MRM)	• Mwea Rice Mills Ltd (MRM) is a subsidiary of the National Irrigation Authority. The rice mill is a limited liability company jointly owned by the Irrigation Authority (55%) and Mwea rice farmers through Mwea Rice Growers Multipurpose Co-operative Society Limited (MRGM) (45%).	• Buying, processing and sales of Rice. • Sales rice by-products. • Commercial milling services to farmers and traders. • Buying and selling of Paddy.
Millers		
7. Western Kenya Rice Mills (WKRM)	• Western Kenya Rice Mills (WKRM) Ltd was incorporated in 1993 and is jointly owned by National Irrigation Authority (60% shareholding and Western Kenya schemes Rice Farmers at 40% of shareholding).	• Its core business is processing and marketing of milled white rice mainly from Western Kenya Schemes.

3) Irish potato FVC

a. Cropping season

Table 3.2.14 Cropping Calendar

Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Potato (Long rain)			Land Preparation		Seed potato planting/ Growing				Harvesting			
Potato (Short rain)												

b. Production area

Potatoes are mostly grown in the highland areas where maize has low competitive advantage with over 70% of these potatoes being grown in areas 2,100m ASL. At this altitude potatoes grow faster than maize and produce more energy and carbohydrate per ha per day. Such areas include those surrounding Mt. Kenya namely; Meru, Embu and Kirinyanga; parts of Laikipia and both sides of the Aberdare range which include parts of Nyeri, Muranga, Kiambu and Nyandarua counties. Other areas include Mau Narok, Molo, Tinderet, Nandi Escarpment and Cherangani hills. Kericho, Kisii and around Taita hills have also been reported to grow potatoes too but in small acreages. Due to increased demand, potato production is being expanded to non-traditional potato growing areas such Kirinyaga, Naivasha and Tana River. This is the result of improvement to heat-resistant varieties, but further measures against diseases and nematodes are required.

c. Supply chain

The quality of potato is mainly decided by purity of seed potato with virus free> Potato seed producers produce seed starting with tissue culture. In addition, commercial seed growers apply that technology

and produce varieties for the domestic market. Although most farmers recycle crop from the previous season to use as seed, a growing number of small-scale seed "multipliers" and smallholder potato farmers have begun purchasing cuttings to produce seed. Most farmers do not store potatoes but sell directly from the field. The potatoes are marketed through a vertical chain involving many different handlers resulting in high transaction costs. Nearly all Kenya's potatoes are (almost) entirely sold to the domestic consumption market. Apart from households, restaurants, hotels and canteens are major potato consumers. The main part of the potato production in Kenya is sold unprocessed. A small part is processed into French fries (chips) or potato chips (crisps) by processors.

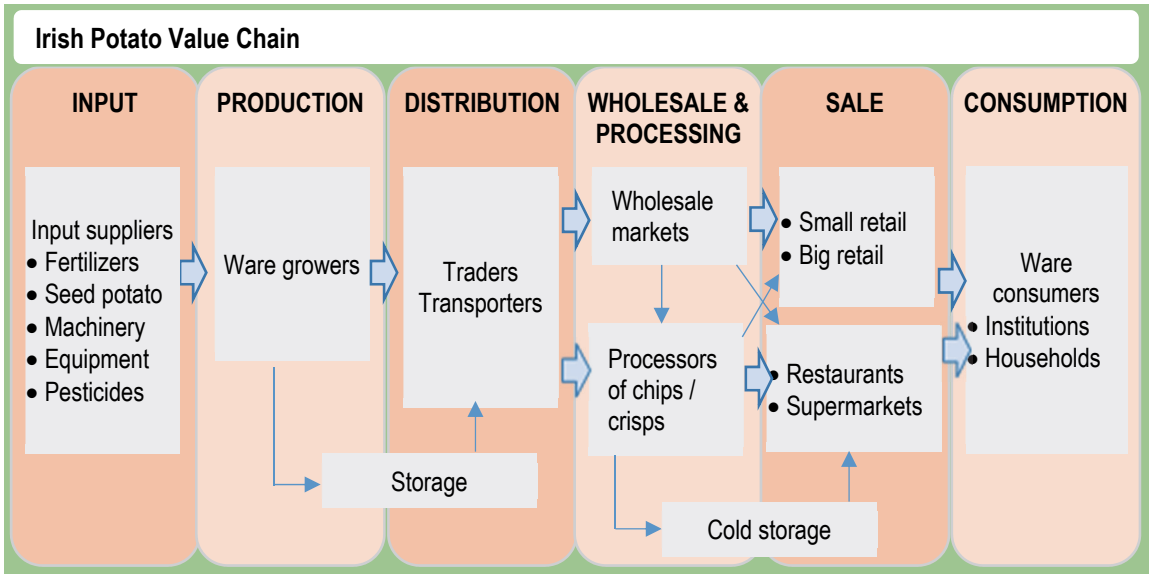


Figure 3.2.9 Irish potato value chain

d. Stakeholders

The key stakeholders in the Kenyan potato industry include the Government regulatory Agencies that include AFA, NCPB and KEPH1S. Other players who have organized themselves in various related groups are farmers associations and seed traders. Potato research is conducted by KARLO and ICP while there are various development partners who provide assistance to potato farmers.

Table 3.2.15 Irish potato value chain stakeholders

Stakeholder	Brief Description	Role
Policy Making Bodies		
1. Ministry of Agriculture, Livestock, Fisheries and Co-operatives (MoALFC)	• Coordinate the formulation and implementation of agricultural policies	• Policy development and implementation formulation of a National Potato Policy, review of the national framework and formation of a potato task force to look into factors affecting the industry. • Official release of new varieties • Capacity building of officers, ASTGS implementors and SME operating youths • Technology transfer
2. County Governments Agricultural Office	• Provide quality extension services and participate in the formulation and implementation of agricultural policies	• Suggest challenges in County development forums • Strengthen agency business partnerships. • Promotion of advance payments for products and services
Research Institutions		

3. KALRO- Tigoni	• Potato research and development	• Development and dissemination of suitable technologies • Provision of basic seed potato Research • Capacity building on seed production and marketing • Variety testing/breeding
4. International Potato Centre (CPI)	• Global custodian of potato • Germplasm conservation and exchange Develop advance potato clones	• Development and selection of germplasm • Capacity building on ware and seed potato production • Development and dissemination of technologies Participate in pest and disease diagnostics for potato
Regulatory Bodies		
1. Kenya Plant Health Inspectorate Services (KEPHIS)	• KEPHIS is a regulatory agency for quality assurance on agricultural inputs and produce in Kenya.	• Undertakes: plant variety protection; seed certification; phytosanitary inspection of imports and exports • Mandated to supervise and carry out Distinctiveness, Uniformity and Stability (DUS) test and National Performance Trials (NPTs)
2. AFA Food Directorate	• Regulate develop and promote food crop industry	• Develop and promote marketing chains • Registration, licensing and regulation of the industry players • Enforce compliance and participate in policy development • Advice Governments on food security issues
3. National Cereals and Produce Board (NCPB)	• Provision of marketing infrastructure for agricultural commodities and inputs	• Selling farm inputs mainly fertilizers • Distribution of seed potato
Farmers Organizations		
4. Kenya National Potato Farmers Association (KENAPOFA)	• Promote, advocate and lobby for the potato farmer. KENAPOFA has a membership of 10,400 farmers and grows 3,350 hectares of potato	• Articulate the issues affecting potato farmers • Collective marketing and market intelligence • Dissemination of market information to members • Collaboration with the regulators for compliance • Organizing members to form marketing groups
5. Kenya National Farmers Federation) (KENAFF)	• Promote, advocate and lobby for the farmer and related sector issues	• Articulate the issues affecting farmers groups • Mobilize potato farmers into producer business groups • Strengthen potato farmer organizations • Dissemination of information
6. National Potato Council of Kenya (NPCK)	• Creating linkage platforms for potato industry development (among the actors)	• Link farmers to financial institutions, markets etc • Collect, Collate and disseminate information on potatoes • Organize trade fairs for all the actors • Inform policy and regulatory making process
Development partners		
7. Development partners (GIZ, The	• Support government in potato industry	• Provide funds for research and development of potato industry

Netherlands, USAID, Agra, SNV, IFDC, etc)	development Facilitate donor –government linkages	• Support transfer of technology • Development of germplasm • Capacity building
8. Seed Traders Association of Kenya (STAK)	• linkages of seed traders	• Production and marketing of certified seeds • Lobby for favourable policy environment • Market intelligence for their members • Collect collate and disseminate information • Lobby for regional harmonization of rules for trade
Potato processors		
9. Potato Processors (Sereni fries, Kentucky fried Chicken, Njoro Canners Midlands, Propack, Deepa….)	• Product development Value addition	• Potato processing and marketing • Provide a market for farmers produce • Diversify the market • Increase the shelf life of potatoes • Fortification and palatability

4) Green gram FVC

a. Cropping season

Table 3.2.16 Cropping Calendar

Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Beans (Short rain)	Seeding/	Growing	Harvesting							Land Preparation		
Beans (Long rain)												

b. Production area

Green gram is considered as one of the richest nutrient legumes and suitable for cultivation in the Arid and Semi-Arid Lands (ASALs) in Kenya. Main production is spreading in Eastern region in the drier areas of lower Kitui, Makueni, Tharaka Nithi, Machakos, Mbeere and Mwingi counties. According to Economic Survey (2017), Makueni county has the largest area under green gram production totaling to 80,340ha. This is followed by Kitui and Machakos counties. In terms of production, Makueni had the highest production at 54,910tons followed by Kitui and Machakos counties

c. Supply chain

Green gram is one of the pulses consumed among the Kenyans especially the Kikuyu and Kamba. Individual consumers are the largest segment and it is mainly served by retailers. These are located in both urban and rural production. Other consumers include institutions, vendors and traders. The most commonly demanded form of green grams is whole grain. Nonetheless split grains are also sold but to smaller extent. Exporters mainly procure whole grain from large scale farmers, groups of small-scale farmers while some use middle men and traders. They mainly trade in grades 1 and 2, driven by demand from emerging markets such as India and price of the green grams. Local consumption is high in production areas as well as urban centers and where institutions such as hotels are located. Consumers prefer grade 1 which has no foreign matters.

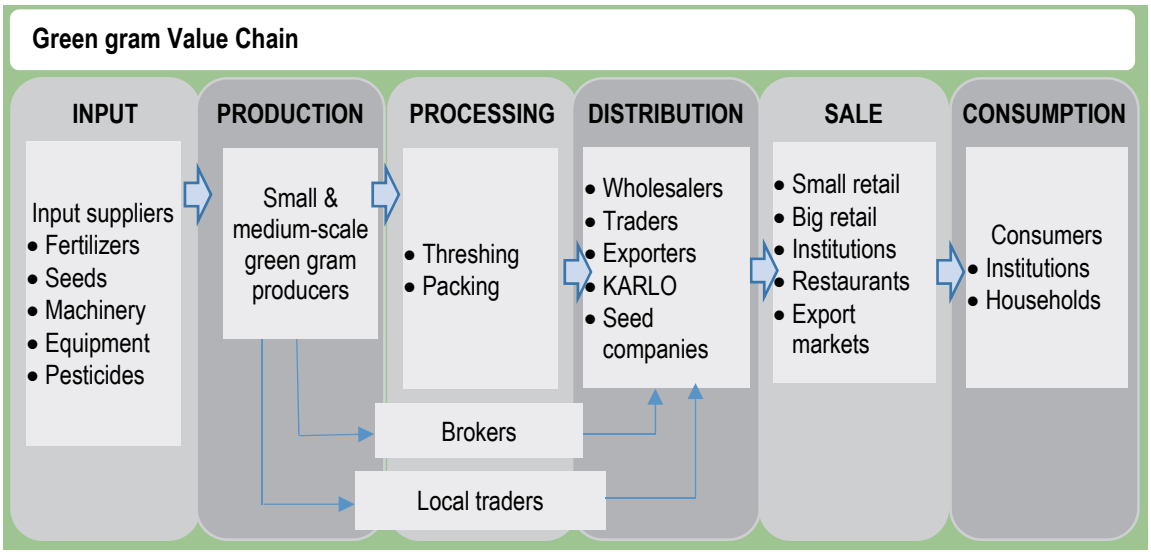


Figure 3.2.10 Green gram value chain

d. Stakeholders

Most players in the green grams value chain operate at functional lines such as inputs, production, packaging and marketing as well as the provision of services such as information, credit and extension. As a result, their efforts remain in a niche area and are too confined to have an appreciable sector-wide impact.

Table 3.2.17 Green gram value chain stakeholders

Stakeholder	Brief Description	Role
Policy Making Bodies		
1. Ministry of Agriculture, Livestock, Fisheries and Co-operatives (MoALFC)	• Policy formulation and guidance. • Support achievement of Kenya Vision 2030. • Information generation and sharing for planning and management of national and county programmes. • Extension services. • Structured intervention programmes.	• Implement policy guidelines. • Release of new varieties • Capacity building of officers, ASTGS implementors and SME operating youths • Seek Government goodwill and support
2. County Governments Agricultural Office	• Leasing storage space. • Agency businesses. • Provision of services – commodity handling and management. • Purchase of Products and services.	• Suggest challenges in County development forums • Strengthen agency business partnerships. • Promotion of advance payments for products and services. • Provision of extension staff
Research Institutions		
3. KALRO Katumani, Embu	• Green grams research and development	• Development and dissemination of suitable technologies • Provision of basic seed on pest and disease management • Maintenance and supply of breeder's seed • Capacity building on seed production and marketing Variety testing/breeding
4. Development	• Resource mobilisation.	• Develop funding proposals.

Partners (Kilimo Trust, ASDSP etc)	• Technology transfer. • Farmer empowerment. • Optimal utilisation of resources. • Compliance with international standards and trade protocols.	• Practice good governance. • Seek partnerships in farmer empowerment, technology transfer, optimal resource utilisation, exchange programmes, etc. • Seek technical support for compliance with international standards and trade protocols
5. National cereals and Produce Board	• NCPB is a State Corporation that was established in 1985 through an Act of Parliament (Cap 338). It is a Statutory Board under MoALFC.	• NCPB trades commercially in grains, provides grain post-harvest services, deals in fertilizer and other farm inputs like seeds, and offers clearing and forwarding services.

5) Cooking banana FVC

a. Cropping season

Table 3.2.18 Cropping Calendar

Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Plantin Banana	Growing and Harvesting in whole year							Peak Harvesting				

b. Production area

The main production counties of banana are Meru, Tharaka Nithi, Embu, Kirinyaga, Muranga, and Nyeri in skirts of Mt. Kenya and Kisii and Nyamira in Nyanza region, Kakamega, Bungoma in Western region and Kericho and Baringoin Rift Valley region. They can also be grown in Kitui, Machakos and Makueni counties of semi-arid areas, where irrigation water is available.

c. Supply chain

Small-scale banana farmers have traditionally grown the crop in small quantities as a subsistence crop, with any surpluses sold to brokers or wholesalers. To commercialize banana farming, some farmers have established producer groups and work together, rather than as sole traders. Through assistance from development partners, some farmers have been improving production, harvesting and handling. Also, logistics is carried out in two stages, and loaded onto heavy-duty trucks at collection points such as local markets and shipped to urban markets. Banana processing is very limited.

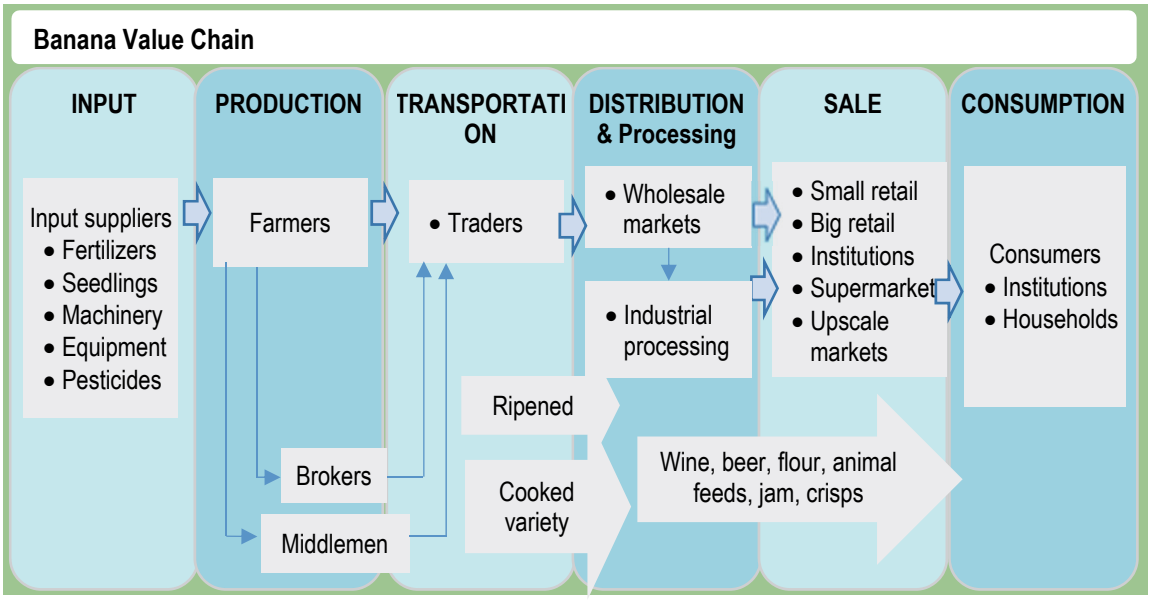


Figure 3.2.11 Banana value chain

d. Stakeholders

Stakeholders in the Kenyan banana industry include MoALFC, the county governments, and regulatory agencies like KEPH1S. Other players who have organized themselves the Banana Growers Association of Kenya. Research on bananas is conducted by KARLO, Universities, and development partners.

Table 3.2.19 Banana value chain stakeholders

Stakeholder	Brief Description	Role
Policy Making Bodies		
1. Ministry of Agriculture, Livestock, Fisheries and Co-operatives (MoALFC)	• Coordinate the formulation and implementation of agricultural policies	• Policy development and implementation • Official release of new varieties • Capacity building of officers, ASTGS implementors and SME operating youths • Technology transfer
2. County Governments Agricultural Office	• Provide quality extension services and participate in the formulation and implementation of agricultural policies	• Suggest challenges in County development forums • Strengthen agency business partnerships. • Promotion of advance payments for products and services.
Regulatory Bodies		
3. Kenya Plant Health Inspectorate Services (KEPHIS)	• Provide regulatory and advisory services	• Variety testing (NPT & DUS), • Granting of plant breeder's rights • Seed certification, • Phytosanitary and quarantine, soil and irrigation water analysis • Inspection of potatoes for export and import. Technology transfer and capacity building on seed production
Research Institutions		
4. KALRO - Thika	• Research	• Research, provision of technologies, capacity building & technical backstopping
5. Jomo Kenyatta University	• University/Research	• Coordination & implementation of banana value chain activities
6. Africa Harvest	• NGO	• Research and supplier of planting materials
7. Agricultural Research in Eastern and Central Africa (ASERECA)	• Donor	• Research and training, provision of funds
Farmers Organizations		
8. The Banana Growers Association of Kenya (BGAK)	• the apex association of banana farmers in Kenya formed in 2010 registered under the Societies Act	• BGAK focuses on strengthening the voice of smallholder banana growers in Kenya
9. The Kenya National Farmers' Federation (KENAFF)	• NGO	• Capacity development, advocacy

6) Sugarcane FVC

a. Cropping season

Table 3.2.20 Cropping Calendar

Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sugarcane (Growing)	Growing and Harvesting in whole year											
Sugarcane (Planting)						Seedling						

b. Production area

Sugarcane production largely depends on climatic and biophysical (soil and topographic) conditions, which vary significantly throughout Kenya. Sugarcane is grown in 14 counties namely Kakamega, Kisumu, Homabay, Migori, Siaya, Nandi, Bungoma, Busia, Narok, Kericho and Kwale.

c. Supply chain

The sugar value chain is connecting with the production of sugarcane as the raw material, the processing for producing crude sugar, the refining processing to white sugar, and the sales. The by-product are molasses used as edible materials, bagasse used as fuel materials, and press mats used as agricultural materials.

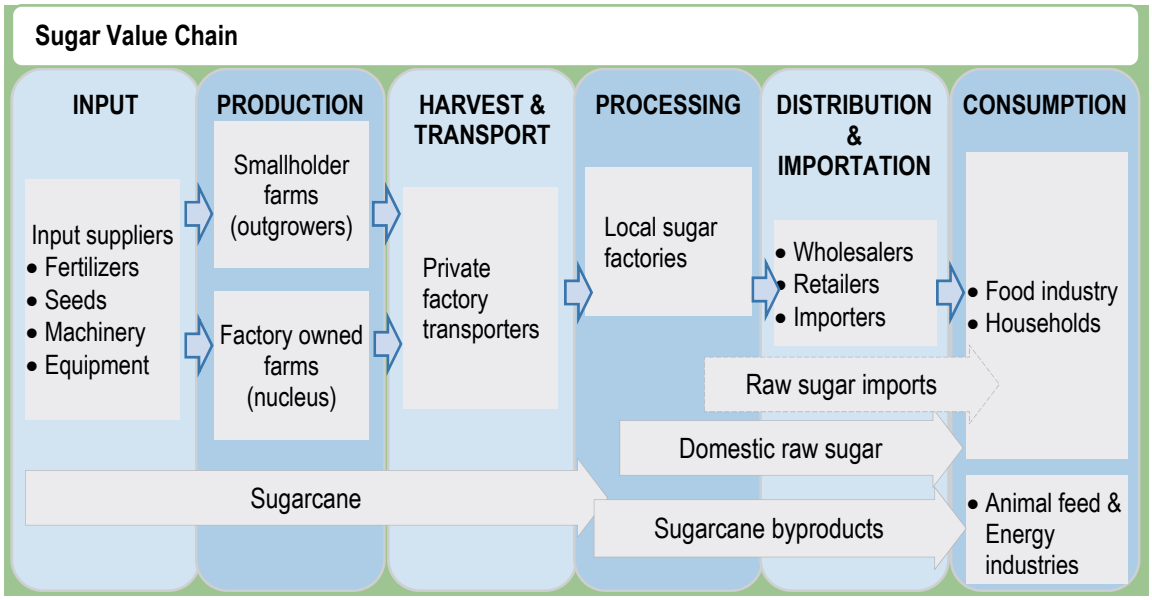


Figure 3.2.12 Sugarcane and sugar value chain

d. Stakeholders

Leading the key stakeholders in the Kenyan sugar industry is a government regulatory agency, namely the Sugar Directorate of AFA. Other players who have organized themselves in various related groups are farmers associations like KUSPAW and KNFSF. Sugar research is conducted by the Sugar Research Institute and KSSCT. Millers and distillers are also important players in this industry.

Table 3.2.21 Sugarcane value chain stakeholders

Stakeholder	Brief Description	Role
Policy Making Bodies		
1. Ministry of Agriculture, Livestock, Fisheries and Co-operatives (MoALFC)	• Coordinate the formulation and implementation of agricultural policies	• Policy development and implementation, supervision of state own factories • Official release of new varieties • Improvement of management of state own factories based on ASTGS i • Technology transfer
2. County governments Agricultural Office	• Guidance to the national governments in the sugar sub-sector	• Suggest challenges in County development forums • Strengthen agency business partnerships. • Provision of extension staff
Regulatory Bodies		
3. Sugar Directorate	• The Sugar Directorate was established under the Agriculture and Food	• The role of the AFA Act 2013 and the Crops Act 2013 is to streamline the agricultural sector and introduce new

	Authority Act 2013 as one of its Directorates	governance and supervisory structures in order to better coordinate agriculture in the devolved system of government.
Research Institutions		
4. Sugar Research Institute	• The Sugar Research Institute (SRI)- is the research arm of the industry established under the KALRO Act of 2013.	• Conduct research and develop appropriate technologies, products and services for the production of sugar cane • Milling of such crops and utilization and marketing of sugar and its co-products.
5. Kenya Society of Sugarcane Technologists (KSSCT)	• Kenya Society of Sugarcane Technologists (KSSCT) is an affiliate body of both the International and East African Societies of Sugarcane Technologists (EASST).	• KSSCT is an association of sugar technologists in Kenya, which forms a platform of sharing research findings and innovations among the scientist
Millers and Distillers		
6. Millers	• Millers are licensed to operate a sugar or a jaggery mill for the production of sugar and other products.	• Processing of sugarcane to produce sugar and other products for sale and • making timely payments to cane growers
7. Distillers	• Distillers are licensed investors who process molasses to spirits and derivatives.	• Distillers process molasses as feedstock into ethanol and its derivatives.
Farmers Organizations		
8. Contract farmers	• Farmers are recognized by the Crops Act 2013 as growers who produce sugarcane or any other scheduled crop in Kenya for the manufacture of sugar.	• Farmers grow and supply Sugarcane to millers for processing.
9. Kenya Union of Sugarcane Plantation and Allied Workers (KUSPAW)	• Welfare and rights protection for workers in sugar factories.	• The Union's main role is negotiating and settling differences arising between members and their employers by conciliation, arbitration or otherwise. It also safeguards the interests of members, to obtain redress for all broken contracts on behalf of members who may be unreasonably or unjustly dismissed from their employment
10. Kenya National Federation of Sugarcane Farmers (KNFSF)	• Union of sugar cane producers	• Lobby for the welfare and rights of sugarcane farmers

7) Tea FVC

a. Cropping season

Table 3.2.22 Cropping Calendar

Crop	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec	
Tea (Growing)																								
Tea (Peak Harvesting)																								

b. Production area

The tea growing areas are endowed with the ideal climate for tea - tropical, volcanic red soils and well distributed rainfall ranging between 1,200mm to 1,400mm per annum that alternates with long sunny days. Hence the main tea growing areas are situated in and around the highland areas on both sides of the Great Rift Valley; and astride the Equator within altitudes of between 1,500m and 2,700m ASL. These regions include the areas around Mt. Kenya, the Aberdares, and the Nyambene hills in the Central region and the Mau escarpment, Kericho Highlands, Nandi and Kisii Highlands and the Cherangani Hills. The highlands are spread across 19 tea-growing counties that include Nakuru, Narok, Kericho, Bomet, Nyamira, Kisii, Kakamega, Bungoma, Vihiga, Nandi, Elgeyo Marakwet, Trans-Nzoia, Kiambu, Murang'a, Nyeri, Kirinyaga, Embu, Tharaka-Nithi, and Meru.

c. Supply chain

Tea growing is carried out by small, medium and large-scale farmers. Small scale farmers constitute 71 per cent of all tea growers and have a land holding of 0.2 hectares and below. Large scale farmers comprise of those with landholding of more than 10 hectares. Small-scale farmers sell their produce to 68 factories across the country managed by the Kenya Tea Development Agency (KTDA), which they collectively own.

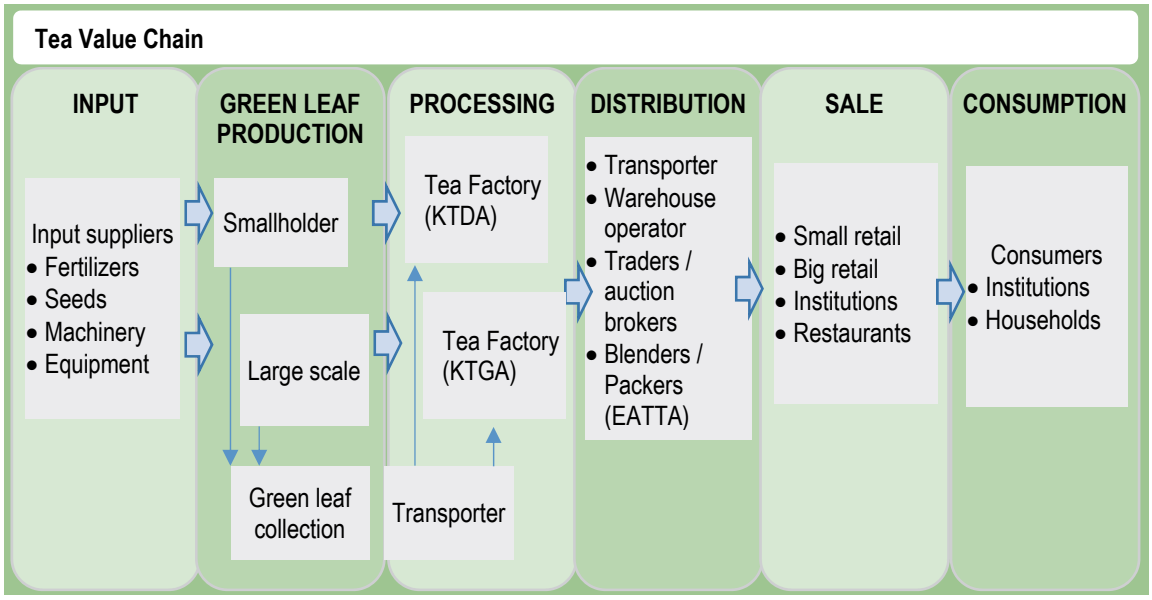


Figure 3.2.13 Tea value chain

d. Stakeholders

The Kenyan tea industry is largely organized in the categories of producers, Brokers, Packers, Buyers/Exporters and Warehousemen and is grouped as EATTA members. Other key players and stakeholders include the Government regulatory Agencies that include TBK, TRFK, KEPH1S, KRA and KPA. Tea industry has many players who have organized themselves in various related groups depending on the type of services offered to the industry. This includes tea broking, buying and exporting, warehousing and related logistics.

Table 3.2.23 Tea value chain stakeholders

Stakeholder	Brief Description	Role
Policy Making Bodies		
1. Ministry of Agriculture, Livestock, Fisheries and Co-operatives (MoALFC)	• Coordinate the formulation and implementation of agricultural policies	• Policy development and implementation • Official release of new varieties • Improvement of management of state own factories based on ASTGS • Technology transfer

2. County governments Agricultural Office	• Guidance to the national governments in the tea sub-sector	• Suggest challenges in County development forums • Strengthen agency business partnerships. • Provision of extension staff
Regulatory Bodies		
3. Tea Board of Kenya (TBK)	The Tea Act, 2020, established TBK, which comprises of four tea directors, a member from big private tea estates, representatives from tea traders and a chair appointed by the President.	• Develop, promote and regulate the development of the tea industry. • Formulate of policies, plans and strategies for the regulation of the tea sector. • Register tea factories, tea growers, warehouse operators, tea packers, tea buyers, exporters, importers, tea brokers, management agents, tea auction organizers, commercial tea nurseries, commercial green leaf transporters. • Promote best practices and standards in production, processing, marketing, grading, storage, collection, transportation and warehousing of tea • Regulate the sale, import and exports of tea;
4. Kenya Plant Health Inspectorate Services (KEPHIS)	Provide regulatory and advisory services	• Variety testing (NPT & DUS), granting of plant breeder's rights and seed certification, • Phytosanitary and quarantine, soil and irrigation water analysis • Technology transfer and capacity building on seed production
Research Institutions		
5. Kenya Tea Research Institute	Based in Kericho County, the institute is the technical research arm of the tea Industry.	• Development of improved clones, appropriate technologies for improvement of yield and quality of tea products. • Advise to producers on the best clonal selection to suit the various ecological zones and has so far has developed over 914 improved clones,
Farmers Organizations		
6. Kenya Tea Development Agency (KTDA) Holding Ltd	The KTDA is a private company that provides management services to smallholder tea farmers through their factories.	• Advises smallholder tea growers on the best method of tea growing, • Collects the Greenleaf from the growers for processing and markets the tea on their behalf.
7. Kenya Tea Growers Association (KTGA)	KTGA was established in 1931 by large-scale tea producers.	• Promote the common interests of the plantation sub-sector members in the cultivation and manufacture of tea and to • Promote good industrial relations and sound wage policies for the workers.
Traders Associations		
8. East African Tea Trade Association (EATTA)	EATTA is a voluntary organization for Tea Producers, Buyers (Exporters), Brokers, Tea Packers and Warehouses	• EATTA members work to promote the best interests of the Tea Trade in Africa. Currently, membership comprises over three hundred companies extending across the East and Central African borders.
9. Purple & Specialty Tea Association of Kenya (PSTAK)	PSTAK was formed in 2016 and registered on 4th July 2017	• Members of PSTAK deliberate on issues touching on planting, manufacture, and marketing of High Value Purple & Specialty Teas. They formed PSTAK to come together, learn, be orderly and speak with one voice.
10. The Mombasa Tea Auction	In November 1956, the Export Auction System was initiated under the management of the EATTA in Nairobi.	• In 1969, the auction centre was moved to the Port of Mombasa which was the nerve centre of warehousing, handling and shipping. The Mombasa Tea Auction consists of a main grades auction and secondary grades auction and

		is held weekly on Mondays. The Mombasa Tea Auction has grown to be the second largest tea auction in the world after the Colombo Tea Auction in Sri Lanka

3.2.3 Impacts of COVID-19 on FVC and Underlying Factors

Interviews with MoALFC and AFA crop experts pointed out the following effects and phenomena of the effects of COVID-19 on FVC.

- Changes in foods purchased due to decreased or lost income opportunities for urban residents (temporary stagnation of demand for fresh vegetables, increased demand for maize, millet, and potatoes)
- Temporary suspension of transportation across counties
- Temporary closure of central wholesale market and local market
- Cross-border restrictions due to stricter border measures, especially in Namanga on the Tanzania border, Busia on the Uganda border and the Malaba border post, problems with asymptomatic infected truck drivers and transportation assistants despite possession of PCR inspection certificates
- Rising fuel prices
- Temporary shortage of agricultural inputs due to stagnation of logistics
- Depletion of purchase funds of agricultural products traders
- It has become difficult to convene agricultural workers
- Suspension of agricultural extension activities by county government agricultural bureau staff and prohibition of meetings such as seminars
- Destabilization of international grain prices of wheat and maize (infection spread in major grain producing areas such as the United States and Brazil) and intervention in the market by government import bids
- Temporary blockage of export horticultural crop shipments due to airport closure and significant loss, especially fresh vegetables
- Loss of demand for school feeding ingredients due to school closure
- Catastrophic impact on the food service and tourism industry due to a decrease in inbound demand
- FVC-related industries such as the increase in delivery companies such as Uber Eat and Glovo in cities, the increase in electronic money transactions such as M-Pesa in Safaricom, and the rise of unicorn companies (mainly transaction brokerage businesses) supported by WB. change
- Changes in crops cultivated by small-scale horticultural farmers and sales destinations
- Agricultural machinery sales are sluggish due to lack of funds from farmers
- The beginning of the return of urban residents to rural areas for agricultural production

(1) Impacts on Respective Crop FVC: Maize

1) Impacts on FVC of Respective Crop: Maize

In the Maze value chain, production costs were affected by the shortage of over-the-counter products due to the influence of COVID-19 and the rise in the price of imported fertilizer. Domestic demand for maize flour increased, and imports from neighboring countries complemented the deficient volume, and prices were stable. On the other hand, the profits of farmers deteriorated due to the rise in production costs.

Table 3.2.24 Impact on each VC stage on maize

VC stage	2020		2021		Background and factors	Period
	Extent of impact	Impact	Extent of impact	Impact		
Input	Large	Input supply decreased	Large	Input price increased	Imports of chemical fertilizers were delayed, and they were in short supply at stores.	Jan 2020 -present
Production	Small	Production increased slightly Production cost increased	Medium	Yield decreased Production cost increased	Weather was favorable in 2019-2020 season. But cost of production increased	Mar 2020 -present

Process	Large	Milling operation decreased	Small	Milling operation recovered	The factory was closed, and factory workers were restricted to move due to COVID-19 protocol.	Jun-Dec 2020
Distribution	Large	Distribution volume decreased	Small	Distribution volume recovered	Imports of cheap maize from Uganda and Tanzania increased, and movement restrictions affected domestic distribution.	Mar-Dec 2020
Sales	Small	Sales volume decreased slightly	Small	Sales volume recovered	The selling price was controlled, and the price of domestic maize was stable.	Mar 2020 -present
Consumption	Medium	Consumption increased slightly	Medium	Consumption increased slightly	Due to the decrease and loss of income opportunities, the consumption of maize as a main cereal has increased.	Jun 2020 -Oct 2021

Note: Large: Large negative impact, Medium: Negative impact, Small: No impact or minor impact, -: Not applicable. The extent of impact was rated based on the results of the key informant survey, the questionnaire survey, and the results of the field survey.

MoALFC warns that the price of chemical fertilizer gradually increased from 2020 and rose sharply from November 2021, and the retail price of DAP fertilizer and urea fertilizer doubled in January 2021 from January 2021. Applying volume of fertilizer affects yields of maize, and it is expected that farm income will shrink, so the President Office is seeking measures to curb retail selling prices.

Table 3.2.25 Price index for farm inputs

Price Index (2001＝100)	2016	2017	2018	2019	2020
Chemical fertilizer	197.8	234.1	241.6	208.1	234.2
Fuel and Electricity	123.3	148.5	168.1	127.1	121.5

Source: Kenya National Bureau of Statistic 2021s

2) Change of VC Flow: Maize

Increased Use of Domestic Fertilizers:
The supply of cheap imported fertilizers such as urea fertilizers and DAP fertilizers has dropped significantly, forcing farmers to buy domestic blended fertilizers.

Crop Diversion:
In response to rising production costs, some small-scale producers have converted to the production of fruit crops such as avocados. On the other hand, in the Western region and the Nyanza region, some farmers changed from sugarcane to maize.

Increased Farm Storage:
Maize production increased, but farmgate prices were low. Some farmers have stored for a short period to wait for higher selling prices. However, the prices remained low, and the import of maize by millers also led to depression in factory buying prices.

Increased Consumption of Maize Products:
After the outbreak of COVID-19, consumer households increased consumption of maize flour, especially in low-income households.

(2) Impacts on Respective Crop FVC: Rice

1) Impacts on FVC of Respective Crop: Rice

Disruptions in the rice value chain after COVID-19 were in the form of reduced sales due to closure of cross-border trade with Uganda (a major market for rice produced in Western region) and restrictions of movement, which reduced sales of the Mwea *pichori* rice along the Nairobi-Embu Road. In addition, major institutions like schools that consume a lot of rice were closed, yet farmers had produced a lot of rice in the season after COVID-19 set in. With a reduced market for their produce, many farmers stored their paddy rice in the NIA warehouses as they waited for the market to pick up. Temporary storage will be carried out in the warehouses of the multi-purpose cooperatives of Mwea, Ahero, West Kano, and Bunyala, or the warehouses of rice millers with consigning to mill at the facility in Mwea. Following these disruptions, and the increased cost of production due to high price of fertilizers, some farmers left their farms fallow in the later rice planting seasons.

Table 3.2.26 Impact on each VC stage on rice

VC stage	2020		2021		Background and factors	Period
	Extent of impact	Impact	Extent of impact	Impact		
Input	Large	Input supply decreased	Large	Input price increased	Imports of chemical fertilizers were delayed, and they were in short supply at stores.	Jan 2020 -Present
Production	Medium	Production increased slightly Production cost increased	Large	Yield decreased Production cost increased	Weather was favorable in 2019-2020 season. But cost of production increased	Mar 2020 -Jun 2021
Process	Large	Milling operation decreased	Medium	Milling operation decreased	With low demand and poor prices for rice, farmers stored most of the paddy	Jun-Dec 2020
Distribution	Large	Distribution volume decreased	Large	Distribution volume decreased	Restriction on movement and low demand of rice affected distribution slightly	Mar-Dec 2020
Sales	Medium	Sales volume decreased slightly	Medium	Sales volume decrease	Demand dropped when Ugandan export market was closed, and local institutions closed.	Jun 2020 -Jun 2021
Consumption	Small	Consumption increased slightly	Small	Consumption decreased slightly	Consumers preferred to increase spending on maize rather than rice.	Jun 2020 -Jun 2021

Note: Large: Large negative impact, Medium: Negative impact, Small: No impact or minor impact, -: Not applicable. The extent of impact was rated based on the results of the key informant survey, the questionnaire survey, and the results of the field survey.

By irrigation scheme, Mwea production is overwhelming, but it is steadily increasing except for West Kano and Bunyala irrigation schemes, which were affected by the flood.

Table 3.2.27 Production of paddy rice by irrigation scheme

(unit : ton)

Irrigation scheme	County	2015/16	2016/17	2017/18	2018/19	2019/20
Mwea	Kirinyaga	78,760	59,291	89,960	120,996	141,920
Ahero	Kisumu	6,494	7,752	4,596	8,473	9,600
West Kano	Kisumu	4,634	4,083	4,527	9,423	5,704
Bunyala	Busia	4,522	3,632	3,741	3,686	3,492
South West Kano	Kisumu	7,100	6,440	7,386	8,184	8,062
North Kano	Kisumu			1,921	3,040	3,584
Bura	Tana River			474	1,083	1,728
Tana	Tana River				900	1,200
Lower Kuja	Migori				4,800	5,600

Source: NIA

2) Change of VC Flow: Rice

Decreased Use of Chemical Fertilizers:
The supply of imported fertilizers was significantly reduced, and farmers did not apply chemical fertilizer.

High to Low Production Levels:
Production was high after the onset of COVID-19 but many farmers reduced their production at later seasons because they could not sale their previous stock.

Reduced Milling of Rice:
Processing of rice was reduced with lower sales and farmers opting to store their rice hoping for better prices

Slow Distribution:
Distribution was reduced with the closure of cross-border trade and was slow after the border trade resumed under covid prevention measures.

Fluctuating Sales Volumes:
Government-procured intervention through the Kenya National Trading Company (KNTC) increased farmer sales for a period of time, but the suspension of the school feeding programme due to school closures affected shipments from farmers and multipurpose cooperatives.

(3) Impacts on Respective Crop FVC: Irish Potato

1) Impacts on FVC of Respective Crop: Irish Potato

Since the onset of COVID-19, farmers have been producing a lot of potatoes owing to the good rains in their areas. However, this led to a huge supply of the crop and a reduction of prices. This situation was worsened when the distribution of the crop to the markets was disrupted by restrictions to movements and restaurants were closed for a period of time and when they were allowed to reopen, their operating hours were reduced, and social distancing was enforced. A decline in consumption of potato and it processed products of chips and crisps has been noted because of restrictions.

Table 3.2.28 Impact on each VC stage on Irish potato

VC stage	2020		2021		Background and factors	Period
	Extent of impact	Impact	Extent of impact	Impact		
Input	Large	Input supply decreased	Large	Input price increased	Importation of fertilizers was delayed by international restrictions.	Jan 2020 -Present
Production	Medium	Production increased slightly Production cost increased	Large	Yield decreased Production cost increased	Favorable weather increased production, but cost of production increased.	Mar 2020 -Jun 2021
Process	Large	Processing decreased Sales decreased	Medium	Processing decreased Sales decreased	Processing affected by restrictions on movement.	Mar 2020 -June 2021
Distribution	Large	Distribution volume decreased	Medium	Distribution volume decreased	Restriction on movement affected distribution.	Mar-Dec 2020
Sales	Medium	Sales volume decreased	Medium	Sales volume decrease	Demand has decreased while supply is still high.	Jun 2020 -Dec 2021
Consumption	Small	Consumption increased	Small	Consumption recovered	With depressed incomes, households increased consumption of staple food.	Jun 2020 -Dec 2021

Note: Large: Large negative impact, Medium: Negative impact, Small: No impact or minor impact, -: Not applicable. The extent of impact was rated based on the results of the key informant survey, the questionnaire survey, and the results of the field survey.

2) Change of VC Flow: Irish Potato

Increased Use of Locally Manufactured Fertilizers:
The supply of imported fertilizers was significantly reduced, and farmers have to procure domestically blended NPK fertilizers at high prices.

Increased Production after the Start of COVID-19:
Production increased after the onset of COVID-19 but with demand going down, and producers shifted to other crops

Reduced Distribution Activities:
Distribution of potatoes reduced with low demand from consumers for the crops. Sales volumes decreased and sale prices went down to the lowest levels.

Reduced Consumption of Potatoes:
Consumption of potatoes decreased slightly particularly when restaurants were closed, social distancing in dining places enforced and their operation hours reduced

(4) Impacts on Respective Crop FVC: Dried Bean

1) Impacts on FVC of Respective Crop: Dried Bean

The value chain for dried bean including green grams was affected by the increased prices of fertilizers and agro-chemicals due to the reduced supplies from imports. However, farmers also experienced unreliable rainfall amounts in the season after the onset of COVID-19. Although the other seasons experienced fair rainfall amounts and farmers were able to harvest the crop, prices were low due to reduced exportation to the major market of India. In terms of logistics, transportation costs have risen due to rising fuel costs. Nevertheless, imports of cheap dried beans from Ethiopia increased and were supplied to Central region.

Table 3.2.29 Impact on each VC stage on green gram

VC stage	2020		2021		Background and factors	Period
	Extent of impact	Impact	Extent of impact	Impact		
Input	Small	Input supply decreased	Small	Input price increased	Importation of fertilizers was delayed by international restrictions.	Jan-Dec 2020
Production	Medium	Production decreased slightly Production cost increased	Small	Yield decreased slightly Production cost increased	Weather was favorable in 2019/2020 season, but unfavorable in 2020/2021 due to heavy rain for bean growth. Cost of production increased	Jan-Dec 2020
Process	Large	Processing decreased Sales decreased	Large	Processing decreased Sales decreased	Effects on processing was negligible.	Mar-Dec 2020
Distribution	Large	Distribution volume decreased	Large	Distribution volume decreased	Inflow from Ethiopia was increased. Restriction on movement affected distribution.	Mar 2020 -Present
Sales	Medium	Sales volume decreased	Medium	Sales volume decrease	Demand has decreased, particularly by exporters while supply is still high.	Jun 2020 -Jun 2021
Consumption	Small	Consumption decreased slightly	Small	Consumption recovered	With depressed incomes, households increased consumption of staple food	Jun 2020 -Jun 2021

Note: Large: Large negative impact, Medium: Negative impact, Small: No impact or minor impact, -: Not applicable. The extent of impact was rated based on the results of the key informant survey, the questionnaire survey, and the results of the field survey.

2) Change of VC Flow: Dried Bean

Changing Production Levels:
Throughout the COVID-19 period, the production levels were generally maintained although the weather shifted from favorable to unfavorable in the 2019 to 2020 seasons.

Demand of Processed Beans:
The limited demand of frozen beans was increased through supermarkets.

Slow-Down in Distribution:
Distribution was slowed down by restrictions to movement and was worsened by reduced uptake by exporters, mainly to India. Similarly, transporters increased their charges, citing an increase in the price of fuel.

Low Sales Volumes:
Sales volumes and prices were low due to reduced purchases by local consumers and exporters

Reduced Consumption:
Consumption reduced slightly due to the closure of institutions and a shift in the preference of more essential food products by urban consumers whose cost of living had increased due to layoffs.

(5) Impacts on Respective Crop FVC: Cooking Banana

1) Impacts on FVC of Respective Crop: Cooking Banana

When COVID-19 set in, banana production was at a high point and the disruption on distribution and consumption led to a slump in prices. Coupled with the high prices of inputs, farmers were discouraged when they could not sale most of their produce and a lot of it went to waste due to low demand. Consumption of the product in major urban markets declined significantly as people lost their jobs and moved out of towns or changed their consumption patterns to most essential foods.

Table 3.2.30 Impact on each VC stage on cooking banana

VC stage	2020		2021		Background and factors	Period
	Extent of impact	Impact	Extent of impact	Impact		
Input	Large	Input supply decreased	Large	Input price increased	Importation of fertilizers was delayed by international restrictions.	Jan 2020 -present
Production	Small	Production decreased slightly Production cost increased	Medium	Yield decreased	Weather was favorable but cost of production increased.	Mar 2020 -Jun 2021
Process	-	-	-	-	-	-
Distribution	Large	Distribution volume decreased	Medium	Distribution volume recovered	Restriction on movement and low demand of bananas affected distribution.	Mar-Dec 2020
Sales	Large	Sales volume decreased	Small	Sales volume recovered	Demand dropped after the onset of pandemic.	Mar-Dec 2020
Consumption	Small	Consumption decreased	Small	Consumption recovered	Consumers preferred to increase spending on more essential foods.	Mar 2020 --Jun 2021

Note: Large: Large negative impact, Medium: Negative impact, Small: No impact or minor impact, -: Not applicable. The extent of impact was rated based on the results of the key informant survey, the questionnaire survey, and the results of the field survey.

2) Change of VC Flow: Cooking Banana

Decreased Use of Chemical Fertilizers: The supply of imported fertilizers was significantly reduced, and farmers did not apply chemical fertilizer.

Abandonment of Farming Management: The farmers abandoned control of banana plantations due to lower demand and lower prices. Many of the ripe crops were lost due to reduced demand. This reduced farmers' willingness to produce.

Decreased Distribution Activities: Following the reduced demand of bananas, distribution activities slowed down significantly. Local motorcycle transporters were moving fewer bananas to the markets, with one rider reporting that he makes one to two trips to the local market a day, yet before covid, he would make about 7 trips. And truck drivers who transport the produce to urban centers reported that they reduced the number of trips per week, from two to one, which would often go half-full.

Reduced Consumption of Bananas: Consumers ate less bananas as they shifted to more essential foods, leading to reduced demand. The shift in their consumption pattern was prompted by layoffs and uncertainties about the future under COVID-19

(6) Impacts on Respective Crop FVC: Sugarcane

1) Impacts on FVC of Respective Crop: Sugarcane

COVID-19 effects on sugarcane impacted the processing value chain earlier than the production, considering that it is a long-term season crop. After COVID-19 in the first wave, the milling companies were affected by the restrictions to movements and cases of infections among one of the major processors in Kisumu. However, this did not disrupt supplies as production levels were maintained and the industry was grappling with other bigger problems of low milling capacity because of closure of public mills.

Table 3.2.31 Impact on each VC stage on sugarcane

VC stage	2020		2021		Background and factors	Period
	Extent of impact	Impact	Extent of impact	Impact		
Input	Large	Input supply decreased	Large	Input price increased	Importation of fertilizers was delayed by international restrictions	Jan 2020 -Present
Production	Large	Production decreased Production cost increased	Large	Production decreased Production cost increased	Weather was favorable in 2019-2020 season. Cost of production increased	Jan 2020 -Present
Process	Large	Sugar factory closed, Operation rate decreased	Large	Operation rate decreased	Mismanagement of public milling and effects of covid hampered processing	Jan 2020 -Present
Distribution	Medium	Distribution volume decreased	Medium	Distribution volume decreased	Restriction on movement affected distribution slightly	Mar-Dec 2020
Sales	Small	Sales volume decreased slightly	Small	Sales volume recovered	Demand has been stable throughout	Jan 2020 -Present
Consumption	Small	Consumption decreased slightly	Small	Consumption recovered	Consumers have maintained the same levels of consumption	Jan 2020 -Present

Note: Large: Large negative impact, Medium: Negative impact, Small: No impact or minor impact, -: Not applicable. The extent of impact was rated based on the results of the key informant survey, the questionnaire survey, and the results of the field survey.

2) Change of VC Flow: Sugarcane

Increased Use of Locally Manufactured Fertilizers:
The supply of imported chemical fertilizers has decreased significantly, the supply of fertilizers from contracted sugar factories has temporarily stopped, and farmers have to purchase generally marketed chemical fertilizer from farm input shops, which has become a burden.

Decline in Sugar Processing Capacity:
From the beginning of the COVID-19 pandemic, five state own sugar factories were closed and raw materials were distributed to eight private companies. But the sugar processing capacity was limited. The closure of Kenya's largest company, Mumias Sugar, had a major impact on local farmers and local related industries. Currently, the Ugandan Sararai Group will re-invest.

Logistics Stagnation: Transportation from farmers to sugar factories was delayed, causing delays in payments to farmers.

Stabilization of Retail Prices by Imported Products: Sugar consumption is stable. Imports from Egypt and Brazil became a buffer, and retail prices stabilized.

(7) Impacts on Respective Crop FVC: Tea

1) Impacts on FVC of Respective Crop: Tea

The influence of COVID-19 on the tea value chain at the input level was a decrease in the supply of inputs, particularly fertilizers. Farmers were informed that KTDA could not get the supply of fertilizer from importers because of weaken international supply chain. Consequently, farmers acquired some fertilizers from local inputs dealers. Because the price was higher than what they usually get, they bought and applied less amounts of fertilizers than they would under the supply arrangements from KTDA, and this affected yields.

Table 3.2.32 Impact on each VC stage on tea

VC stage	2020		2021		Background and factors	Period
	Extent of impact	Impact	Extent of impact	Impact		
Input	Large	Input supply decreased	Large	Input price increased	The procurement of chemical fertilizers by KTDA was difficult, and the contract inputs supply to farmers was also delayed.	Jan 2020 -Present
Production	Large	Production decreased	Large	Yield decreased	Farmers were forced to procure or reduce fertilizers purchasing from farm input shops at	Mar 2020 -Present

		Production cost increased		Production cost increased	high prices. As the result, the growth of tea leaves become slow, and the yeild was reduced.	
Process	Large	Operation rate decreased	Large	Operation rate decreased	COVID-19 caused a shortage of workers and reduced the operating hours of the tea factories..	Mar-Dec 2020
Distribution	Medium	Distribution volume decreased	Small	Distribution volume decreased slightly	Due to movement restrictions, shipping from the factory to Mombasa was restricted	Mar-Dec 2020
Sales	Small	Sales volume decreased slightly	Large	Price decreased	The limit price at the Mombasa Tea Auction has dropped.in 2020-2020.	Jul 2021 -Jul 2020
Consumption	Small	Consumption decreased slightly	Small	Consumption recovered	Consumption in exporting countries such as South Asia, Middle East and North Africa has shrunk.	Jan 2020 -Present

Note: Large: Large negative impact, Medium: Negative impact, Small: No impact or minor impact, -: Not applicable. The extent of impact was rated based on the results of the key informant survey, the questionnaire survey, and the results of the field survey.

2) Change of VC Flow: Tea

Shift of Procurement of imported to Local Fertilizer: When the importation of fertilizers by KTDA was delayed for almost one year, farmers resorted to buying fertilizers from local inputs dealers who were selling it at a higher price - 2,700 Kshs per bag of fertilizers that KTDA was selling at 1,700 Kshs per bag. Some of the tea processing companies like Githonga Tea Factory in Meru, made their own arrangements to import their own fertilizers and procured it from local fertilizer producers like Toyota Tsusho Baraka fertilizer, whose prices were still high.

Reduced Collection of Green Tea Leaves: Timing of collection of tea had to be in line with the curfew hours, hence during the day only. Consequently, tea factories reduced their tea collection time from 24 hours to about 12 hours and very often, they could not reach many farmers. As a result, there was a decline on the volumes of tea leaves they could collect.

Reduced Tea Processing Time: Processing of tea was changed from 24-hour operation time to 12-hour operation during the restrictions on movement, which prohibited staff from travelling at night. Also, the number of shifts were reduced from three a day to two or one. Processors who choose to operate at night had to keep their night-time staff on longer shifts in compliance to the curfew hours.

Slumping Tea Leaves Auction Prices: Demand in exporting countries changed due to the impact of COVID-19, and tea auction prices were sluggish from July 2020 to July 2021. But due to the global economic recovery trend, the prices are recovering from August 2021.

3.2.4 Influence on each VC Stage

(1) Overview of Influence on FVC

The impact of COVID-19 pandemic, its background, and the time of the impact are summarized below for each of the six FVC processes from input to consumption. In this section, analysis and consideration will be focused on each process as below.

Table 3.2.33 Impact, background and period by VC process

VC Process	Impact	Background	Period
Input	Supply decrease, price increase	・ Distribution obstruction, petroleum product price increase, imports decrease (temporary)	2020.3～2020.12
Production	Relatively stable Production Crop conversion Postharvest loss	・ Restriction on movement of people and goods ・ Insufficient input (especially chemical fertilizer) ・ Demand changes	2020.3～2021.3 2020.3～2020.12 2020.6～2021.6
Processing	Reduced processing amount	・ Restriction on movement of people and goods ・ Factory closure, especially government-affiliated sugar factories in Western region ・ Underdeveloped rural industry	2020.3～2020.6 2020.3～2021.6 (During inflow of delta variant) 2020.1～present
Distribution	Distribution volume decrease	・ Distribution obstruction, fuel cost increase	2020.3～2021.6

		・ Strengthening quarantine at Mombasa Port ・ Border blockage, especially paddy (to Uganda), sugar cane (from Uganda), rice milling / maize (from Tanzania)	(Closure of border points with Uganda during inflow of Delta variant) (Closure of border points with Tanzania during problems of unreliability on health protocols)
Sales	Sales volume decrease	・ Temporary closure of market facilities ・ Decrease in tourist inbound tourists ・ Suspension of government procurement through KNTC for school feeding programme ・ Curfew and restriction to restaurants	2020.3～2020.12 2020.3～2021.10 2020.3～2021.6 2020.3～2021.10.20
Consumption	Decline in consumption Increased consumption of low-priced foods	・ Income decline ・ Temporary changes in staple food, especially from rice to maize, cassava, sorghum and millet	2020.3～2021.12 2020.3～2021.6

Note) KNTC：Kenya National Trading Company

(2) Impacts on Input Stage and Underlying Factors

1) Overview

At the input stage of the value chain, the suppliers include fertilizer blending factories, agricultural machinery dealers, seed production companies, seed and seedling distributors, pesticide manufacturers, and agricultural material distributors. Rice and locally encouraged seeds and seedlings are produced and sold by NIA (irrigation office) or donor projects. In the Mwea irrigation scheme, multipurpose agricultural cooperatives sell certified seeds and fertilizers. The spread of COVID-19 affected the import and transportation of raw materials. Imports of agricultural machinery from major manufacturers had to decrease due to weaken supply chain by closure of manufacturing plants in Brazil and India. Even now, due to the rise in petroleum products and fuel costs, many inputs are higher than before the COVID-19 pandemic.

2) Challenges, Needs and Perspective

- For small-scale cereal production farmers, the government provides an electronic voucher system at 40% subsidy in prices of chemical fertilizer. However, there are cases where poor farmers resell purchased fertilizers to obtain cash, so monitoring is necessary for fertilizer subsidy system.
- It is expected that there will be a shortage of agricultural workers during the cultivating and harvesting seasons even after COVID-19, and farmers are demanding agricultural mechanization services. However, since it is difficult for individuals to own agricultural machinery such as tractors; ex. costing at 3.0-3.5 million Kshs, nominal output 80 hp, according to a survey by Nairobi in 2021). Therefore, the programme on the capacity building for agricultural service providers and multipurpose agricultural cooperatives under the agricultural mechanization hubs, which are described in Agricultural Mechanization Bill.
- Potato FVC efforts by the National Potato Council of Kenya (NPCK), which integrates farm inputs (seeds/ seedlings, chemical/ organic fertilizers, mechanization services, pathological diagnosis / pesticides, transportation services, etc.), shall ensure the quality of input goods and services. Aso, the registered farmers can purchase farm inputs at stabilized prices. Application to other crops may improve the supply chain of farm inputs.
- The county's agricultural extension workers, analysis agencies, domestic fertilizer manufacturers, and fertilizer dealers should cooperate in the analysis and information disclosure of recommended fertilizer components based on soil analysis so that excess fertilizer components are not applied. In addition, efforts to utilize crop residues, manure, and local resources (sewage sludge, etc.) are required.

(3) Impacts on Production Stage and Underlying Factors

1) Overview

Production in 2020-2021 was generally good except for legumes, but had a significant impact on farmers' profits. Smallholders make up the majority of the country's major crop producers. Medium and large-scale farmers are also producers who provide urban consumers at low cost to compete with imported agricultural products. Immediately after the outbreak of COVID-19, many producers were affected in various ways.

The results of the VC survey are shown below.

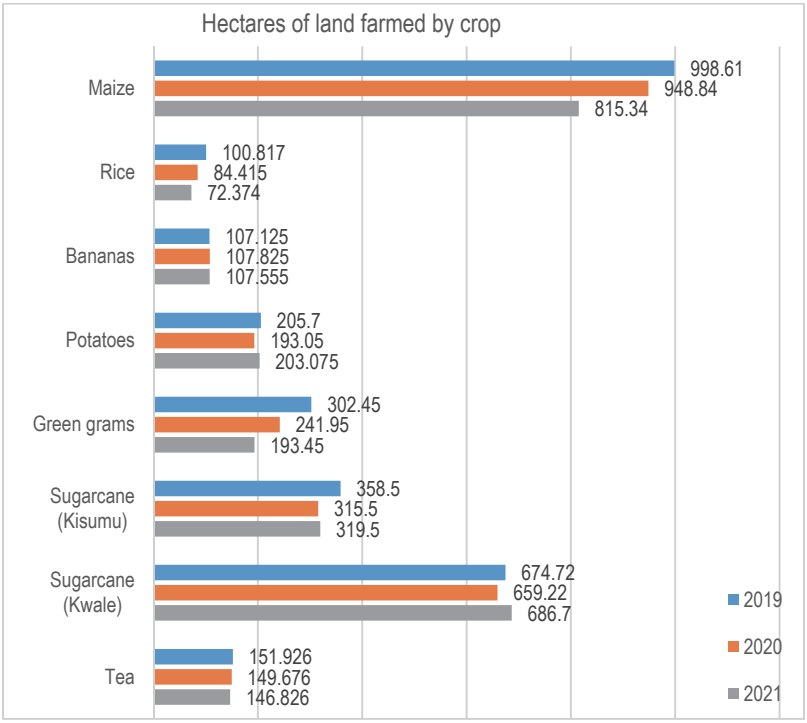


Figure 3.2.14 Production : Total production areas by crop

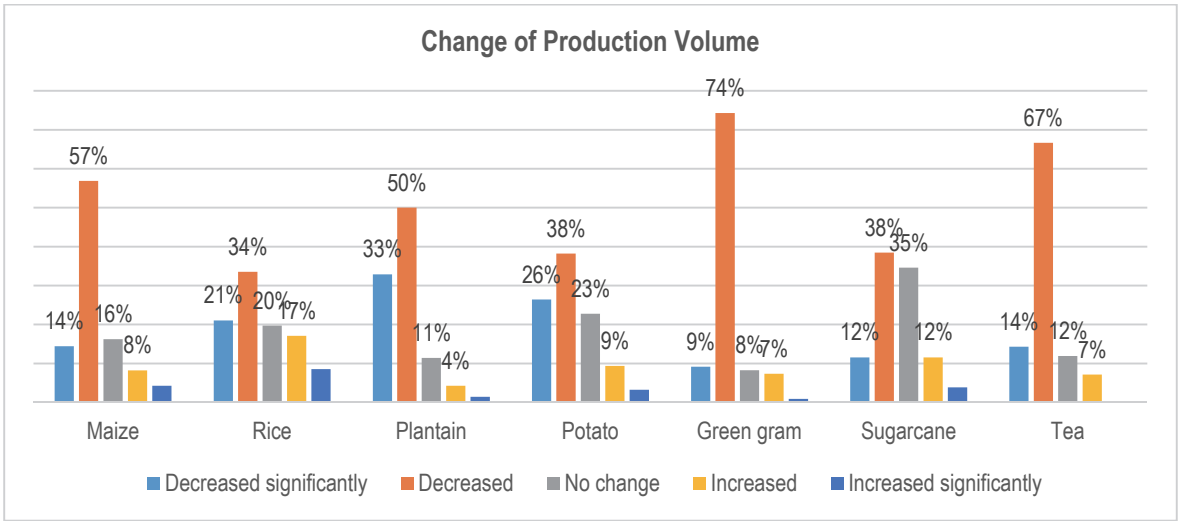


Figure 3.2.15 Production : Change of production volume

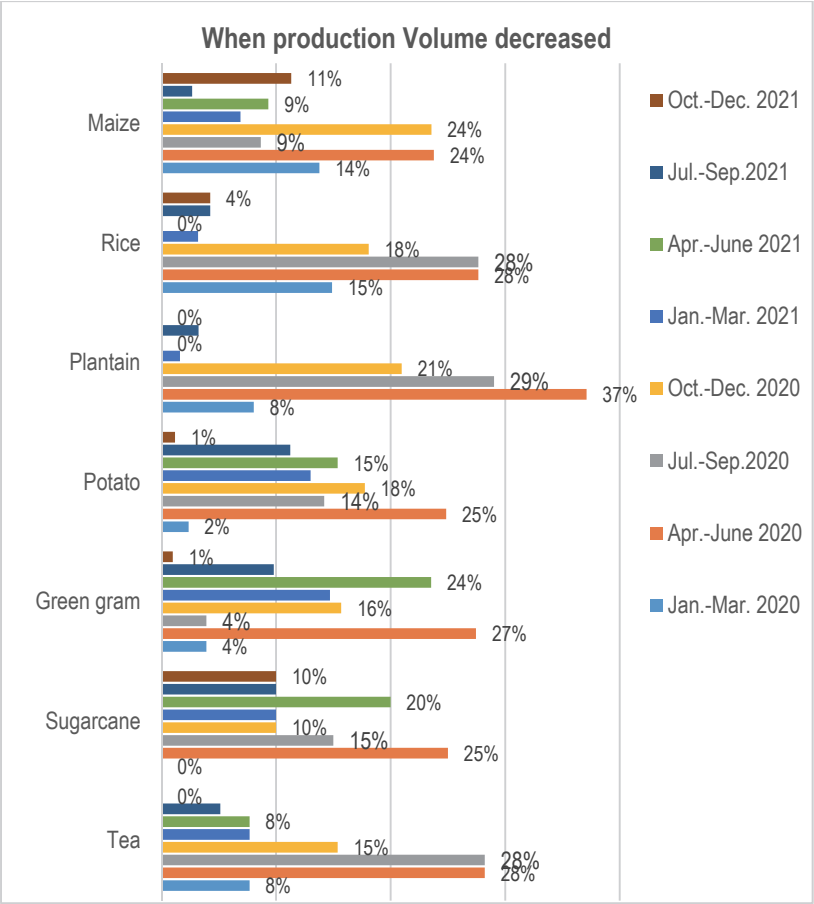


Figure 3.2.16 Production : Period affected by COVID-19

Table 3.2.34 Production: Level of impact of COVID-19 on the quality of farm produce

Level of impact of COVID-19 on the quantity of farm produce	Frequency (%)
High impact	306 (42%)
No impact	176 (24%)
Medium impact	146 (20%)
Low impact	109 (15%)
Grand Total	**737 (100%)**

Table 3.2.35 Production: Affected period by COVID-19

When it happened	Frequency (%)
1st season (2020)	251 (45%)
2nd season (2020)	243 (43%)
1st season (2021)	64 (11%)
2nd season (2021)	3 (1%)
Grand Total	**561**

Table 3.2.36 Production: Change of harvest level by COVID-19

Reason for change on quantity of produce from your farm	Frequency (%)
Input cost	266 (47%)
Input availability	112 (20%)
Weather or natural disaster	59 (11%)
Change in demand	57 (10%)
Market availability	35 (6%)
Others	32 (6%)
Grand Total	**561**

Table 3.2.37 Production: Difficulty to find buyers before COVID-19

	How easy or difficult it was for producers to find buyers before COVID-19	
Crop	Difficult	Easy
Maize	17 (22%)	61 (78%)
Rice	20 (20%)	78 (80%)
Banana	3 (3%)	83 (97%)
Potato	9 (9%)	95 91%)
Green grams	19 (15%)	110 (85%)
Tea	2 (2%)	92 (98%)
Sugarcane	9 (6%)	134 (94%)
All producers	79 (11%)	653 (89%)

Table 3.2.38 Production: Difficulty to find buyers after COVID-19

	How easy or difficult it was for producers to find buyers after COVID-19	
Crop	Difficult	Easy
Maize	36 (78%)	28 (22%)
Rice	63 (92%)	58 (8%)
Banana	69 (96%)	66 (4%)
Potato	57 (81%)	46 (19%)
Green grams	98 (85%)	83 (15%)
Tea	15 (33%)	5 (67%)
Sugarcane	55 (89%)	49 (11%)
	393 (85%)	335 (15%)

Table 3.2.39 Production: Period of impact on finding buyers during COVID-19

	When impact on finding buyers for produce happened							
Crop	Jan.-Mar. of 2020	Apr.-Jun. of 2020	July.-Sep. of 2020	Oct.-Dec. of 2020	Jan.-Mar. of 2021	Apr.-Jun. of 2021	July.-Sep. of 2021	Oct.-Dec. of 2021
Maize	44%	19%	0%	25%	11%	0%	0%	0%
Rice	24%	17%	18%	4%	11%	1%	13%	13%
Bananas	7%	56%	23%	14%	0%	0%	0%	0%
Potatoes	2%	16%	36%	19%	26%	2%	0%	0%
Green grams	16%	39%	21%	22%	1%	0%	0%	0%
Sugarcane	23%	14%	30%	27%	0%	2%	2%	2%
Tea	0%	33%	53%	13%	0%	0%	0%	0%

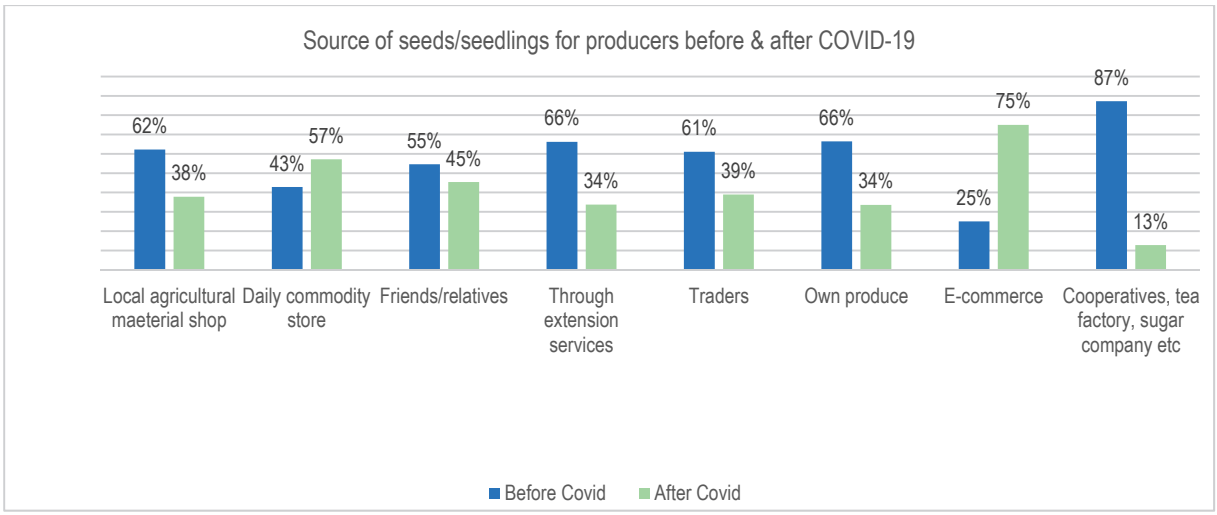


Figure 3.2.17 Production : Source of seeds/seedlings during COVID-19

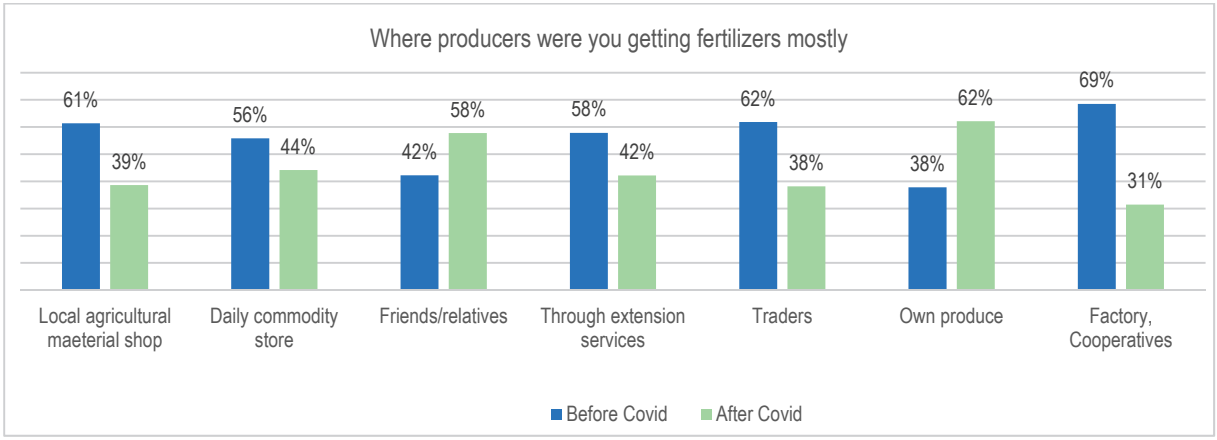


Figure 3.2.18 Production : Source of fertilizer during COVID-19

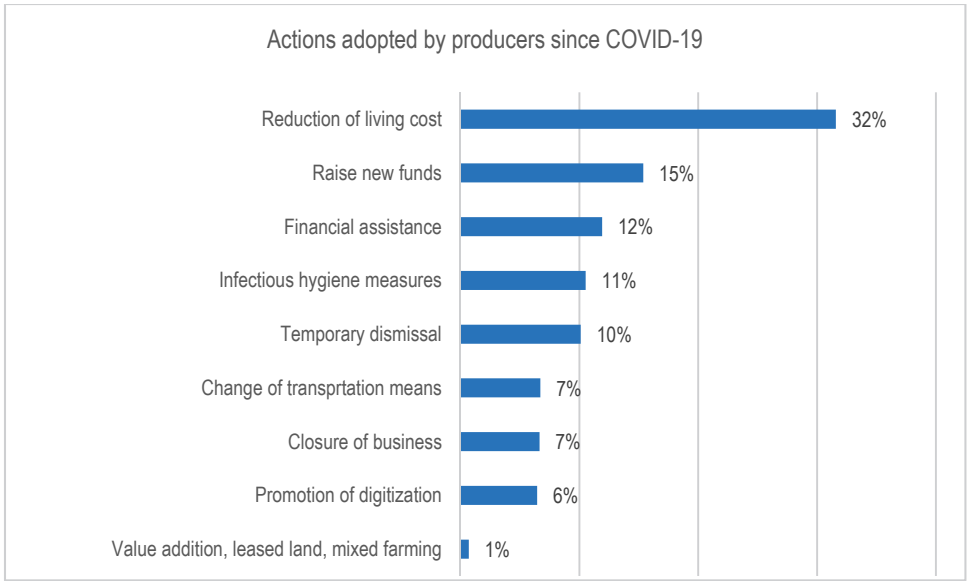


Figure 3.2.19 Production : Actions adopted during COVID-19

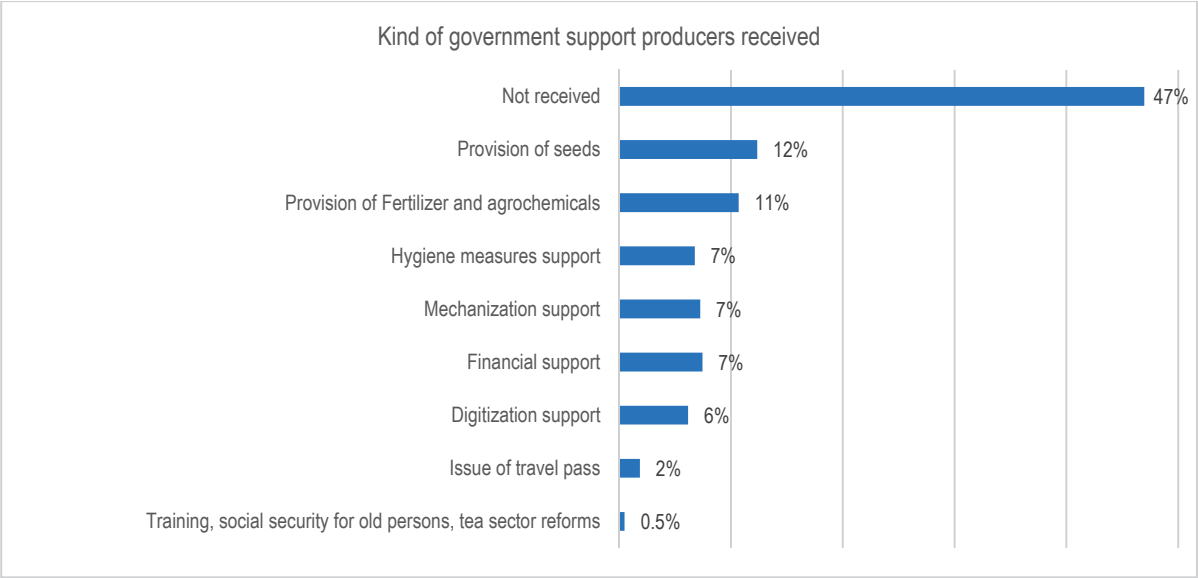


Figure 3.2.20 Production : Kind of government support received during COVID-19

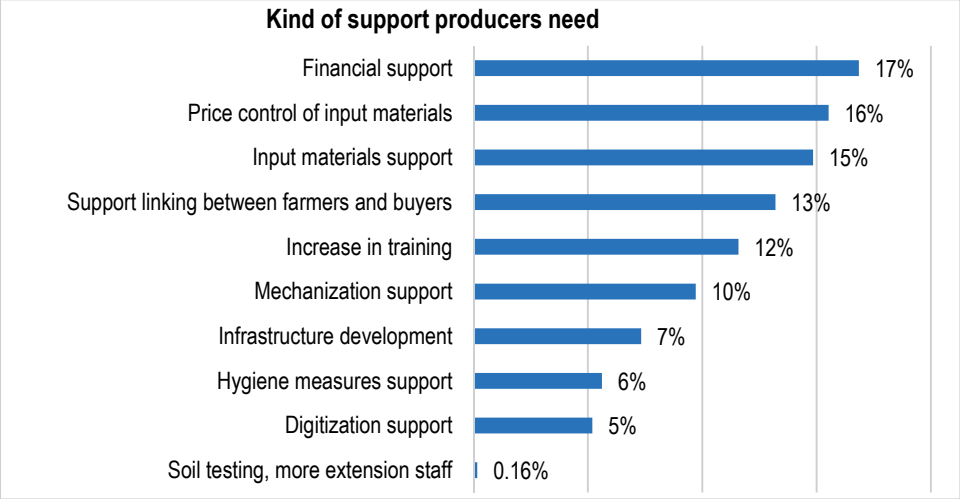


Figure 3.2.21 Production : Kind of support needed during COVID-19

2) Challenges, Needs and Perspective

- The universal issue is how to reduce the relatively high production costs to create farmers' profits.
- The pilot project of Warehouse Receipt System for maize is the mechanism to suppress post-harvest losses and allow farmers to receive substantial advance payments, and it is necessary to urgently expand to other crops such as paddy rice and dried beans.
- Delays in payments to sugarcane farmers is still a social problem, and it is necessary to privatize state-owned sugar factories. In addition, farmers far from the factory need to hurry to strengthen the capacity by the county agricultural extension staff to in order to convert to other horticultural crops.
- In order to control farmers' income and post-harvest losses, it is required to add value through the preparation and processing of agricultural products in rural areas. Especially, the request from the green gram farmers was strong.
- Purple tea, which has a higher polyphenol value than black tea, is produced by small-scale farmers, and it is necessary to expand its sales channels, and improve cultivation and processing technology.

- MoALFC is setting up agricultural mechanization hubs with cooperatives as a management body for rice and potatoes as a pilot project in the Agricultural Mechanization Bill. However, the operation of agricultural machinery has problems such as maintenance work skills and savings of repair costs.

(4) Impacts on Processing Stage and Underlying Factors

1) Overview

Processing of the target crops varies by each crop. Green grams, potatoes and banana undergo minimal processing while sugar, tea, maize and rice are processed by distinctly large milling and processing companies. Similarly, these crops that are heavily processed were affected most by COVID-19 pandemic.

The results of the VC survey are shown below.

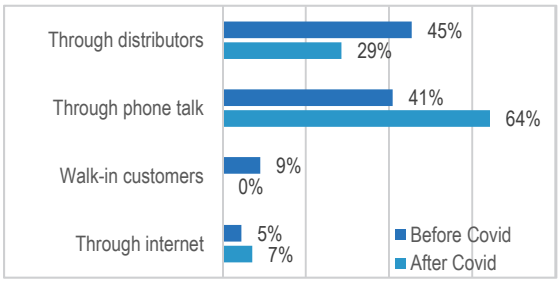


Figure 3.2.22 Processing : Change of buyers during COVID-19

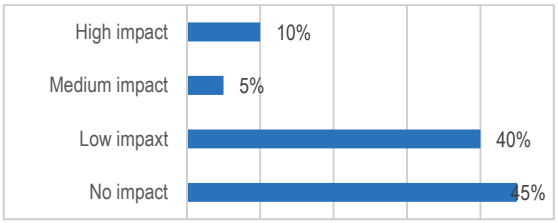


Figure 3.2.23 Processing : Impact on COVID-19

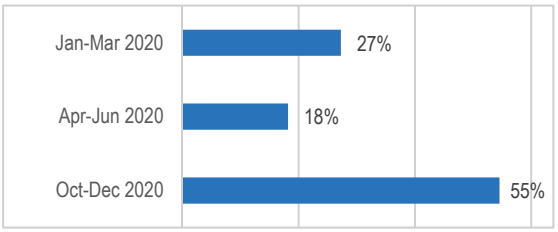


Figure 3.2.24 Processing : Period of affected by COVID-19

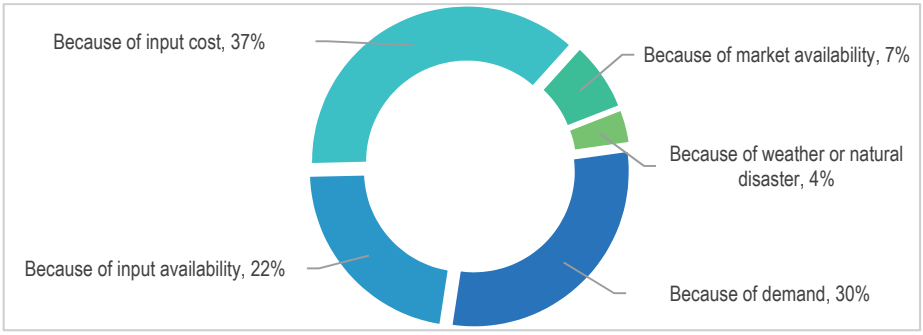


Figure 3.2.25 Processing : Reason to change buyers during COVID-19

Table 3.2.40 Processing: Problems during COVID-19

Issues in Procurement	Frequency	Percent
Decrease of raw material supply	4	22%
Instability of material supply	6	33%
Low quality of material	4	22%
Lack of transportation means	4	22%
Total	18	100%

Table 3.2.41 Processing: Wages of transportation labor during COVID-19

Level of impact of COVID-19 on the wages of transportation labor	Frequency	Percent
Low impact	10	40%
No impact	7	28%
Medium impact	6	24%
High impact	2	8%
Grand Total	25	100%

Table 3.2.42 Processing: Period of change on wages of transportation labor during COVID-19

When this change on wages of transportation labor happened	Frequency	Percent
Oct.-Dec. of 2020	8	44%
Jan.-Mar. of 2020	4	22%
Apr.-Jun. of 2020	3	17%
July.-Sep. of 2020	3	17%
Grand Total	18	100%

Table 3.2.43 Processing: Operating funds before and after COVID-19

level of operating funds	before COVID-19	After COVID-19
Enough	18 (72%)	8 (32%)
Not enough	7 (28%)	17 (68%)
Grand Total	25 (100%)	25 (100%)

Table 3.2.44 Processing: Period of impact on operating funds during COVID-19

When this change on level of operating funds happened	Frequency (%)
Apr.-Jun. of 2020	10 (59%)
July.-Sep. of 2020	5 (29%)
Oct.-Dec. of 2020	1 (6%)
July.-Sep. of 2021	1 (6%)
Grand Total	**17 (100%)**

Table 3.2.45 Processing: Prevention measures during COVID-19

Prevention measures	Frequency	Percent
Stay at home	1	5%
Instruction of hand washing to your labors	6	30%
Instruction of social distancing to your labors	6	30%
Instruction of wearing masks to your labors/ distribution of masks to your labors	6	30%
Vaccination	1	5%
Total	21	100%

2) Challenges, Needs and Perspective

- Fuel prices and electricity prices have risen since the outbreak of COVID-19, causing product processing costs to skyrocket.
- State-owned sugar factories have faced long-standing management problems. There is a factory that is out of service.
- Since the self-sufficiency rate of rice in Kenya is only 14.9 % (2019) calculated by FAOSTAT data, private rice mills have not developed in Western region, and farmers sell rice to middlemen for Uganda.
- The Agricultural Technology Development Center lacks facility and personnel, and it is desirable to conduct capacity development for extension staff for agricultural product processing technology and SME operators, who purchase raw materials from small-scale farmers.

Table 3.2.46 Food balance in rice

Year	2016	2017	2018	2019
Production (ton)	67,707	54,159	75,108	107,110
(%)	(8.5)	(7.9)	(11.2)	(15.0)
Import (ton)	728,819	634,854	602,104	607,819
(%)	(91.5)	(92.3)	(89.5)	(85.1)
Export (ton)	90	960	4,358	908
(%)	(0.0)	(0.1)	(0.6)	(0.1)
Balance (ton)	796,436	688,053	672,854	714,021
(%)	(100.0)	(100.0)	(100.0)	(100.0)

Source: Calculated by FAOSTAT

(5) Impacts on Distribution Stage and Underlying Factors

1) Overview

There are various distribution channels for agricultural products, such as direct sales by farmers, traditional distribution via local markets and wholesale markets in urban areas, modern distribution via processing factories and supermarket chains, and via exporters and auction markets. Of these, the distribution channels via market facilities and processing factories were greatly affected.

The results of the VC survey are shown below.

Table 3.2.47 Distribution: Period and reason of change of handling volume during COVID-19

tons of products handled in a year before COVID-19	level of impact of COVID-19 on the tonnage handled	When change in the quantity handled happened	tons of products handled in a year after COVID-19	Why the tonnage handled changed
600	High impact	Apr.-Jun. of 2020	250	Because of finance availability
100	High impact	Jan.-Mar. of 2020	60	Because of cost
80	High impact	Jan.-Mar. of 2020	60	Because of cost
200	High impact	Jan.-Mar. of 2020	180	Because of finance availability
30		Jan.-Mar. of 2020	28	Because of logistic problem

Table 3.2.48 Distribution: Period and reason of change of handling amount during COVID-19

price of the products procured before COVID-19	level of impact of COVID-19 on procurement price	When this change in the price of the products happened	price of the products procured after COVID-19	Why the price of the products procured changed
100	No impact			
100,000	High impact	Jan.-Mar. of 2020	120,000	Because of market availability
50,000	High impact	Jan.-Mar. of 2020	60,000	Because of input availability
1,000,000	High impact	Jan.-Mar. of 2020	2,000,000	Because of input availability
200		Jan.-Mar. of 2020	200	Because of input cost,

Table 3.2.49 Distribution: Change of access to supply during COVID-19

difficulty in access to supplies before COVID-19	Level of difficulty to access supplies before COVID-19	level of impact of COVID-19 on access to supplies	When this change in access to supplies happened	Level of difficulty to access supplies after COVID-19
Yes	Easy to find	High impact	Jan.-Mar. of 2020	Difficult to find,
Yes	Easy to find	High impact	Jan.-Mar. of 2020	Difficult to find,
Yes	Difficult to find,	High impact	Jan.-Mar. of 2020	Difficult to find,

Table 3.2.50 Distribution: Change of transportation cost during COVID-19

cost of transportation before COVID-19 per month	level of impact of COVID-19 on the price of transport	When this change in the price of transport happened	cost of transportation after COVID-19
250,000	Medium impact	Apr.-Jun. of 2020	150,000
5000	High impact	Jan.-Mar. of 2020	7000
5000	High impact	Jan.-Mar. of 2020	6000
5000	High impact	Jan.-Mar. of 2020	6000
5000	No impact		

Table 3.2.51 Distribution: Change of operating fund during COVID-19

sufficiency of operating funds before COVID-19	level of impact of COVID-19 on operating funds	When this change in your operating fund happened	Sufficiency of operating funds after COVID-19	Why operating funds changed
Enough	High impact	Apr.-Jun. of 2020	Lack	Because of input cost,
Enough	Low impact	Jan.-Mar. of 2020	Lack	Because of demand
Enough	High impact	Jan.-Mar. of 2020	Lack	Because of demand
Enough	High impact	Jan.-Mar. of 2020	Lack	Because of input cost,
Lack	No impact			

2) Challenges, Needs and Perspective

- Improving the efficiency of logistics due to rising fuel prices is the biggest challenge for distributors.
- Since lorries are kept on standby at the border posts for a long period of time, there is a risk of deterioration of cargo quality, and it is desirable to introduce an independent engine type refrigerated lorries. Otherwise, the transport companies should introduce web site application to custom clearance for smooth crossing the border posts following MOH protocols including vaccine certificate for crews.
- During shortage of drivers during COVID-19, the collection lorries are adjusted the operating time. For example, KTDA picked and collected tea leaves only outside the curfew period.
- Although most logistics companies have been registered as Essential Workers, they still need employee infection control measures based on MOH protocols and hygienic education.

(6) Impacts on Sales Stage and Underlying Factors

1) Overview

In the municipalities of Nairobi, Mombasa, Kisumu, Nakuru, and Eldred, modern transaction channels by supermarkets are growing. Although Uchumi and Nakmatt were once the mainstream, but they were eliminated due to management problems. Carrefour, Food Plus and Naivas are expanding rapidly with shopping malls. The price of processed products is not much different from that of general retail stores.

Rice, potatoes and fresh vegetables that have passed through local markets and central wholesale markets are not tied by cold chains, so their freshness deteriorates quickly, but they are inexpensive. At general food general stores, middlemen ship according to orders. Since March 2020, there have been five waves of increase in daily infected people, and until October 20, 2021, the curfew had been ended. In the fifth wave of Omicron variant, the government does not restrict movement or shorten operating hours.

Retailers say COVID-19 has significantly reduced the volume of crops they trade. Among the target crops, the retailers answered reduction sales for banana at 74%, green gram at 72%, maize at 57%, and potato at 56%. The results of the VC survey are shown below.

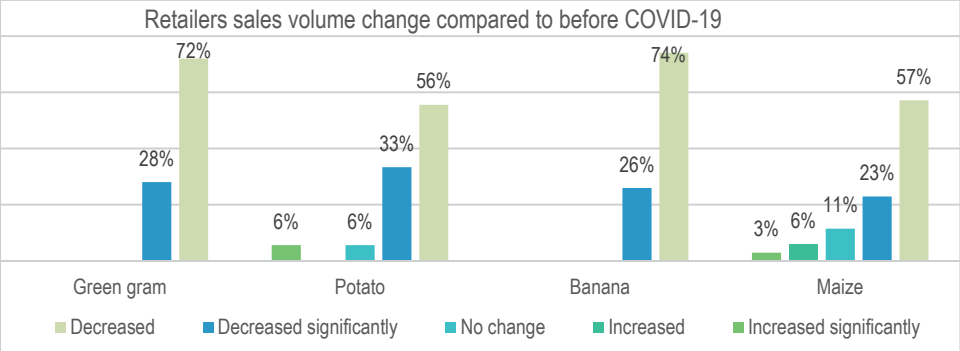


Figure 3.2.26 Retail : Change of sales during COVID-19

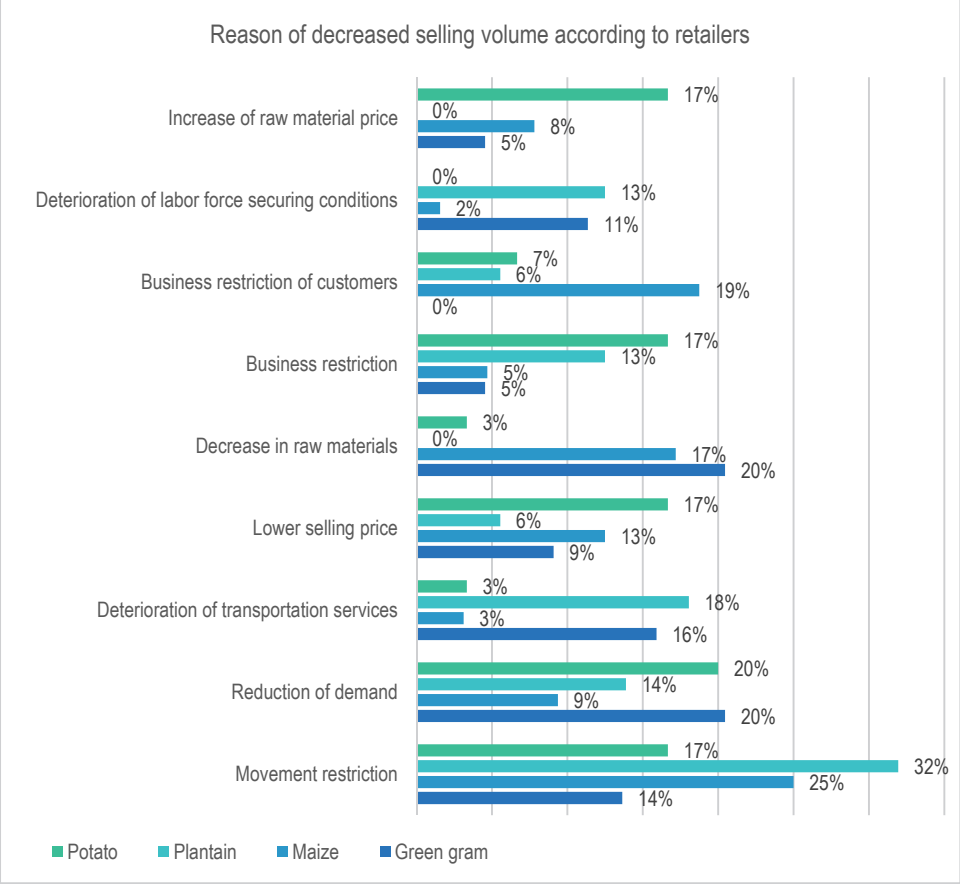


Figure 3.2.27 Retail : Reason of decreasing selling volume during COVID-19

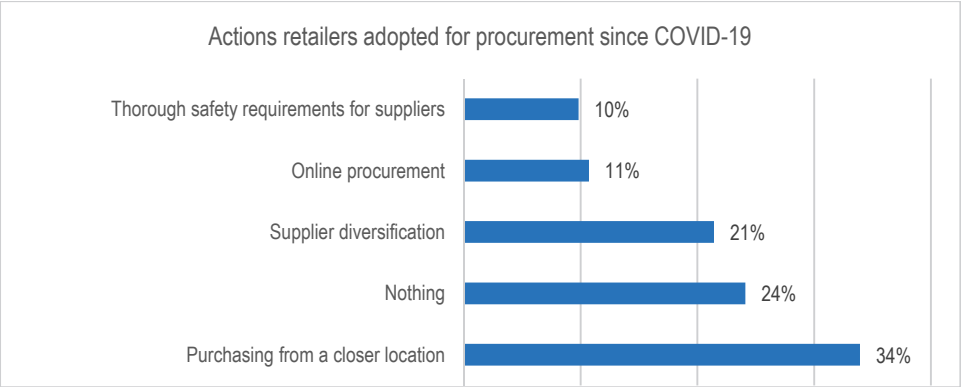


Figure 3.2.28 Retail : Actions adopted during COVID-19

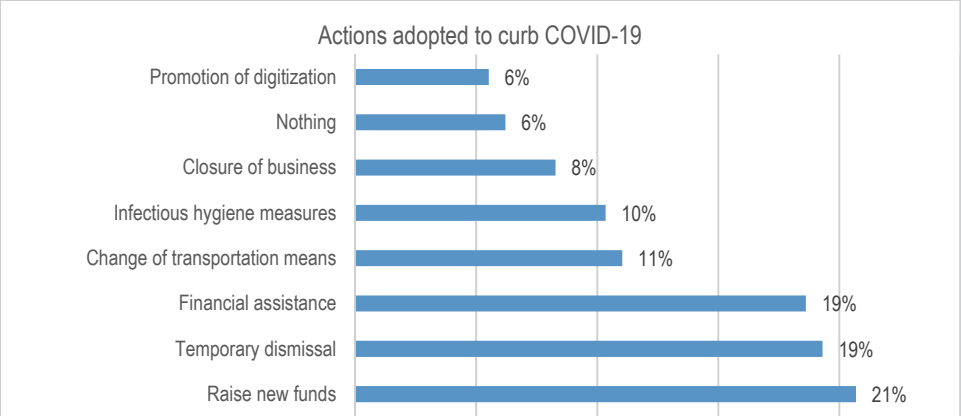


Figure 3.2.29 Retail : Actions adopted to curb COVID-19

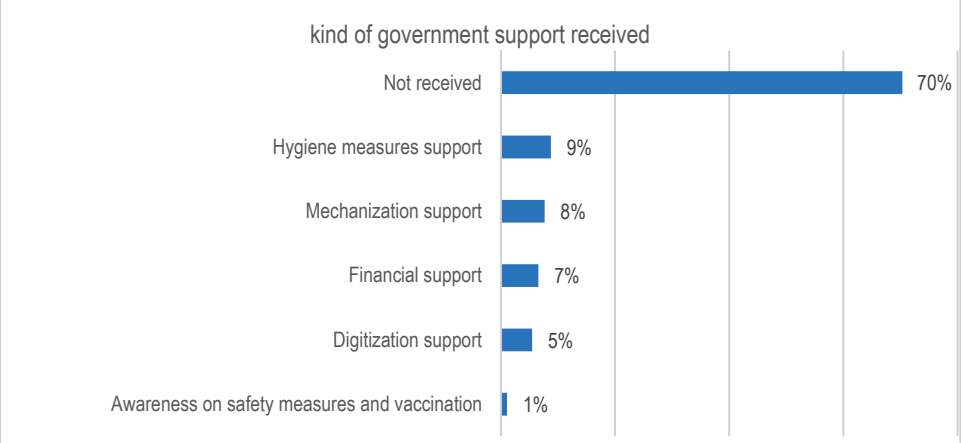


Figure 3.2.30 Retail : Kind of government support received after COVID-19

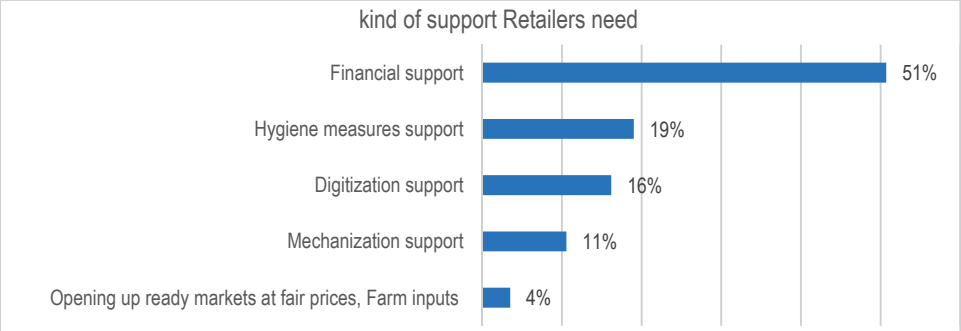


Figure 3.2.31 Retail : Kind of support needed during COVID-19

2) Challenges, Needs and Perspective

- It is important to continue education and practice for prevention of viral infections. In rural towns and villages, consciousness against COVID-19 is still low.
- Retail / restaurants are crowded places, so increase of the vaccination rate of employees is priority task. Proportion of fully vaccinated above 18 years old is still low at 17% at the mid of January 2022.
- It is important to stimulate the market by promoting the procurement of grains and legumes to school feeding programme through KNTC.
- Recovering demands by resuming the tourism industry using the QR code of the Ministry of Health and the vaccine passport system after ending of Omicron variant pandemic are desirable.
- The retailers and restaurants are requesting for low interest small credit for continuous business operation.

(7) Impacts on Consumption Stage and Underlying Factors

1) Overview

The loss of employment opportunities in urban areas has led to sluggish consumption of rice, fruits, vegetables, and processed foods. Of the staple foods, maize, wheat, cassava, and millet are stable. At the beginning of the first wave, there was concern about buying up maize flour and sugar, but the surge in food prices was avoided by the overall decrease in demand and the adjustment of import licenses by AFA directorates. With the reopening of schools, rice and dried beans have begun to be procured from KNTC.

The results of the VC survey are shown below.

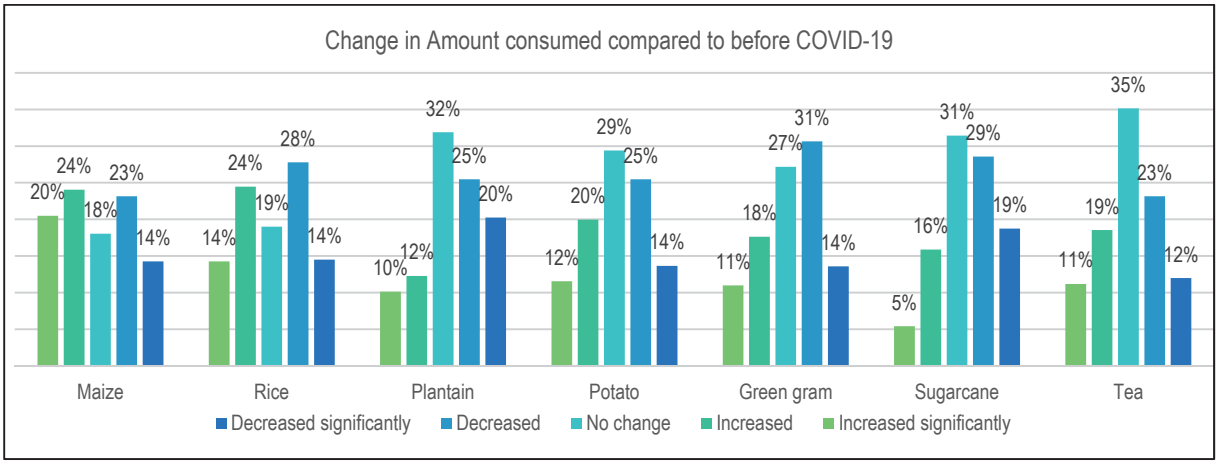


Figure 3.2.32 Consumption: Change of consuming products after COVID-19

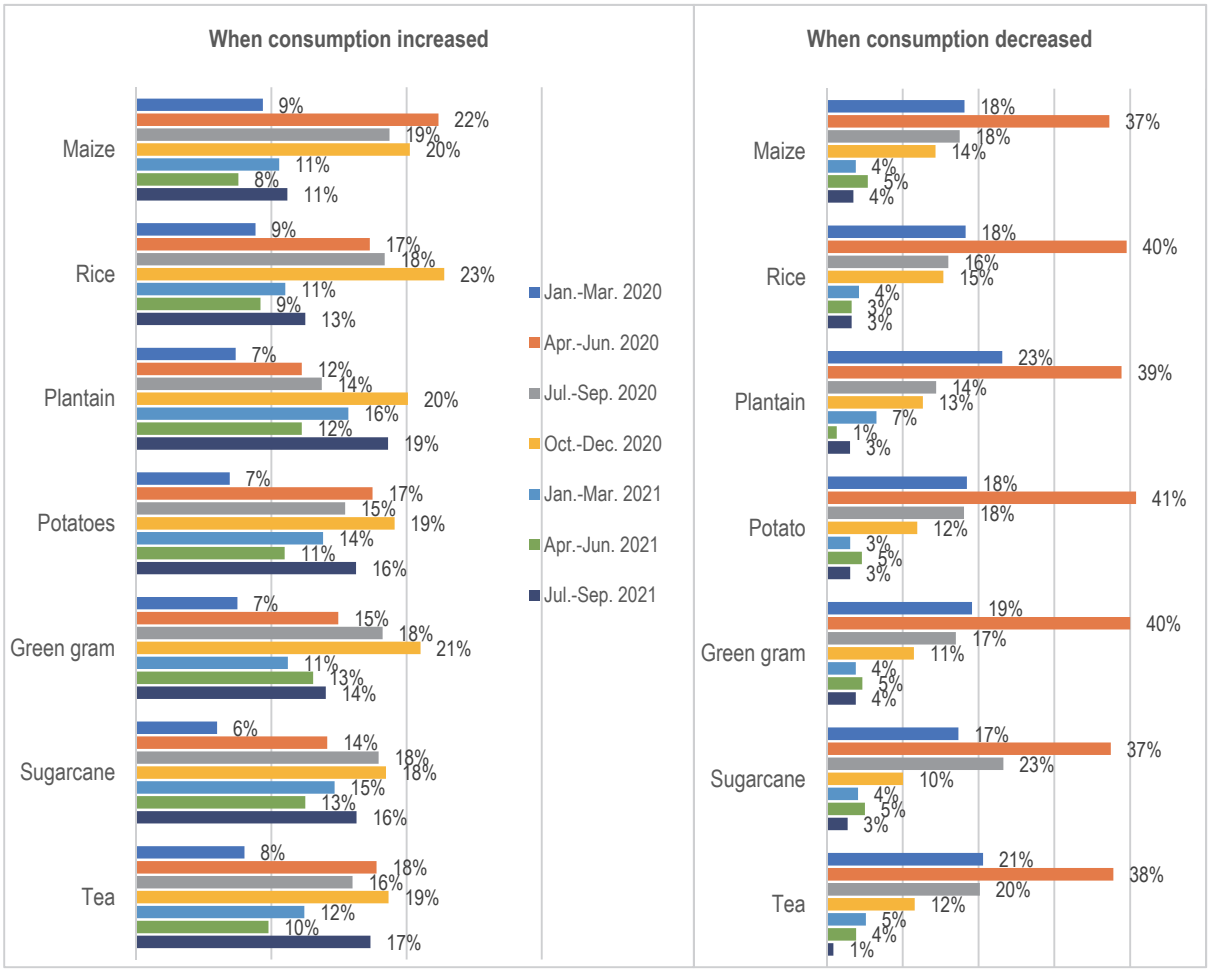


Figure 3.2.33 Consumption: Period of change of consuming products after COVID-19

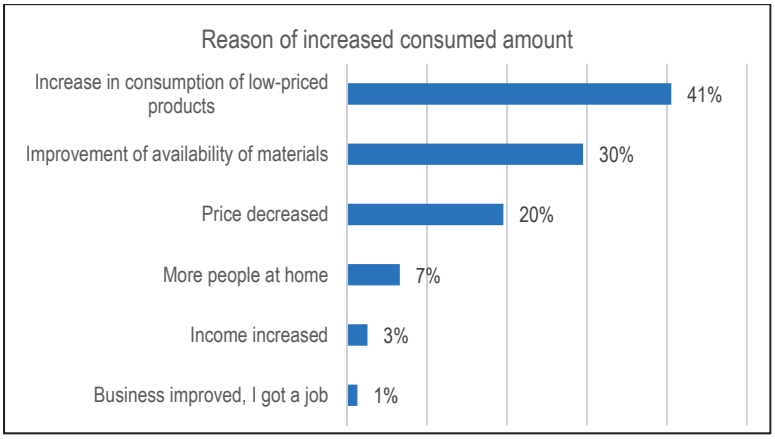


Figure 3.2.34 Consumption: Reason to increase consumption after COVID-19

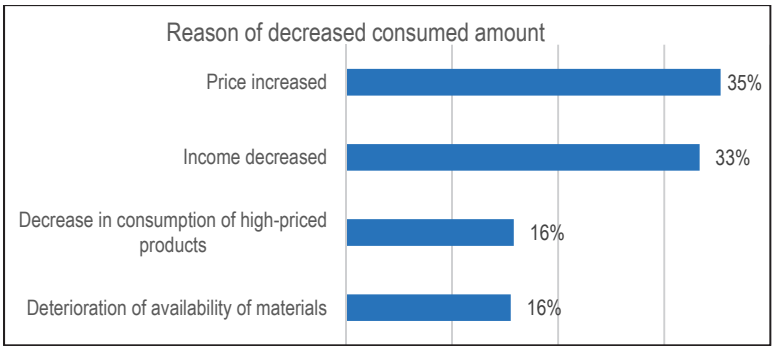


Figure 3.2.35 Consumption: Reason to decrease consumption after COVID-19

Table 3.2.52 Consumption: Change of income after COVID-19

Change in Income Compared to before COVID-19	Frequency	Percentage (%)
Decreased	201	43.8%
Decreased significantly	189	41.2%
Increased	14	3.1%
Increased significantly	5	1.1%
No change	50	10.9%
Grand Total	459	100.0%

Table 3.2.53 Consumption: Action adopted after COVID-19

Actions you have adopted since COVID-19	Frequency	Percentage (%)
Stay home	251	23.9%
Online delivery	72	6.9%
Low price range	266	25.3%
Consumed safe food	216	20.6%
Purchased easy-to-purchase foods	245	23.3%
Grand Total	1,050	100.0%

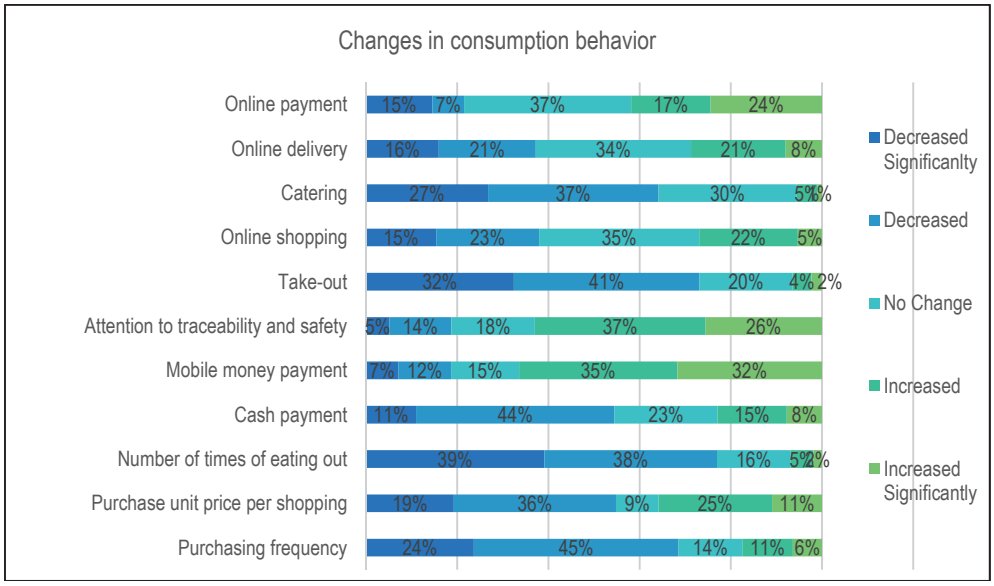


Figure 3.2.36 Consumption: Change in consuming behavior after COVID-19

2) Challenges, Needs and Perspective

Under the influence of COVID-19, some households have returned to rural areas due to lay-off or unpaid holidays. Creating job opportunities in rural areas are necessary for the stability of civilian life. The government's road-and-bridge initiative secured a certain employment even during COVID-19 pandemic. Sustainable public works in rural areas contribute to society. In recent years, securing a water source by constructing the Thiba dam in Kirinyaga county has greatly contributed to increasing rice production and increasing farmers' income, and expected to respond to the long-term increase in consumer demand for rice. In the future, it will be necessary to secure a stable water source for food production in the densely populated Western an Nyanza regions. In addition, it is still necessary to strengthen food production and improve nutrition in dry and semi-arid areas. Although water resources are limited.

3.2.5 Impacts on FVC in the Country

(1) Common and Differentiated Effects by Crops and Underlying Factors

1) Common Effects across Crops

- After the onset of COVID-19, there was a consistent rise of fuel prices, and agricultural inputs, and this led to a rise in the cost of production of all crops.
- When the price of fertilizers and agrochemicals rose, farmers either applied less amounts of these inputs, applied the inputs late or planted crops on reduced acreage.
- To observe the government preventive measures of COVID-19 on social distancing and gathering, agricultural extension services were modified or removed altogether. These measures stopped face-to-face interactions with farmers, gatherings that were necessary for demonstration activities and holding of expos and agricultural shows.
- The cost of enforcing covid requirements was an added cost across all crops and their value chains. In every value chain, someone had to be assigned to ensure that social distancing is observed, and they had to introduce and increase hygiene stations and modify existing ones.
- Operations of processing of the produce was limited to daytime hours.
- The transportation and distribution of all crops and their products was disrupted by the restriction to movements, which stopped all activities between 6:00 pm (and later, 10:00 pm) and 4:00 am
- There was a general change in the business environment cutting across all the crops value chains. Face-to-face meetings were drastically reduced and virtual meetings were used as an alternative. Worker who were deemed to be most vulnerable to covid disease were allowed to work from home. Wherever possible, online services were preferred over the traditional interactive services.
- Faced by rising cost of living, most of it linked to the rise in the cost of fuel, farm laborers were asking for more pay
- Lockdown and layoffs send people home where they started or focused on farming.
- Although most farmers reported a decrease on production volumes of all the seven crops compared to the period before covid, there was a difference in the scale of this decrease. The greatest decrease in production volume was reported by 83% of green gram farmers followed by 81% of tea farmers in the study sample. Crops with the lowest decrease were sugarcane and rice as reported by 50% and 55% of the farmers respectively.

The biggest impact of the spread of COVID-19 infectious diseases is the problem of upstream supply shortages, such as the inability to import high-quality chemical fertilizers and other agricultural materials due to import / export restrictions, and the resulting decrease in production. On the other hand, the disposable income of consumer households has decreased due to restrictions on movement and loss of employment opportunities, and consumer needs have come to mainly purchase grains and sugar,

which are high-calorie foods, and retail. However, cereal sales became the mainstream, and the demand on the downstream side changed, and the balance between supply and demand was lost. The period is mainly from March to September 2020, but even now, the supply-demand balance is not as balanced as it was before the outbreak of COVID-19, centering on grain and horticultural crops. The key indicators for evaluating the balance between supply and demand may include the income of small-scale farmers, the price index of input goods such as fertilizers, the ratio of food imports from neighboring countries to total food imports as a buffer, and cereal consumption per capita of consumers.

The extent of impact of 7 target crops in Kenya at each VC stage are shown below.

Table 3.2.54 Distribution type and extent of impact of target crops by COVID-19

VC stage	Crop						
	Distribution among corridor			Distribution within corridor	Domestic distribution		Outside regional distribution
	Cereals/staple food	Cereals/staple food	Horticultural crop	Horticultural crop	Cereals/staple food	Industrial crop	Export / industrial crop
	Maize	Rice	Dry Bean (Green gram)	Irish potato	Cooking banana	Sugarcane	Tea
Input	Large	Large	Small	Large	Medium	Large	Large
Production	Small	Small	Medium	Small	Medium	Large	Medium
Processing	Medium	Large	Small	Medium	-	Large	Large
Distribution	Medium	Large	Large	Large	Medium	Large	Large
Sales	Small	Medium	Medium	Medium	Medium	Small	Middle
Consumption	Small	Medium	Small	Medium	Small	Small	Small

Source: VC survey

2) Differentiate Effects across Crops

- Sugar cane deliveries and availability of sugar remained unchanged despite the disruptions on the FVC stages of the crop.
- Potatoes and bananas were hardest hit by the effects of covid. Immediately after COVID-19 set in, consumption declined, yet producers were harvesting huge amounts of the produce. And because a very small proportion of these crops goes through processing and they have a short shelf life, most of the harvest was lost through rotting.
- Green grams, maize, rice and tea suffered modestly particularly because the crops have longer shelf life. In addition, rice, tea and maize enjoyed some form of support from the government, which cushioned the FVCs to a great extent.

(2) Trends and Underlying Factors in the Country

1) Trends by Crop types

For each crop investigated in the FVC study in Kenya, the following trends were specifically observed in the effects of COVID-19 on their FVC.

Crop	Trends
1. Maize	• Inputs supply, particularly fertilizers, was disrupted significantly • Production of maize was high after covid. but many farmers shifted to other crops later • Processing was at normal level • Distribution was slightly affected at the onset of covid was normal from local and imported maize • Sales were in the normal range • Consumption increased after covid due to stockpiling. Institutions consumed less
2. Rice	• Inputs supply, particularly fertilizers, was disrupted significantly • Production increased after covid but farmers planted on less acreage in the follow up seasons • Processing decreased as demand was low and most paddy rice was stored in warehouses

	• Distribution was slightly disrupted but recovered. However, exports to Uganda have remained low • Sales decreased both in the local markets and to Uganda • Consumption decreased following covid effects on incomes
3. Bananas	• Inputs supply, particularly fertilizers, was disrupted significantly • Production remained high throughout the period after covid • Processing has not been affected • Distribution was affected after covid and recovered slightly but is still low • Sales have slumped to the lowest levels since 2019 • Consumption decreased as incomes were affected
4. Potatoes	• Inputs supply, particularly fertilizers, was disrupted significantly • Production increased and remained high to date • Processing is within the normal range • Distribution was slightly affected after covid but stabilized later • Sales volumes decreased and they remain low to date • Consumption decreased following the closure and shortening of operating hours by restaurants
5. Green grams	• Inputs supply, particularly fertilizers, was disrupted significantly • Production remained stable • Processing was at normal level • Distribution was slightly affected after covid, but returned to normal • Sales declined as the export market to India decreased demand • Consumption remained normal
6. Sugarcane	• Inputs supply, particularly fertilizers, was disrupted significantly • Production have been at high levels since the onset of COVID-19 to date • Processing of sugar cane is low due to slow-down and closure of public mills • Distribution of sugar remains at normal level • Sales have remained at normal levels owing to controls • Consumption has been at normal levels
7. Tea	• Inputs supply, particularly fertilizers, was disrupted significantly • Production of green tea leaves increased after covid but was disrupted from the last quarter of 2021 • Processing of tea leaves declined • Distribution of tea was disrupted • Sales of tea increased and then reduced in the medium term • Consumption of tea in the international markets reduced in the medium term

2) Change of Crop Flow

Following the onset of COVID-19 and its effects on the FVC, the flow of each of the 7 crops has changed as follows.

Maize: In the first season of 2020, maize farmers produced a high volume of the crops, but this declined significantly in the subsequent seasons as costs of production were high and prices low. Many farmers stored their harvests or sold them at very low prices. In the most recent seasons, many farmers have been shifting from maize to growing other crops.

Rice: Most of the rice that was produced from the Western Region of Kenya in the first season after the onset of COVID-19 was not sold to the main market in Uganda because of restrictions to movement. In the follow-up seasons, rice farmers reduced production as they kept previous produce in warehouses for longer than normal periods. Purchases from KNTC and the opening of institutions that take up rice have helped to improve sales, but production remains still slightly below normal levels.

Bananas: Production from banana farms continues to be high but the low prices and demand is

discouraging farmers, who face huge post-harvest losses when their produce is not bought. Sales through middlemen has been low since COVID-19 set in, and farmers are increasingly neglecting their crops because of this.

Potatoes: Farmers have been harvesting large volumes of potato produce since the onset of COVID-19. However, a high proportion of their produce has not been bought or was bought at low prices. Uptake by middlemen has been so low that some of the produce that was not bought went to waste.

Green grams: Although production levels have been maintained throughout the period after COVID-19, the uptake of green grams has been low, and farmers were forced to sell their produce at low prices. Demand from the main export market to India reduced significantly and therefore most of the produce is sold locally.

Sugarcane: Since the onset of COVID-19, sugar cane farmers have been producing high volumes of the produce, but low absorption and processing capacity by millers has delayed harvesting. Mature sugarcane is often left in the farms beyond harvest time and when harvested, the produce is kept at the waiting bay for long periods. Along with high costs of inputs, this has discouraged farmers and they are likely to shift to producing other crops in the forthcoming seasons.

Tea: The production of green tea leaves has been on a gradual decline since the first season of 2020 to date, because of the high costs of inputs restrictions to movement. In turn, deliveries to the tea factories have been going down steadily, leading to reduced volumes that are processed and sold.

(3) Underlying Factors of Vulnerability in FVC in the Country

Findings obtained so far from this study in Kenya show that farmers have been exposed to vulnerabilities in the FVC because of the COVID-19 preventive measures that were imposed by the government. Many of these vulnerabilities in the FVC revolve around lockdown measures and closure of borders and closure of public spaces.

Therefore, according to the findings from the study, farmers in Kenya are facing the following vulnerabilities in the FVC;

- High dependence on imported fertilizers left most farmers with inadequate supplies to carry out their farming activities in good time
- Poor management of public sugar milling companies has reduced the sugar milling capacity in the country and caused delays in deliveries to the few private millers.
- High cost of crop production has discouraged many small-scale farmers from farming of some crops like maize, bananas and potatoes.
- Unstable markets for most crops where prices rise and drop significantly over a short period of time. This was observed particularly in the case of green grams, maize, potatoes, and bananas.
- Limited access and use of warehousing and storage facilities exposes farmers produce to post-harvest losses.
- High dependence on labor to do most of the farm work exposes farming to production risks in the absence of labor
- Agriculture value chain activities like procurement of farm inputs, marketing or selling, which rely solely or mostly on face-to-face interactions are highly vulnerable to restrictions of movement
- Similarly, extension services that rely on face-to-face interactions are highly vulnerable to restrictions of movement
- When major shocks like COVID-19 occur, farmers are more likely to suffer losses when service providers are scattered and an integrated solution across the value chain is needed.

- Farmers who suffer more losses of their crops owing to reduced demand are more likely to have limited knowledge of post-harvest handling techniques.
- Inadequate credit facilities or lack of financial products tailored to agricultural value chains
- A low capacity of processing of crops like green grams, bananas, and potatoes denies farmers an opportunity to add value to their produce and earn a little more income

Mechanism of Warehouse Receipt System (WRS)

The Warehouse Receipt System Council (WRSC) was established in 2020 under the Warehouse Receipt System Act (2019) to minimize post-harvest losses. The process is that the owner of the agricultural product (farmer or trader) deposits the goods in a warehouse certified by the county government, and a warehouse receipt is issued as proof of ownership. After inspection by the Agriculture and Food Authority (AFA), the warehouse operator issues a warehouse receipt as a receipt for agricultural products. Farmers can sell produce when either a government agency, WRSC, or warehouse operators find a buyer. It is used when the supply of agricultural products is excess, and the price is dropping. The warehouse operator shall repack, store, fumigate, and ship the stored agricultural products. The warehouse storage fee is set in advance and must be displayed. The storage fee is 3 Kshs /kg and the fumigation fee is 3 Kshs /kg (November 2021). The farmer as an owner is put his name on the warehouse receipt and can be transferred to a third party. The county government inspects the warehouse facility and issues a license to the warehouse operator. In the future, the Kenya National Multi-Commodity Exchange (KOMEX) will function like the Nairobi Stock Exchange (NSE) to trade warehouse receipts. Warehouse receipts are used for direct sales, and farmers can use warehouse receipts to access financing. Currently, WRS covers agricultural products such as maize, rice, beans, mung bean, coffee, cotton, potatoes, coconut, milk powder, dried fish, and dried meat, and WRASC has approved 13 products. A certificate of conformity will be issued to the warehouse operator, and the warehouse of the National Cereal Products Board (NCOB) will also be a potential warehouse operator for the WRC. The minimum allowable lot is 200 bags of 50 kg, and small-scale farmers need to collect their products through cooperatives. WRS aims to facilitate joint collection by smallholders and facilitate access to processors and traders.

(4) How Resilient FVC Should be in the Country

Resilience and vulnerability are two complimentary perspectives. While vulnerability relates to the lack of capacity to prevent or withstand negative impact, resilience is the capacity to do so (Miller et al, 2010). To improve resilience against effects such as those brought about by COVID-19, the following are recommended.

a. Utilization and Application of Digitalization in Input Distribution and Sales

In Kenya, various efforts are being made in EC transactions amid the prevalence of COVID-19. In the case of potatoes industry under public-private partnership, the network contents have expanded to seed potato sales, agricultural machinery services, chemical fertilizer sales, pathological diagnosis with pesticide sales, and harvesting product sales. The registered members have increased to more than 20,000 since April 2021. This network system creating EC platform can apply to other crops such as rice, dried beans, and fresh vegetables for domestic consumption. It is expected to reduce distribution costs and create trading opportunities. E-commerce is rapidly becoming widespread in Kenya, and the EC platform is highly integrated with finance. In fact, DigiFarm, a subsidiary company of Safaricom, has increased the number of registered members to more than 1 million as of December 2021. It is desirable to incorporate collaboration with leading companies and start-ups in digitization in agricultural projects.

b. Support on Rice Production

In order to increase rice production, which demand is increasing rapidly from other grains, it is necessary to promote infrastructure development, including the rehabilitation of irrigation facilities in the western irrigation area and the diversification of production areas. Furthermore, if there is a shift from the current IR rice variety to marketable rice varieties by means of supporting appropriate cultivation technology, improving the quality of certified seeds, and supporting rice distribution through the Warehouse Receipt System. The integrated supports will contribute to improvement of farmers' income.

c. Support for Reduction of Production Costs through Agricultural Mechanization

The Agricultural Mechanization Bill aims to establish mechanization hubs and disseminate under public-private partnership. Agricultural machinery owners move seasonally among the northern corridors and operate according to their needs, and it makes still expensive costs. Comprehensive efforts are needed to curb production costs from the perspective of mechanization, such as financing agricultural machinery service providers including rice mills, capacity building of mechanical operators and mechanics, eliminating custom tariffs on spare parts, and improving the management capabilities of multipurpose cooperatives. In addition, support for companies considering business operations in Kenya may contribute to the development of service providers.

d. Support on Agricultural Production and Food Supply in Arid and Semi-Arid Lands where facing Seasonal Food Shortages

Due to the COVID-19 pandemic, food supply to arid and semi-arid areas where are northern Rift Valley and Eastern regions remains unstable in 2020 and 2021, although there was no damages of drought or locus. Given the limited water resources, it is also important for residents to use local resources to secure food production and secure their resilience.

Table 3.2.55 (Reference) Ongoing/completed projects/measures in Kenya toward resilient FVC

Good Practice	Implementor（VC stage）	Contents/ Background/ Factor
Operation of Irish Potato EC Platform for VC stakeholders	National Potato Council of Kenya (NPCK), USAID, International Potato Research Centre (CIP)、International Fund for Digital Competence (IFDC) (All Stages)	NPCK operates EC platform on the website under the name of Viazi Soko (potato market). The directors are composed of the public and private sectors and are an organization that easily reflects the opinions of related private companies. The headquarters is located at KARLO-Kabete site. The contents include farm inputs including seed potato, chemical / organic fertilizer, mechanization service, pathological diagnosis service with applicable pesticide/ fungicide, transportation service, etc. The favorable service for farmers is provision of virus-free seed potato, which is popular variety (Shangi ver.). Framers can reserve the order with advance payment before 6 months. Transporters can arrange efficient distribution routes.
Matching between farmers and agricultural machine owners	Hello Tractor Ltd, USAID, John Deere (Input and Production Stages)	By declaring working site, time, working content, and scale by farmers, farmers can negotiate with the owner of agricultural machines. Agricultural machinery owners can operate efficiently. The activities are expanding mainly in the Western region.
Small credit to farmers using electronic money	DigiFarm Ltd. (Production Stage)	Farmers register personal information and farming information, and the company set credit lines and make small credit by M-Pesa, their own company group's electronic money. As of November 2021, there are about 1 million registrants.
Low input farming by large-scale farm for maize production	Komool Farms Ltd., Trans-Nzoia county government agricultural office (Production Stage)	In the maize farming system, efforts are being made to increase the number of microorganisms in the soil by reducing the plowing work reducing twice to once for disc plow cultivation, and by squeezing the crop residue of the previous crop. Furthermore, performing soil analysis will lead to a reduction in the amount of applied chemical fertilizer.

Source: FVC Study Team

(5) Adaptation and Counter Measures in the Country and Potential Cooperation

The following are the measures to deal with the factors of impact (direct factors) and the existence of vulnerabilities.

Table 3.2.56 Adaptation / Overcoming Measures and Support Measures

Affecting factors / VC vulnerabilities	Objectives	Period	Countermeasure	Necessary action	Target crop	Target VC
Rising prices of chemical fertilizers	Price stabilization	short	VAT 16% tax exemption Tax exemption for imported raw materials	Subsidy for fertilizer Tax reform Fertilizer subsidy Expansion of E-voucher system	Maize Rice Wheat Hort. crops	Input
Rising wages for agricultural	Labor saving in agricultural work	mid/ long	Promotion of agricultural	Deployment of agricultural mechanization hub	Rice Potato	Input

workers			mechanization Sale of used agricultural machinery and rice milling units in Japan	Collaboration with Japanese companies Low interest loan to agricultural machinery		
Low self-sufficiency rate of rice	Rise of production	mid/ long	Promotion of rice cultivation in Western & Nyanza region	Irrigation facility rehabilitation Rice farming guidance Production of certified seeds	Rice with byproduct	Production
Few employment opportunities in rural areas Food loss	Adding value by processing	short/ mid	Technical support for small-scale processing	Strengthening Agricultural Technology Development Center Industry-academic collaboration Low-interest loans for agricultural processing machines	Hort crops Root crops Cereals Specialty tea	Processing/ Retail
Low sugar self-sufficiency	Increasing milling capacity	short/ mid	Privatization of sugar factories	Low-interest loan	Sugarcane	Processing
Low pricing of rice at farm gate	Food security	short	Expansion of Warehouse Receipt System	Improvement of the system	Maize Rice Bean	Distribution Sales
High distribution costs	Promotion of EC	short	Activation of EC transaction	Launch of EC site by crop	Rice Hort. crops Specialty tea	Input/ Production/ Distribution/ Retail
Chronic food shortage area	Resilience of ASAL residents	short/ mid	Adaptable farming technic and supply of foods	ASAL Cultivation guidance Groundwater development	Bean Sorghum	Input/ Production

3.3 Uganda

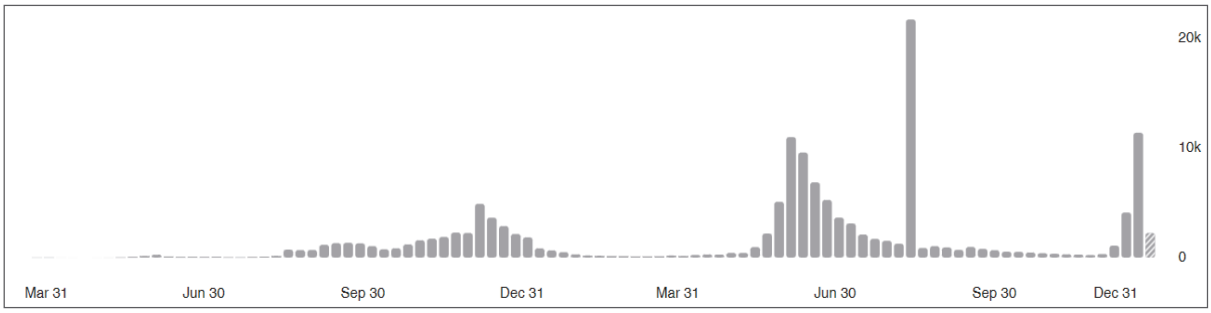
Against COVID-19, two lockdown measures were taken, one for 34 days from April to May 2020 and the other for 44 days from June to July 2021, after the first case of infection was confirmed in March 2020. More than 160,000 people were infected and 3,500 were died by the end of January 2022. What is unique regarding the Ugandan government's measures is that while taking extremely strong measures, such as a continuous night curfew and the closure of schools from June 2021 to January 2022 except for some grades, designated people involved in the production, distribution, and sale of foods, as essential workers and granted them exceptional travel and business permits to maintain the food supply chain.
The main impacts of COVID-19 on FVC can be summarized as follows: the impact on rural production was very minor, and the impact of reduced demand in cities and towns led to reduce the amount of sales, processing and distribution, which resulted in lower producer prices and reduced sales of perishable products, such as plantain and horticultural crops. As the impact on production conducted in rural area, where about 80% of Ugandan is living, is limited, the overall impact on Ugandan FVC can be said not significant; the impact of COVID-19, however, directly hit vulnerable people, such as those without stable jobs in urban areas. With regard to consumer prices, cereals did not decline much because they are difficult to convert to consumption and can be stored for a relatively long period of time, while perishable items, such as plantain and horticultural crops, experienced large decline, if temporary. Another issue common to all VC players is that they are small businesses and therefore vulnerable, which is an issue to be taken into account when considering future support measures.
Vulnerability in food VC in Uganda is due to the following factors: producers do not have market information such as market prices and demand trends, making them vulnerable to changes in the market environment; low profitability of agricultural production, making it difficult for producers to improve their livelihoods; lack of private business development in the agricultural sector, making it difficult to add value to agricultural products through processing, etc.; and underdeveloped financial support systems for farmers and small-scale businesses, making it difficult to stabilize their farming and business bases.
Measures to address these problems include 1) distribution of superior seeds, fertilizers, and pesticides, 2) strengthening of agricultural technical guidance, 3) raising awareness among farmers (market strategy and selection of crop groups based on agricultural statistics and market analysis), 4) government planning to contribute to the formation of production areas, 5) establishment of market information networks using ICT, 6) development of crop warehouses, 7) establishment of logistics system 8) Financial support for processors and upgrading of processing equipment; 9) development of marketing strategies, such as branding/packaging; and 10) development of rice millers.
Considering the above issues, the following support measures to be implemented by JICA are proposed: 1) Support for establishing agricultural technology and strengthening dissemination system, 2) Promotion of market-oriented agriculture, and 3) Needs assessment for warehouse construction.

3.3.1 Status of COVID-19 and Development Partners' Initiatives

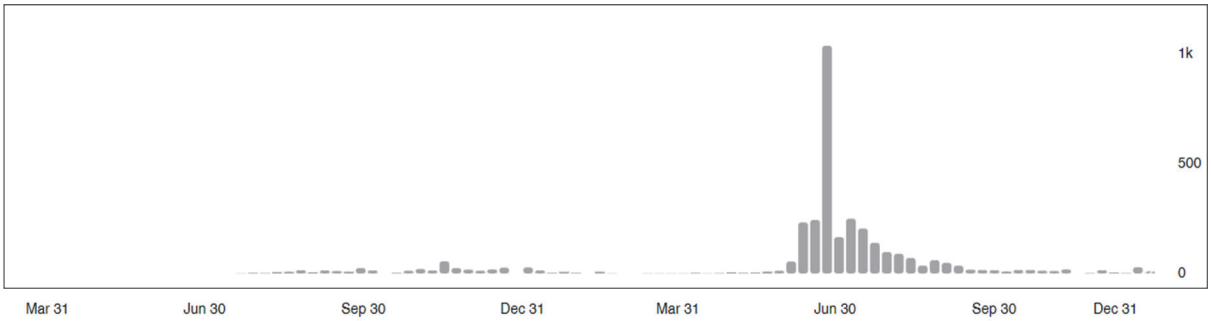
(1) Status of COVID-19

The first case of COVID-19 in Uganda was reported on March 21, 2020. According to African Development Bank, the countries with the highest infection rates in Africa are South Africa (21.4%), Algeria (15.4%), Rwanda (13.7%), Egypt (10.5%) and Uganda (6.8%), which account for 67.8% of the total cases in Africa as of December 5 , 2021. The infected persons in Uganda amount to 162,007 as of February 3, 2022, while the total deaths to 3,545 at the mortality rate of 2.2%.

The daily frequency trend of infections is shown in Figure 3.3.1. The peak periods are recognized both in December 2020 and June 2021. An anomaly can be seen in the August 2021 and the cause is unknown. In addition, since December 2021, Omicron virus has begun to spread around the world. In Uganda, the number of infected people per day was below 100 until the first half of December. It has been, however, increasing rapidly since mid-December, with an average of 1,453 infected people per day in the last week of December and 1,936 new infected people as of December 31, which brings great concern that the number of infected people will increase further.



Process of infection



Process of deaths

Source：WHO https://covid19.who.int/region/afro/country/ug

Figure 3.3.1 Process of infected people and number of deaths

Government of Uganda(GOU) has implemented lockdowns twice, in a total of four months, from April to May 2020 and from June to July 2021.The government policies and measure under the lockdown are shown in Table 3.3.1.

Table 3.3.1 Trend of infection and measures

Time	Measures	Preventive Measures against COVID-19
April 2020	First lockdown 1st April~4th May (34days)	・ First case was found on 16th March. ・ Border closure (except for logistics), Movement restrictions, Night curfew (Continue until January, 2022 with time relaxation), Suspension of public transportation, Prohibition of private vehicles except for emergency supplies and food, Prohibition of sales in markets except for food, Closure of schools(Continue until January, 2022, except for some grades). *The above was gradually liberalized from May 5, 2020.
June 2021	Second lockdown 18th June~31st July (44 days)	・ Semi-lockdown was conducted from June 6th to 17th before the lockdown. ・ Prohibition of movement across prefectural borders, Restrictions 30% limit on the number of employees working at office (later strengthened to 10% limit), Prohibition of movement other than on foot (transportation of food is allowed), Prohibition of movement across prefectural borders, Night curfew (19:00 to 5:30), Closure of schools, etc.

Source: Government of Uganda website: https://statehouse.go.ug/media/news/2020/03/25/presidents-address-covid19-new-guidelines; FAO website: fapda.apps.fao. org/fapda/#main.html org/fapda/#main.html.

After the lockdown in 2021, measures such as limiting the number of people on motorcycles (one person in addition to the driver), limiting the number of people in private cars (two people in addition to the driver), closing schools, and night curfew from 7:00 p.m. to 5:30 a.m. were continued as shown in Figure.3.3.2

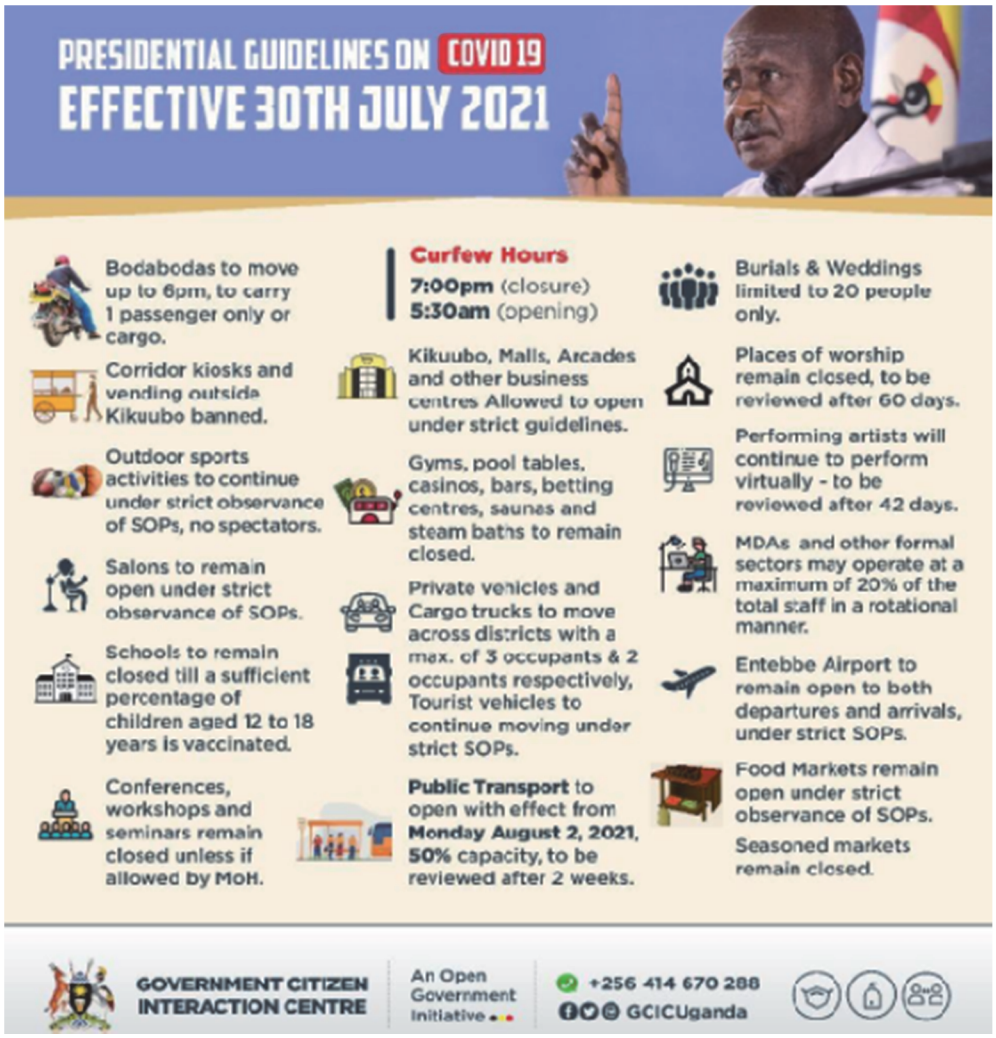


Figure 3.3.2 Measures for COVID-19 effective on July 30, 2021

Figure3.3.3 shows the contents of the Presidential Statement issued on December 31, 2021. In December, despite a sharp increase in the number of cases, the government announced mitigation measures, including the reopening of schools that have been closed since April 2020 lockdown, a night curfew, and the removal of restrictions on the number of passengers on public transportations. It is believed that the priority is to restore economic activity, there are, however, concerns that the number of serious illnesses and deaths may increase due to the rapid increase in the number of people infected with the Omicron Virus in Uganda, where the medical system is fragile.

Figure 3.3.3 Policies announced on December 31, 2021

(2) Impact on economic activity

Ugandan economic activity was hit hard in the industrial and service sectors, by a sharp contraction in public investment, a slowdown in consumer spending caused by four-month-long lockdown, the closure of all borders except for critical cargo, and disruptions in global demand and supply chains. According to the World Bank, Ugandan real GDP growth rate in the fiscal year (FY) 2020 declined to 2.9% from 6.8% in 2019. It also expects that if real GDP growth for the FY 2021 remains at the level of that of FY 2020, GDP per capita will be far below the pre-COVID-19 Figure, even if it recovers significantly in FY 2022.

Ugandan agricultural sector is the backbone of the country, accounting for 25% of real GDP and 50% of total export amount. 80% of the total population lives in rural areas and 70% of the employable population have employment opportunities in agriculture, therefore agriculture is a more important industry for Ugandans than economic indicators suggest. The agricultural sector also plays an important role in the growth of other sectors as it is the basis for a wide range of economic activities supporting agriculture, including importation and distribution of production inputs.

Ugandan agriculture has been repeatedly hit by short-term droughts during year 2016 to 2019. The reduction in production of major crops due to the drought has caused food prices to soar, making it difficult for low-income groups to obtain even the minimum amount of food needed. At the same time, the agro-processing industry has seen its profitability decline as the cost of procuring raw materials has risen. Although agricultural statistics for 2020 and 2021 have not yet been released, a field survey conducted by survey team in Uganda indicated that production was on a slight improvement trend from

the current level due to favorable weather conditions, if the spread of COVID-19 infection is prolonged, there are concerns that it will have a negative impact on the overall national economy.

(3) Government Policies and Measures against COVID-19

The Government of Uganda has introduced the policies listed in Table 3.3.2 and has enforced related measures.

Table 3.3.2 The government policies and measures

Government body (agency)	Policies and Measures/ Target audience/VC process/Time	Result/Source
Board of Revenue	Policies and Measures: Extension of the deadline for filing taxes Target: All citizens VC stage: production, sales, distribution, and consumption Time: March 2020	VAT and corporate tax filing deadlines extended by one to two months. FAO Fapda - Food And Agriculture Policy Decision Analysis Tool (http://fapda.apps.fao.org/fapda/#main.html)
Government of Uganda	Exemption from the prohibition of movement regarding the transportation of foodstuffs Target : Distributors VC stage: Distribution Time: March 2020	People involved in the production, transportation, and sale of agricultural products and other foodstuffs were designated as essential workers and exempted from the movement restriction. FAO Fapda - Food And Agriculture Policy Decision Analysis Tool http://fapda.apps.fao.org/fapda/#main.html
Government of Uganda	Policies and Measures: Exemption from sales restrictions Target: Distributors VC stage: Sales Time: March 2020	In addition to exempting food markets from sales restrictions (with the exception of groceries, which will not be closed), the order encourages grocery deliveries and states that supermarkets should consider home delivery services. https://statehouse.go.ug/media/news/2020/03/25/presidents-address-covid19-new-guidelines
Government of Uganda	Policies and Measures: Food distribution Target: Approximately 15 million Kampala residents affected by the lockdown, as well as elderly, sick, and lactating mothers and cab drivers living in Wakiso District. VC stage: consumption; timing: April 2020	Distribution of 6 kg of maize, 3 kg of soybeans and salt per person. For lactating mothers and the sick, 2 kg of milk powder and 2 kg of sugar were also distributed. FAO Fapda - Food And Agriculture Policy Decision Analysis Tool (http://fapda.apps.fao.org/fapda/#main.html)
Government of Uganda	Policies and Measures: Permission to resume business activities Target: Shops, restaurants, and wholesale market personnel VC stage: distribution, sales, and consumption Time: May 2020	Stores, restaurants, and wholesale markets are allowed to reopen. Public transportation will not be reopened and activities will be limited to cycling or walking. FAO Fapda - Food And Agriculture Policy Decision Analysis Tool (http://fapda.apps.fao.org/fapda/#main.html)

Source: Compiled by the survey team based on the FAO website, GOU website, etc.

(4) Initiatives by Development Partners

The main support by development partners to the Government of Uganda is shown in Table 3.3.3

Table 3.3.3 Contents and results of cooperation by development partners

Partners	Details of support (target, VC stage, scale, timing)
World Health Organization (WHO)	COVAX has allocated 3,552,000 doses of Astra Zeneca vaccine to Uganda from January to June 2021, with the remaining 2,688,000 doses to be supplied by June 2021. Support GOU by working with donor agencies and international organizations https://covid19.who.int/region/afro/country/ug
United Nations Children's Fund (UNICEF)	Support for vaccination through the COVAX Facility (an international framework for the joint purchase and equitable distribution of COVID-19 vaccines among multiple countries) UNICEF developed the Oxygen Plant-in-a-Box package to help countries rapidly increase the capacity to produce oxygen in hospitals and clinics, with the first plant going to Uganda in September 2021. https://www.unicef.org/uganda/stories/first-unicef-oxygen-plant-box-heads-uganda-help-covid-19-response
World Food Programme (WFP)	WFP-Uganda has set up five large-scale border inspection stations across the country. At Entebbe Airport, an inspection station with an area of 900 square meters has been established with a capacity of 1,000 persons/day. Dispatch of specialized logistics personnel to facilitate import procedures for food aid, etc. Rental of truck 10beds for transporting foodstuffs (total loading capacity: 180 tons) 4-month lease of a 5,000-ton grain warehouse to promote the school lunch program Local procurement of 10,000 tons (24.6million US$) of food7.0 produced in Uganda Nutritional support for 13,000 pregnant and lactating women and infants throughout the Karamoja region. https://www.wfp.org/publications/wfp-uganda-covid-19-response

Japanese Government	On the 922day of 2020, H.E. Mr. Kazuaki KAMETA, Ambassador Extraordinary and Plenipotentiary of Japan to the Republic of Uganda, and H.E. Mr. Matia KASAIJA, Minister of Finance, Planning and (H.E. Mr. Matia KASAIJA, Minister of Finance, Planning and Economic Development of the Republic of Uganda) on the grant aid (Economic and Social Development Program) of 400 million yen. Announced the provision of health and medical equipment, including ambulances and beds for wards. https://www.mofa.go.jp/mofaj/press/release/press4_008771.html The Government of Japan announced today that it will provide a total of approximately US$9.8 million in financial assistance to support refugees and host communities in Uganda, as well as to strengthen border security.2020420 The assistance, which will focus on mitigating the impact of the spread of the new coronavirus in Uganda, will be provided by the United Nations High Commissioner for Refugees (UNHCR), United Nations Population Fund (UNFPA), United Nations Women (UN Women), United Nations Children's Fund (UNICEF) It is implemented through the United Nations World Food Programme (WFP), the United Nations Development Programme (UNDP), the International Organization for Migration (IOM), and the International Food Policy Research Institute (IFPRI). https://tokyo.unfpa.org/ja/node/58280
British Government	1013On 2021, the UK government committed £500,000 (over $708,000) to UNICEF Uganda. In July 2021, training and personal protective equipment (PPE) were supplied to the oxygen plant, oxygen cylinders, and COVID-19 treatment unit via UNICEF, using a portion of the above funds. https://www.unicef.org/uganda/press-releases/uk-officially-hands-over-life-saving-oxygen-cylinders-support-ugandas-covid-19 On October 8, 2020, the UK government announced a grant of 1.322 billion pounds (6.11 billion UGX). The UK grant was earmarked to support activities of the World Health Organization (WHO) and the International Organization for Migration (IOM). IOM supported the strengthening of the health sector's capacity to prevent, prepare for, detect, and respond to the spread of COVID-19. WHO will strengthen the coordination of COVID-19 response activities at national and local levels. WHO strengthened coordination of COVID-19 response activities at the national and local levels and supported enhanced surveillance, detection, and laboratory confirmation of positive cases and a reporting system for rapid containment of positive cases.
U.S. Government	The U.S. government provided $46 million for Uganda; $4 million was allocated to the U.N. World Food Program (WFP) for COVID-19; and approximately $9.3 million was distributed to the U.N. High Commissioner for Refugees (UNHCR), the International Committee of the Red Cross (ICRC), UNICEF, and NGOs to help refugees and host communities cope with COVID-19. refugees and host communities to support their COVID-19 efforts. https://www.usaid.gov/uganda/press-releases/united-states-contributes-133-million-support-refugees-and
Government of Denmark	On May 19, 20202009, the Danish government signed a grant worth $2 million to support the COVID-19 response in Uganda. The grant was provided through WHO and the United Nations Population Fund (UNFPA) and was used to procure life-saving supplies such as masks and personal protective equipment (PPE) for health care workers. On July 21, 2021, the Danish government provided 5 billion Ugandan shillings (155 million yen) to GOU through WHO. https://reliefweb.int/report/uganda/danish-government-extends-additional-financial-support-worth-over-5-billion-shillings
Government of Ireland	On September 30, 20202012, with US$250,000 provided by the Irish government, WHO procured equipment and installed it in treatment centers in the country. In addition to the equipment, pulse60 oximeters, oxygen concentrators40, and high-flow nasal oxygen tubes31 for critically ill patients were provided. On September 28, 2021, the Irish government will provide 335,500 doses of AstraZeneca vaccine through COVAX. https://www.irishtimes.com/news/ireland/irish-news/ireland-to-give-335-500-covid-19-vaccines-to-uganda-1.4686070
Norwegian Government	On July 15, 20212012, the WHO commissioned financial support worth over 8 billion Ugandan shillings ($248 million) to improve the deployment of the COVID-19 vaccine in Uganda.
Korean Government	On 202012August 3, KOICA entrusted WHO with five walk-through booth units, 26,400 sets of RNA extraction kits, 26,400 sets of PCR diagnostic kits, and 100 million shillings (310,000 yen).

3.3.2 Agriculture and Crops to Study

(1) Production and Trade

1) Status of Agriculture

Uganda has a total area of 242,000 ㎢, of which 201,000 ㎢ (83%) is land, excluding water areas. Agricultural land has been expanding in line with population growth and FAO (2016) classifies 0.144 million ㎢ (14.4 million ha), 72% of the total land area, as arable land. Based on FAOSTAT, the annual average area of crops harvested in the three years 2017-2019 is 7.04 million hectares, which means that approximately 50% (7.04 million ha divided by 14.4 million ha) of the arable land was used for crop production. Compared to other sub-Saharan countries with tropical savanna climates where climate change is significant, Uganda has relatively high utilization rate (cropping rate) of arable land.

2) Main Crop Production

a. Main Crops and Dietary Life

The major crops of Uganda are shown in Table 3.3.4. The top three food crops, i.e. cassava, maize and plantains (cooking banana), account for nearly 3.02 million ha or 43% of 7.04 million ha of the total harvested area on an average in 2017-2019.

Table 3.3.4 Major Crops in Uganda (2017-2019)

Crops	Area harvested (1000ha)	yield (ton/ha)	Production volume (1000 tons)
Cassava	1,205.30	2.32	2,796.7
Maize	1,001.30	2.66	2,659.8
Plantains and others	811.3	4.26	3,454.6
Coffee, green	507.9	0.55	280.1
Sweet potatoes	461.8	4.21	1,945.2
Sorghum	446.9	0.88	394.0
Sugar cane	65.7	68.98	4,530.7
Vegetables, fresh	181.6	6.63	1,203.4
Millet	164.1	1.41	230.9
Onions, dry	91.2	3.96	360.7
Seed cotton	88.7	1.16	103.1
Rice, paddy	85.3	2.76	235.1
Soybeans	47.3	0.59	27.8
Potatoes	41.7	4.28	178.0
Tea	31.6	2.06	65.0
Peas, dry	24.7	0.51	12.6
Wheat	14.7	1.56	23.0
Tomatoes	7.9	5.43	42.7
Pineapples	0.5	8.46	3.9

Source: FAOSTAT, Crops and livestock products (Production), September 15, 2021 Minor Revision
Note: Crops covered in this study are the highlighted maize, plantain, coffee, onion, rice, potato, and tomato, in total 7 crops.

The per capita availability of staple food crop in Uganda was estimated based on the annual production of each crop and the total population of 40,427,000 in 2019. The results are 63.2 kg of cassava, 60.1 kg of maize, 78.0 kg of plantains, and 3.2 kg of rice. Furthermore, their total amount exceeds 260 kg per capita with supplemental supply of both potatoes (sweet potatoes and Irish potatoes) and other grains (sorghum and millets). The food security in Uganda seems rather stable by diversification of food crops in comparison with ones in other Sub-Sahara countries.

As described below, Uganda is characterized by diversity of food habits. Traditional agriculture has been practiced by selecting crops suited to local natural conditions such as agro-climate, altitude, topography, and soils, and by cultivating the right crops in the right places. However, with rapidly increasing population, and expanding private land under the revised Land Act, shortage of farmland is becoming more serious in rural areas. According to Agricultural Survey (Uganda Bureau of Statistics) in 2018, the land holding size of 66% of smallholders was less than 1.0 ha. Improvement of land productivity is essential for the sustainable growth of the agricultural sector of Uganda. The Government attaches priority to irrigation development to increase the planted area and intensity, to improve unit yields by introducing appropriate farming techniques with high yielding varieties, and to encourage introduction of cash crops of higher value. National Development Plan (NDP) III places a great emphasis on promotion of agro- industries with VC by cluster formation among stakeholders of the agricultural sector.

As observed in other African countries, urbanization in Uganda has led to a change in the consumption structure of food crops, and rice consumption, which is easy to prepare and has high nutritional value, is growing rapidly. Compared to other food crops, rice has a high cash value and contributes significantly to farm income. It is also advantageous in terms of rational use of land, as it can be grown in lowland areas that are not suitable for field crops. It is, however, required to be highly competitive in the market

in terms of both price and quality, and there are many technical issues in promoting VC.

In 2008, Uganda was selected as one of the 23 pilot countries in the Community for African Rice Development (CARD) launched in 2006, and the National Rice Development Strategy (NRDS) was developed with the support of JICA. In the project, the introduction of NERICA varieties, the establishment and dissemination of standard cultivation methods, the improvement of farming efficiency, and the improvement of milled rice quality through the optimization of post-harvest processing techniques were implemented in an integrated manner, resulting in a remarkable increase in the added value of rice in Uganda. In addition, through technology transfer, many rice researchers, agricultural extension workers, and farmers have been trained, and sustainable growth of the rice sector is expected.

b. Cash crops

Ugandan cash crops are represented by craft crops for export, such as coffee, sugarcane, cotton, and tea. These crops were introduced as plantation crops during the colonial period and have historically had a well-established supply chain. Today, they are still directly cultivated and primary processed in corporate farms by private capital and large farmers. Corporate farms purchase raw materials from contract farmers or individual farmers in the surrounding areas. In recent years, due to the government's export promotion policy, the contribution of fish (mainly Nile perch and tilapia), maize, and leather has increased, while the share of the above cash crops in agricultural exports has been shrinking.

Uganda has a long history of coffee cultivation, spanning more than 100 years. Uganda is the second largest coffee producer in Africa and the ninth largest in the world. Since 1970, coffee has been Ugandan main source of foreign currency income, and in recent years, Uganda has become a leading exporter of organically grown coffee among the African countries.

3) Eating Habits and Daily Foods

Everyday food in Uganda includes *Matoke*, green bananas steamed, mashed, and kneaded before they are fully ripe for cooking; Posho, a hard porridge of maize flour kneaded with hot water; and chips (fried potatoes) and steamed and mashed cassava (*Mawogo/Muwago*). In general, most of the dishes are prepared with vegetables such as eggplant, cabbage, and okra together with meat such as goat, chicken, pork, or beef meat, and beans. Recipes that are stewed in peanut paste or tomatoes are also popular. In restaurants, the stew is served with choices of staple foods such as matoke, posho, cassava, pumpkin, sweet potato, or rice, and meat or fish stewed in broth as a side dish.

In addition, Lake Victoria, Lake Albert, Lake Kwanzaa, and Lake Edward are actively fished for Nile perch and tilapia, which are important sources of animal protein for the Ugandan people. Below are some Photo 3.3.1 of typical Ugandan dishes. Coffee, which is Uganda's leading export commodity, is not yet widely consumed at home, but is generally served in urban cafes.

The plate on the right is cassava, vegetables, sweet potatoes and plantain mashed and kneaded (Matoke) and on the left is peanut sauce.

The plate on the left is vegetables, potatoes, maze flour and kneaded together (Posho); on the right, mashed plantains ,and plantain mashed and kneaded (Matoke); on the right, beans and beef sauce (menu at a local restaurant).

Rice with bean sauce

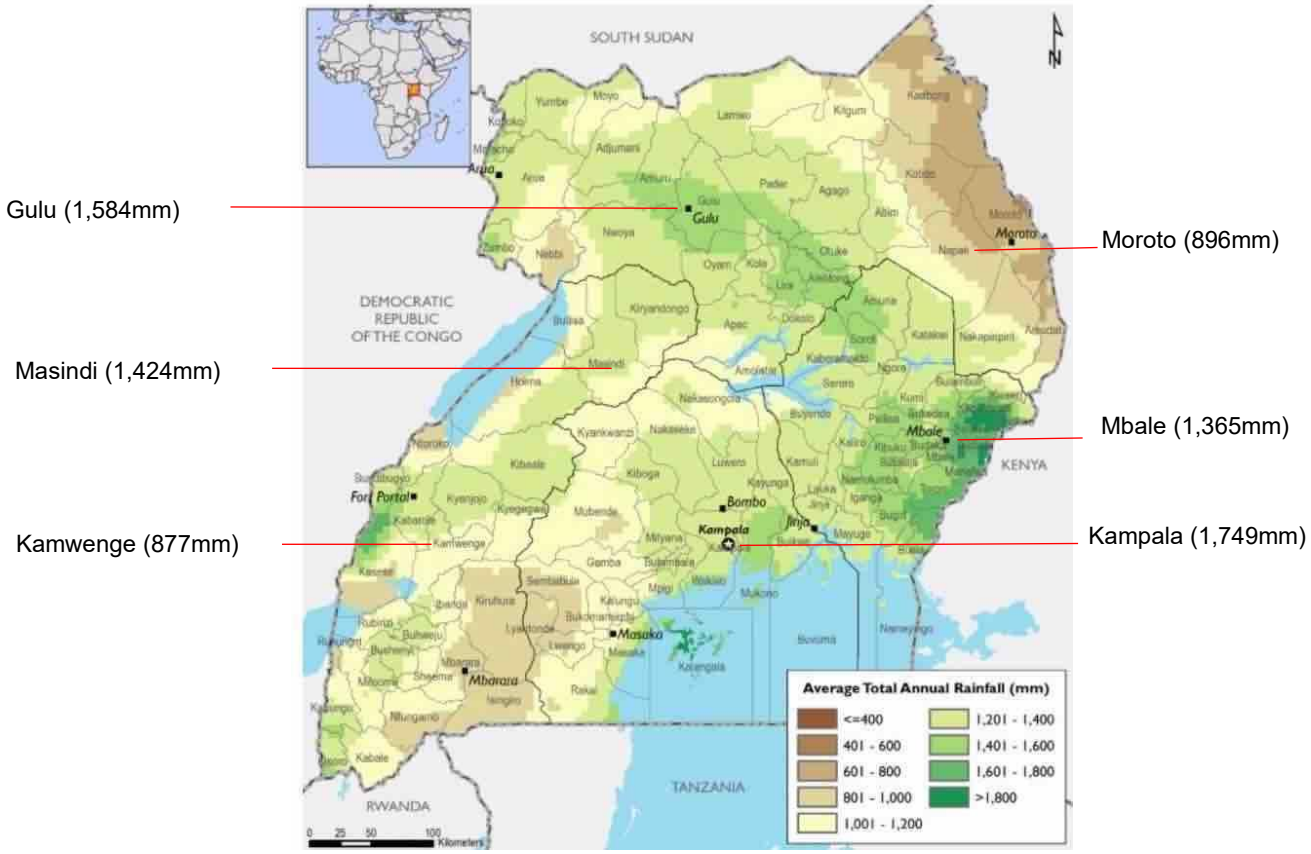
The plate on the right is mashed and kneaded plantain (Matoke), vegetables, and rice; on the left, cowpea sauce.

Photo 3.3.1 A typical Ugandan food recipe

4) Agroecological classification and crop distribution

Uganda has more than 90% of its land area with annual rainfall of more than 1,000 mm, and its relatively mild climate with an elevation of more than 1,000 m above sea level (the water level of Lake Victoria is 1 ,183m above sea level) means that its agricultural potential is high compared to its neighbors. The distribution of annual rainfall in Uganda and the average monthly rainfall at representative sites are shown in Figure3.3.4 and Table3.3.5. Although there are regional differences, Uganda has two rainy seasons a year, from March to June and from August to December.

In terms of production areas for each crop, maize is grown in the eastern and central regions of the country; paddy rice is grown in the eastern part of the country around Mbale district, where there is a lot of rainfall; upland rice is grown in the western part of the country and in the West Nile region; sorghum is grown in the northern part of the country; cassava is grown in the eastern and northern parts of the country; beans are grown in the western and northern parts of the country; plantain is grown in the western part of the country and in the central and eastern parts of the country. Sweet potatoes are widespread in the east, onions and potatoes in the west, and tomatoes in the center and east. As for coffee, the Arabica variety, which is produced in the highlands, is grown in the Mount Elgon district in the east and the Mount Rwenzori district in the west, while the Robusta variety, which is produced in relatively plain areas, is produced mainly in the central region.



Source: USAID FAMINE EARLY WARNING SYSTEMS NETWORK (FEWS NET): UGANDA STAPLE FOOD MARKET FUNDAMENTALS, JANUARY 2017

Figure 3.3.4 Distribution of annual precipitation at representative sites in Uganda (2016)

Table 3.3.5 Precipitation in Uganda (2016)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave./Total
Kampala(El.1,190m)														
Mean Temp	(℃)	18.7	19.3	19.3	19.2	18.7	18.0	17.7	17.8	18.2	18.5	18.4	18.4	18.5
Rainfall	(mm)	111	110	172	225	196	119	88	115	127	159	185	142	1,749
Mbale(El.1,156m)														
Mean Temp	(℃)	17.3	17.8	17.8	17.3	16.8	16.2	16.5	16.5	16.5	16.9	16.7	16.7	16.9
Rainfall	(mm)	80	81	130	167	137	75	52	96	127	154	157	109	1,365
Kamwenge(El.1,280m)														
Mean Temp	(℃)	17.9	18.5	18.2	17.4	17.6	17.6	17.5	17.6	17.1	17.0	16.6	17.1	17.5
Rainfall	(mm)	32	36	85	109	88	33	21	60	87	121	134	71	877
Gulu(El.1,100m)														
Mean Temp	(℃)	20.8	21.7	21.1	19.9	19.2	18.5	18.0	18.0	18.4	18.9	19.0	19.5	19.4
Rainfall	(mm)	19	23	100	207	191	140	167	210	167	199	124	37	1,584
Moroto(El.1,370m)														
Mean Temp	(℃)	15.2	16.3	16.4	16.3	15.7	14.9	14.5	14.4	15.0	15.8	15.5	15.5	15.5
Rainfall	(mm)	12	16	44	106	124	126	156	130	49	65	47	21	896
Masindi(El.1,227m)														
Mean Temp	(℃)	19.4	20.1	20.1	19.3	18.7	18.2	18.0	18.0	18.2	18.6	18.4	18.6	18.8
Rainfall	(mm)	33	39	121	176	143	99	97	142	151	199	157	67	1,424

5) Development plan of GOU

Uganda has been implementing a 6-phase National Development Plan (NDP) starting in 2010 to achieve

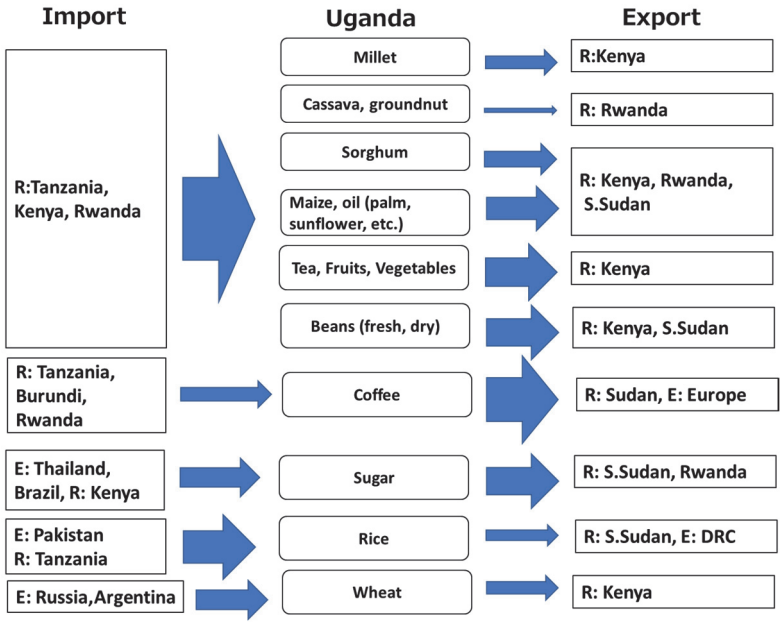
Uganda Vision 2040. Each phase covers five years. The current NDP is NDP III (2020/21-2024/25), which came into effect in 2020. It sets out key challenges, interventions and targets for sustainable socio-economic transformation in Uganda, namely to promote "increased household incomes and improved quality of life" through promoting industry, economic growth, employment and sustainable wealth creation. The target value of this challenge is set to reduce the poverty rate from 21.4% to 18.5%, increase GDP from 18.6% to 28.6%, and reduce the proportion of households dependent on agricultural income from 68.7 to 55%.

NDP III aims to promote industrial development in a wide range of fields, and agriculture promotion is at the top of the list of priority fields.

For rice, the policies up to 2018 are summarized in the National Rice Development Strategy (NRDS), however, the formulation of the subsequent policy, NRDS II, has been delayed and is currently being finalized.

6) Trade and Distribution

Since it is difficult to collect relevant information on Ugandan trade in agricultural products, only the import and export values with major trading partners by crop are presented here, mainly referring to FAO STAT (2017-2019). The results are shown in Figure 3.3.5



Source: Prepared by survey team based on information from FAO STAT

Note R: Within eastern Africa, E: Outside eastern Africa

Figure 3.3.5 Ugandan main trading partners for agricultural products (2017-2019)

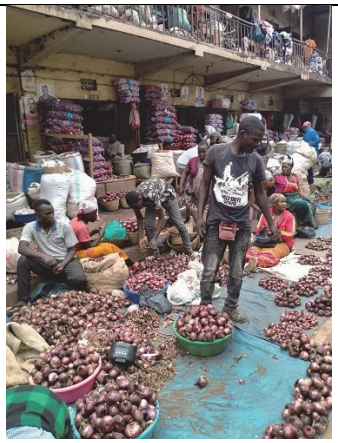
Ugandan main border trade is with Tanzania, Kenya, Rwanda and South Sudan within the Eastern African region. As can be seen from above, Uganda is both an importer and exporter of all crops, but imports from Tanzania and exports to South Sudan are prominent. Rice is imported from Pakistan and Tanzania and exported to South Sudan and the Democratic Republic of Congo(DRC). Although it is not possible to discern from the statistics, the imported rice is high quality rice for high income groups. The rice exported to neighboring South Sudan may contain NERICA, an upland rice grown in the northern region of Uganda. It may also include World Food Program (WFP)-aided rice purchases and distribution to neighboring countries. Other imports include sugar (Thailand) and wheat (Russia and Argentina) from outside Africa. Coffee (Robusta), the most important product in Ugandan extraterritorial trade, is exported to Italy and other European countries, contributing to foreign exchange earnings.

7) Distribution structure

In Uganda, crops collected in the production areas are generally transported by middlemen to Kampala and other major consumption areas. The production areas do not have sufficient warehouses to store

harvested products for long periods of time, and even grains are transported to consumption areas within a relatively short period of time (one to two months) after harvest. Many of the facilities and equipment owned by companies engaged in simple rice milling and flour milling in the production areas are aging, and this has contributed to a decline in the added value of VCs due to a decline in quality at the processing stage. In addition, it has been pointed out that horticultural crops suffer from losses due to loss of freshness and cargo pain caused by long-distance transportation, as well as quality deterioration due to insufficient moisture adjustment after harvesting (onions are generally shipped without drying).

Wholesale and retail trade is concentrated in Kampala and regional cities, where some wholesalers having large transportation facilities. In Kampala, the city-run Nakasero Market is one of the largest fresh food outlets, and there are also supermarkets for the wealthy, where carefully selected domestic produce is sold alongside imported produce.


Market in Kampala where onions are sold.


Local market where bananas, fruits, and vegetables are sold.

Photo 3.3.2 Retail market for fruits and vegetables

In recent years, the export of horticultural crops (vegetables and fruits) produced in Uganda to European countries has been increasing rapidly, reaching 0.4 million tons in 2017, according to a report (The Uganda Vegetable and Fruit Sector, Wageningen University and Research, Nov. 2019). The main importing countries are the United Kingdom and Belgium, and much of it is consumed by foreigners living in Europe. The main products are beans, tomatoes, potatoes dried fruits (citrus, mango, pineapple), plantains, melons, cassava and maranta arundinacea (for processing starch).

(2) Selecting Crops to Study

The Uganda FVC survey selected three staple food crops (maize, rice, and plantain), three horticultural crops (potato, onion, and tomato), and coffee as a crop other than staple food crops and horticultural crops. The background of the selection is shown in Table 3.3.6 below.

Table 3.3.6 Selected target crop and background

Type	Crops	Type	background etc.
Staple food crop	Rice	Within and outside region	One of the staple foods. The country is trying to fill the gap between supply and demand, and a JICA project is underway.
	Maze	Within region	Typical staple food. There is also intra-regional trade with Kenya, South Sudan, and Rwanda.
	Plantains	Domestic	Typical staple food. Few existing studies.
Horticultural crop	Potato	Within region	A candidate for Ugandan future staple food. A leading horticultural crop in Africa.
	Onion	Within region	Important for import and export to neighboring countries in the region, such

			as Kenya, Rwanda, and South Sudan. A major horticultural crop in Africa.
	Tomato	Within region	Important for export to Kenya and other neighboring countries. A major horticultural crop in Africa.
Other	Coffee	Outside region	As the largest cash crop in their country, there is high enough room for export expansion.

Source: Survey team

An overview of each crop is given in the following sections, and references are given in Table 3.3.7 below.

Table 3.3.7 References for each crop (Uganda)

Crops	Literature	Author/Year of Publication
Rice	MARKET ASSESSMENT AND BASELINE STUDY OF STAPLE FOODS COUNTRY REPORT-UGANDA	USAID/January 2010
	Value Chain Analysis of the Rice Sub-sector in Uganda	UNDP Development of Inclusive Markets in Agriculture and Trade (DIMAT)/November 2012
	Understanding the Rice Value Chain in Uganda: Opportunities and Challenges to Increased Productivity	Mildred Barungi and Tonny Odokonyero, Economic Policy Research Center/July 2016
	The Structure of Rice Retail Markets in Sub-Saharan Africa: The Case of Uganda	Masao KIKUCHI, Yusuke HANEISHI, Kunihiro TOKIDA, Atsushi MARUYAMA, Godfrey ASEA, and Tatsushi TSUBOI（Japanese Society for Tropical Agriculture）/2015
Maize/ Plantain	UGANDA STAPLE FOOD MARKET FUNDAMENTALS	USAID FAMINE EARLY WARNING SYSTEMS NETWORK (FEWS NET)/JANUARY 2017
Tomato/Onion	The Uganda vegetables and fruit sector Competitiveness, investment and trade options	Youri Dijkxhoorn, Michiel van Galen, Julian Barungi, John Okiira, Joyce Gema and Valerie Janssen, Wageningen University Economic & Research /November 2019
Potato	Market and Value Chain Analysis of Ware Potato from Eastern Uganda with a focus on postharvest management practices and losses	Alex Tatwangire and Caroline Nabukeera/September 2017
Coffee	The Market and Nature of Coffee Value Chains in Uganda	UNDP,Development of Inclusive Markets in Agriculture and Trade (DIMAT) Project/December 2012
	UCDA MONTHLY REPORT	UCDA(Uganda Coffee Development Authority)/Jun 2021

(3) Overview of FVC

1) Rice

As aforementioned, the consumption structure of food crops in Uganda has changed especially due to urbanization, as experienced in other African countries. Plantain, which represents traditional staple diets in Uganda, requires a lot of time for cooking, while rice is easily cooked and has high nutritional value, resulting in remarkable demand increase. In recent years, rice production in Uganda has steadily increased by obtaining the JICA technical assistance. It is noted, however, that local production is still insufficient to meet local demand and rice is imported from Tanzania, Pakistan and other countries.

The eastern region of Uganda is suitable for rice cultivation in lower wetlands with favorable natural conditions. Although most rice producers are smallholders with less than 1.0 ha of paddy field, there are still high potentials to increase its productivity by improvement of farming techniques technology. In addition, local rice is expected to be competitive in both quality and taste in comparison with imported rice.

Kampala plays a pivotal role as distribution hub with such factors as large transporters, processors with high quality technology, warehouses, supermarkets, and a high-income residential area. Rice is often transported from Kampala to other regional cities and towns. One of the challenges in rice distribution in recent years has been the inflow of Tanzanian rice. Tanzanian rice is cheaper than domestic rice, and the producer price is suppressed, resulting in lower profits for Ugandan rice farmers. As Tanzanian rice distributed in Uganda is the representative variety of domestic rice, Supa rice, which causes competition. The local market survey conducted in December 2021 by the JICA survey team in Kafumbe, Mukasa, Kisenyi and Kawempe within Kampala identified that the sales amount of Tanzanian Supa rice was larger than local rice. It is reported that Tanzanian rice is cheaper and has less impurities such as stones and husks.

a. Cropping Season of Rice

Figure3.3.6 shows the cropping calendar of wetland paddy in Bugweri district. There are two seasons: Season A planted between March and April and harvested between July and August, while Season B, planted between August and September and harvested between December and January.

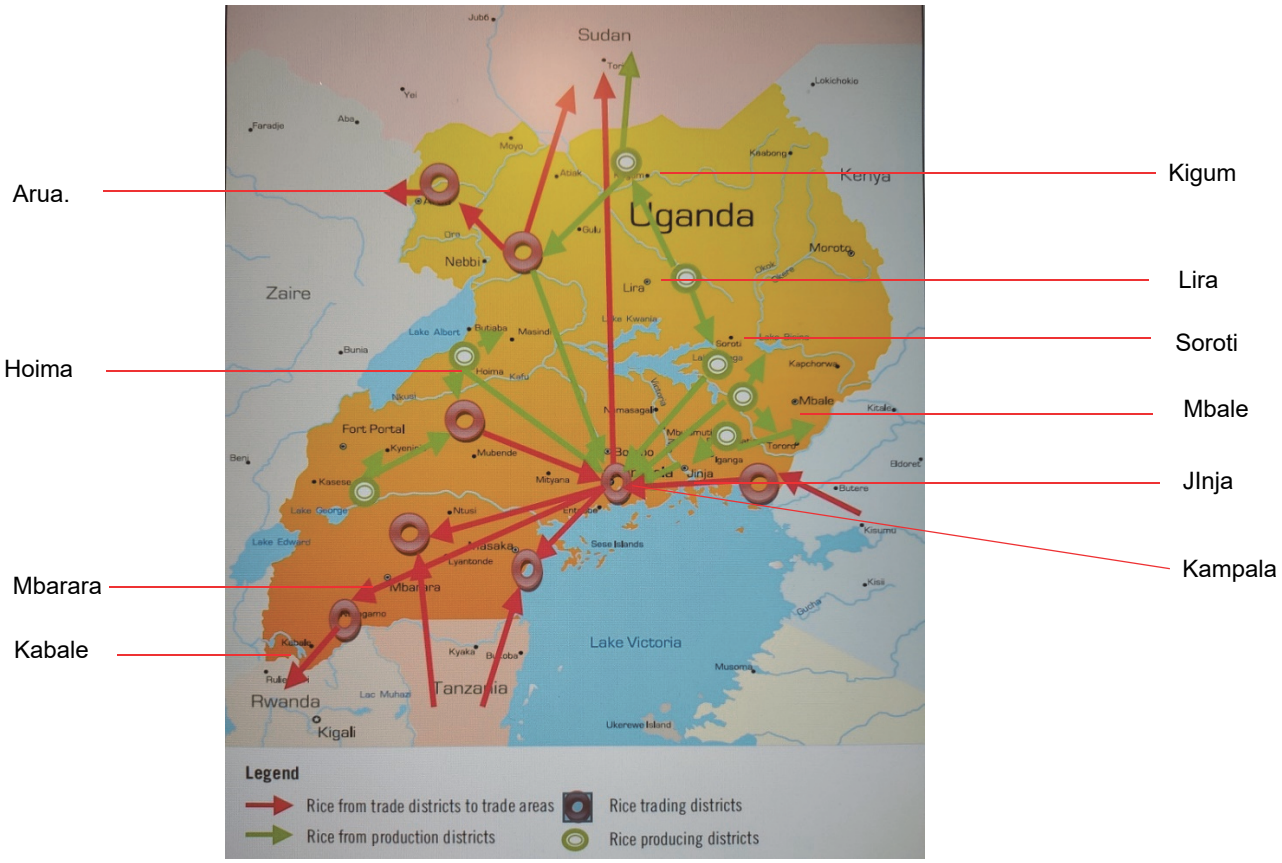
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
First Crop			Planting									
							Harvesting					
Second Crop								Planting				
	Harvesting											Harvesting

Source: Compiled by the survey team based on key informant survey and VC survey

Figure 3.3.6 Cropping Calendar of Rice in Bugweri District

b. Production Area

The main producing areas and distribution channels of rice in Uganda were verified by UNDP in 2012 as shown in Figure 3.3.7. The producing areas are represented by the eastern parts of the country, where soil conditions are generally suitable for wetland rice and sufficient water is available during rice growing season. Rice production is also increasing in the northern parts of the country in recent years. As for rice distribution, large portions of local rice are distributed to every corner of the country through Kampala. Some of large-scale rice mills are operated in Jinja. Also, limited portions of local rice are exported not through Kampala but directly to South Sudan and other neighboring countries. Since the rice sector of Uganda has rapidly developed, it is assumed that producing areas are expanded in comparison to the study results of UNDP resulting in changes in distribution channels. In fact, upland rice is widely cultivated and distributed in the West Nile region, and transported to Arua functioning as collection and shipping center for rice export to South Sudan and DRC.

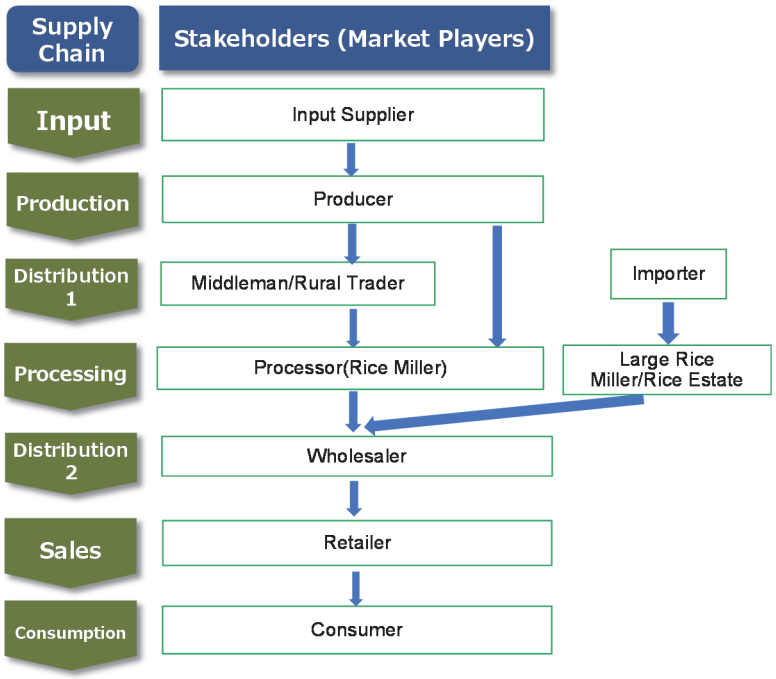


Source: UNDP Development of Inclusive Markets in Agriculture and Trade (DIMAT): Value Chain Analysis of the Rice Sub-sector in Uganda, November 2012

Figure 3.3.7 Rice producing areas and distribution channels in Uganda

c. Supply Chain

A simplified rice supply chain is presented in Figure3.3.8.



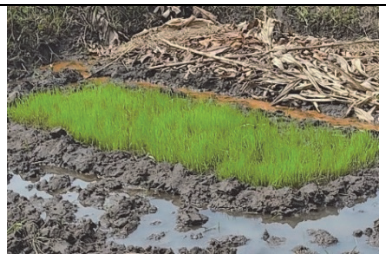
Source: Compiled by the survey team based on Key informant survey and VC survey

Figure 3.3.8 Simplified rice supply chain

As unit prices of rice are set higher than that of other cereals and, rice is recognized as cash crop in Uganda. In fact, even rice farmers don't consume rice as a staple food but they take other crops. In rice producing areas, rice farmers transport dry paddy to rice millers near-by, pay service charge for milling, and sell milled rice to distributors immediately after processing. Milled rice is then shipped to Kampala by distributors and sold to wholesalers and retailers in Kampala or further distributed to the other Regions.

The number of rice mills in Uganda has increased from 156 millers in 2000 to 591 in 2007, and 50-70 new mills have been operating since then, showing the progression of rice sector (JICA, 2011). Small-scale rice mills use, however, mainly mill-top and Engelberg-type rice milling machines, and have not installed high-quality rice milling machines, which is one of the reasons why the quality of rice is deteriorating. In addition, inadequate drying after harvesting and insufficient or over-drying of paddy rice can lead to lower milling yields and higher rice breakage rates, therefore it is important to disseminate post-harvest processing methods to farmers in order to distribute high-quality rice.

Apart from local rice, VC of imported rice is generally managed by local large-scale rice millers. They import unhulled paddy grains, mill them and then distribute to major supermarkets and other retailers through wholesalers.


Production: Nursery


Production: Paddy fields in the village


Processing: Small-scale processing plant in town


Processing: Unhulled rice before processing


Processing: Rice after processing in small-scale rice millers


Processing: Crushed rice is prominent.


Processing: Medium-scale rice millers


Sales: Rice lined up in town stores

Sales: Supa rice (blue bag in the center) alongside imported rice in a supermarket

Photo 3.3.3 Rice supply chain

d. Main Stakeholders

Stakeholders of the rice VC include input suppliers, producers, middlemen, rice millers, short distance distributors who transport the rice to markets in towns near the producing area, long distance distributors who transport rice to cities, such as Kampala and other urban centers, retailers, and importers. There is a wide range of rice millers, from large and medium-sized millers with large facilities and hygiene

control, to small family-run millers with only simple processing facilities in warehouses or outdoors.

2) Maize

Maize is one of the staple foods in Uganda, and plays an important role in supplying the urban poor and public facilities such as hospitals, schools, and prisons. In addition to this, it is often supplied to WFP, which uses it as aid to Uganda and abroad.

Production relies on small-scale farmers who own 0.2~5 hectares, except for a few large commercial farmers. The main domestic market for maize is Kampala, where about 50% of the official trade takes place. Maize is also exported to Kenya, South Sudan, Tanzania and other countries.

a. Cropping Season of Maize

Figure3.3.9 shows the cropping calendar of maize in Masindi district, the survey site. There are two seasons: Season A, which is planted between March and April and harvested between July and August, and Season B, which is planted between August and September and harvested between December and January.

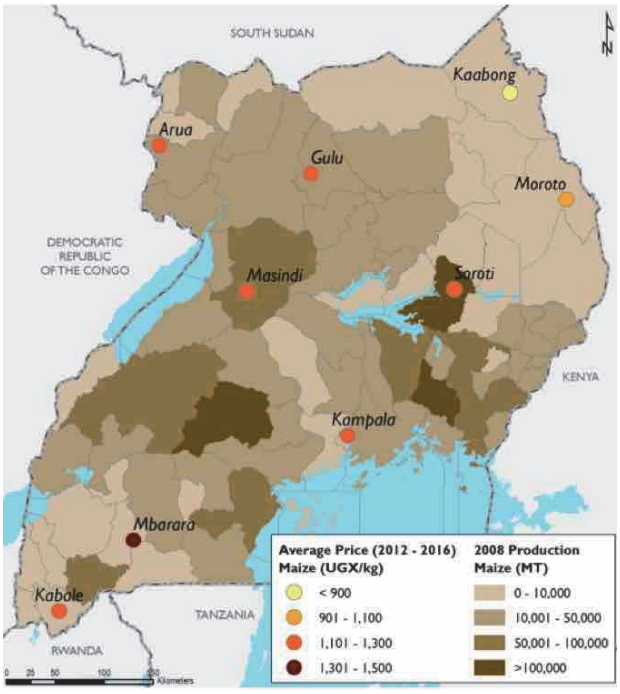
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Season A			Planting				Harvesting					
Season B	Harvesting							Planting				Harvesting

Source: Compiled by the survey team based on Key informant survey and VC survey

Figure 3.3.9 Cropping Calendar of Maize in Masindi District

b. Production Area

Figure3.3.10 shows the main production areas of maize in Uganda; although changes may have occurred since 2017, according to this literature, the production areas are spreading widely throughout the country, especially around the eastern districts of Soroti, Iganga, and Bugiri, and around the central district of Mubende.



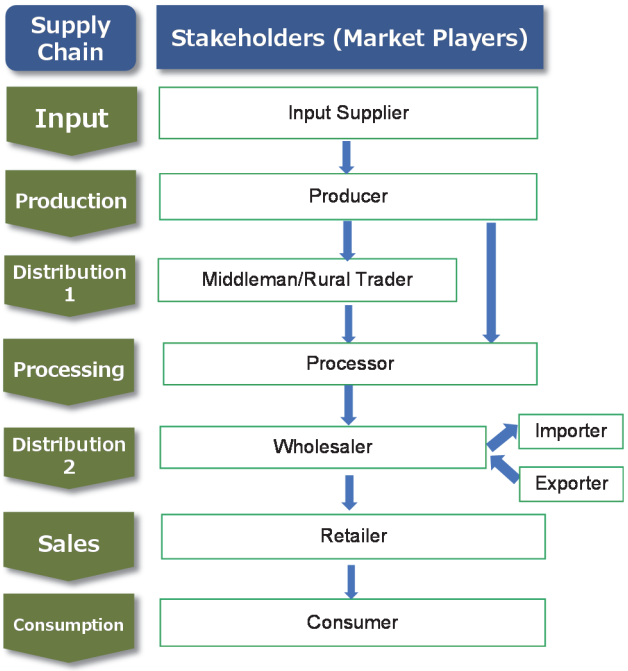
Source: USAID FAMINE EARLY WARNING SYSTEMS NETWORK (FEWS NET): UGANDA STAPLE FOOD MARKET FUNDAMENTALS, JANUARY 2017

Figure 3.3.10 Main production areas of maize in Uganda

c. Supply chain

Figure 3.3.11 shows a simplified maize supply chain. Photo 3.3.4 also shows a part of the supply chain. Once the maize is produced, the farmer takes the fruit and dries it in the sun to adjust the moisture content. The sun-dried maize grains are then sold to middlemen in the village to consolidate the quantity to be sold. The middlemen in the village sell the grains through local transporters or directly to processors in the city or town. The processors, after drying the grains sufficiently, process them into maize flour, pack them in bags, and sell them to retailers through short- and long-distance distributors.

The exported goods are exported by large wholesalers.



Source: Compiled by the survey team based on Key informant survey and VC survey

Figure 3.3.11 Simplified maize supply chain

Production: Maize field

Intra-village distribution: Grains of maize delivered to brokers by motorcycle

Intra-village distribution: Broker's warehouse

Intra-village distribution: Maize measured from middlemen to sell to long distance distributors to Kampala

Long Distance Distribution: Maize being shipped to Kampala

Processing: Small-scale processing plant

Processing: Medium-scale processing plant

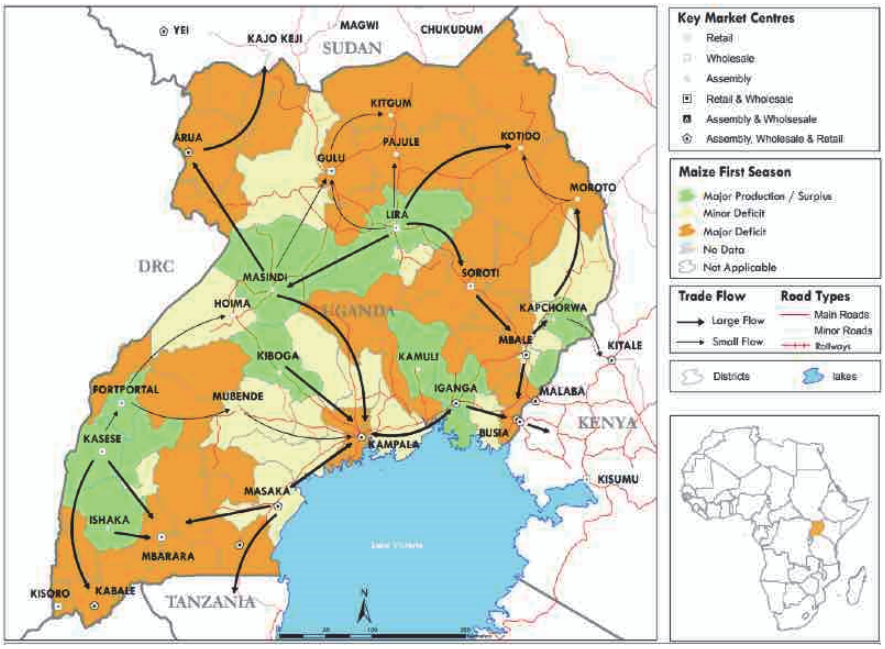
Processing: Products bagged in medium-sized processing plants

Sales: Town stores that sell Maize flour

Sales: Maize flour sold in supermarkets

Photo 3.3.4 Maize supply chain

Figure 3.3.12 shows the main distribution channels and the excesses and deficiencies in each region. According to the information in this document, maize produced in various regions is concentrated in Kampala, which is the distribution hub, Mbale, which is the export hub to Kenya, Arua, which is the export hub to South Sudan, Masaka, which is the export hub to Tanzania, etc. These include Rwanda's Gatekeepers. These are listed as being transported to Gatuna in Rwanda, Busia in Kenya, Bibia in South Sudan, Mpondwe in the Democratic Republic of Congo, Mutukula in Tanzania, and other locations. The situation may, however, have changed after 2017, when the reference was published, due to restrictions on imports and exports with neighboring countries, such as the ban on exports of Ugandan maize to Kenya for a certain period in 2021 due to its high content of aflatoxin, a fungal poison.



Source: USAID FAMINE EARLY WARNING SYSTEMS NETWORK (FEWS NET): UGANDA STAPLE FOOD MARKET FUNDAMENTALS, JANUARY 2017

Figure 3.3.12 Main distribution channels of maize in Uganda and excess/shortage by region

d. Main Stakeholders

The main stakeholders in Maize are input suppliers, producers, middlemen, processors, short distance distributors who transport to markets in towns near the production area, long distance distributors who transport to cities such as Kampala and other remote towns, retailers, importers and exporters, and consumers. As well as rice processors, there are wide range of millers from large scale millers to small scale ones.

3) Plantain

In Uganda, plantain is an important crop as one of the typical staple foods, and occupies the top position in terms of both production and arable land area. Ugandans consume 0.4 kg to 0.7 kg of plantain per day (140-255 kg per year), including plantain, which is said to be the largest amount in the world. (FEWSNET 2017)

Since it is a fragile crop, it can lead to food losses depending on the conditions of warehouses where it is stored and transported. As it is difficult to preserve, most of the food is distributed domestically.

The largest production area in the country is in the southwest, followed by the Lake Victoria coast. It is grown in almost all regions of the country (eastern, central, and western) except in the north. It is commonly grown by small farmers around their houses or on their property for their own consumption. In the western part of the country, Mbarara, there are many large-scale farms.

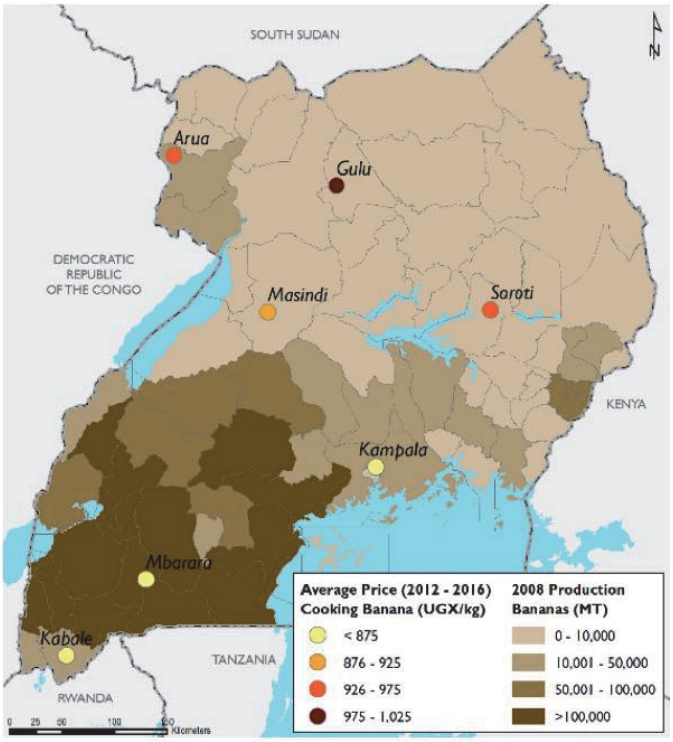
In interviews in each location, farmers responded that plantain trees for cooking in the central region die after a few years, while in the west they usually last for decades.

a. Cropping Season of Plantain

In Uganda, plantains are harvested and distributed throughout the year.

b. Production area

Figure 3.3.13 shows the major production areas of plantain. Plantain, which is particularly important as a food crop in Uganda, is grown predominantly in the non-northern regions of the country (eastern, central and western). Production in the central part of the country has declined due to a combination of factors: lack of labor and management, increased pests and diseases, and reduced soil nutrients. At the same time, as a stable source of supply to meet the demand for plantain due to the growing population of Kampala, plantain production in the southwest has expanded to include the largest production area in the country in the southwest, followed by a large production area around Lake Victoria.



Source: USAID FAMINE EARLY WARNING SYSTEMS NETWORK (FEWS NET): UGANDA STAPLE FOOD MARKET FUNDAMENTALS, JANUARY 2017

Figure 3.3.13 Major production areas of plantain in Uganda

c. Supply chain

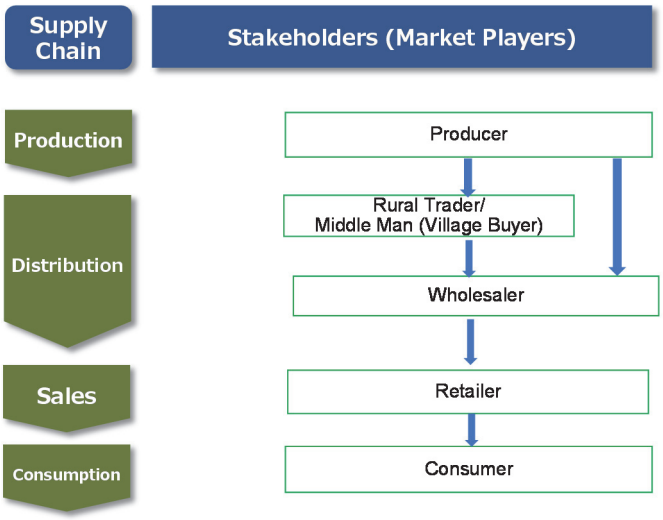
There is no processing involved in plantain, and the value chain is as shown in Figure 3.3.14. The plantains produced are traded through local middlemen or directly to wholesalers.

Most of Ugandan plantains are distributed and consumed domestically. Only a very small amount is being transported by air to Europe, no significant demand, however, is expected overseas yet. Production in the southwest expanded in tandem with the expansion of the metropolitan area from the 1970s, and a unique intra-regional distribution system developed in which plantains are transported fresh to urban stores. Today, about 70% of the plantain supply to Kampala comes from the southwest and 20% from the east.

Until 1979, the plantain distribution system was controlled by cooperatives, however, in the 1980s, a powerful group of middlemen emerged to occupy market information and obtain 30-60% of the consumer price. Plantain distribution today consists of many actors: farmers, wholesalers and middlemen, transporters, urban wholesalers, and retail merchants. Improved access to market information by farmers has allowed them to obtain up to about 60% of the consumer price. Plantain does not have a processing step, and the number of people involved in the supply chain is smaller than for other agricultural products, which is concerned to be a factor in the relative ease with which market information can be conveyed to farmers.

A distinctive actor in distribution is the bicycle trader who visits small-scale farmers one by one to buy plantain and transport them to local distributors. They are also called village buyers because they buy directly from the growers. Many producers are connected to distributers bringing to cities even though they are in rural areas.

There are also people called "Transporter/Wholesalers" who buy the accumulated agricultural products, transport them by truck to the city market, and sell them to other wholesalers and retailers at the market, who know both the situation of the production area and the demand of the city market. They are not simply employees of another company or organization, but are engaged in independent economic activities; they do not comprise a specific ethnic group. In most cases, the trucks they use are rented.



Source: Compiled by the survey team based on Key Informant survey and VC survey

Figure 3.3.14 Simplified plantain supply chain

In photo3.3.5, the flow of culinary plantain from production to sale is shown. The plantains produced by each farmer are transported by bicycle traders to a collection point in town, where they are sold to distributors, and then transported by truck to nearby towns and large consumption areas such as Kampala.

Production: Plantain fields for cooking in the village

Intra-village distribution: Plantain transported by bicycle traders from the village to the collection point

Distribution: Collection point at the edge of town

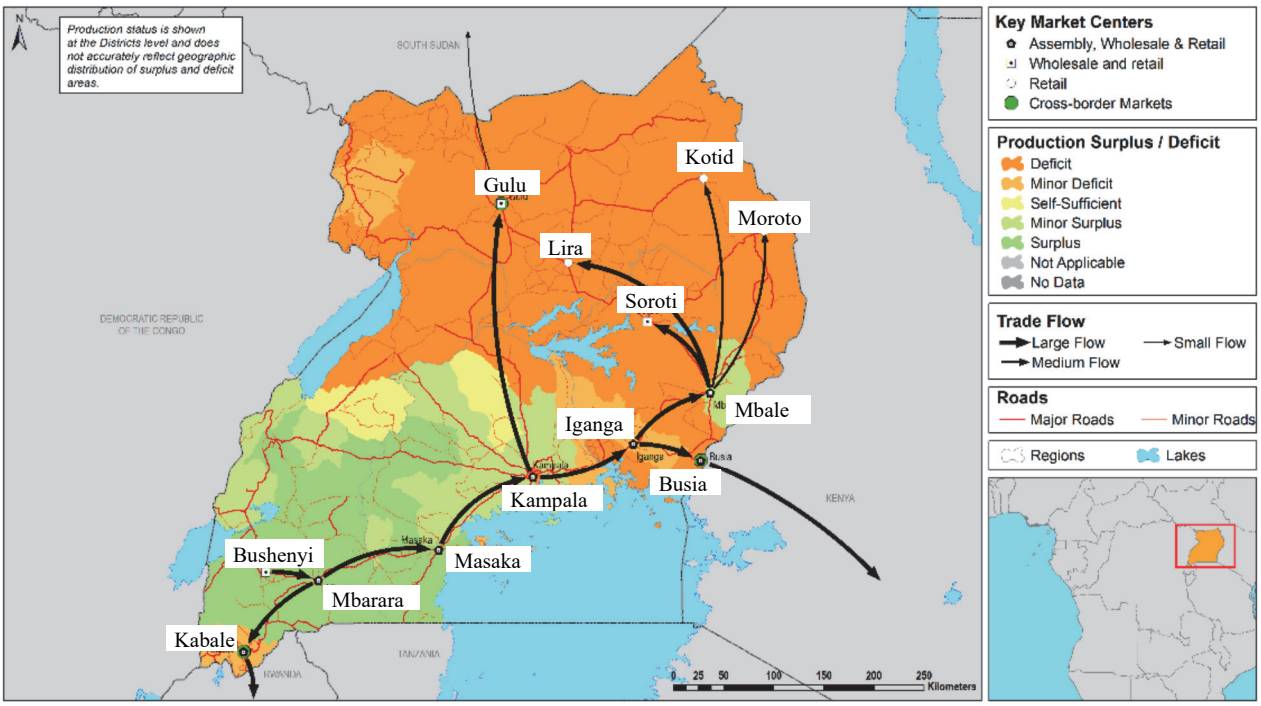
Long-distance distribution: Trucks that ship from a collection point to a nearby town.

Short-distance distribution: motorcycles shipped to nearby markets

Sales: Retailers in the market to be interviewed by the surveyor.

Photo 3.3.5 Plantain supply chain

Figure3.3.15 shows the main production areas and distribution routes of plantain to the market, and it can be seen from this literature that the plantains are distributed from the western production areas where there is a surplus (areas with green markings) to the eastern and northern areas where there is a shortage (areas with dark orange markings).



Source: USAID FAMINE EARLY WARNING SYSTEMS NETWORK (FEWS NET): UGANDA STAPLE FOOD MARKET FUNDAMENTALS, JANUARY 2017

Figure 3.3.15 Major production areas and market distribution channels of plantains in Uganda

d. Main Stakeholders

The value chain for plantains is unprocessed and limited in terms of imports and exports, therefore the stakeholders are limited to producers, middlemen (bicycle traders,etc.), short distance distributors who transport to markets in towns near the production area, long distance distributors who transport to cities such as Kampala and other remote towns, wholesalers, and retailers.

4) Onion

Onions are one of the most widely used horticultural crops in Uganda for home cooking. They are a fragile crop and transport costs can be reduced by bringing them in bulk rather than individually to the market, therefore the middlemen who frequently visit the villages play an important role. There are also many traders who buy up entire plots of land. In Uganda, there is no post-harvest processing of onions, which means that the onions are not dried before shipment, and are easily damaged, especially during the rainy season. Therefore, growers try to sell their onions to middlemen as soon as possible after harvest.

There are many grades of onions, with the middle size, which is just right for home use, being the highest grade, the large size, which is preferred by hotels and restaurants, being the second highest grade, and the small size being the least popular. Smaller sizes are sold at lower prices. Imported products from Tanzania are also available in Kampala, and people in urban areas tend to prefer Tanzanian products.

a. Cropping Season of Onion

Figure3.3.16 shows the cropping calendar of onion in Kabale district, the survey area. There are two seasons; Season A, which is planted between March and April and harvested between June and July, and Season B, which is planted between September and early October and harvested between December and January.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Season A			Planting									
						Harvesting						
Season B	Harvesting								Planting			
												Harvesting

Source: Compiled by the survey team based on key informant survey and VC survey

Figure 3.3.16 Cropping Calendar of Onions in Kabale District

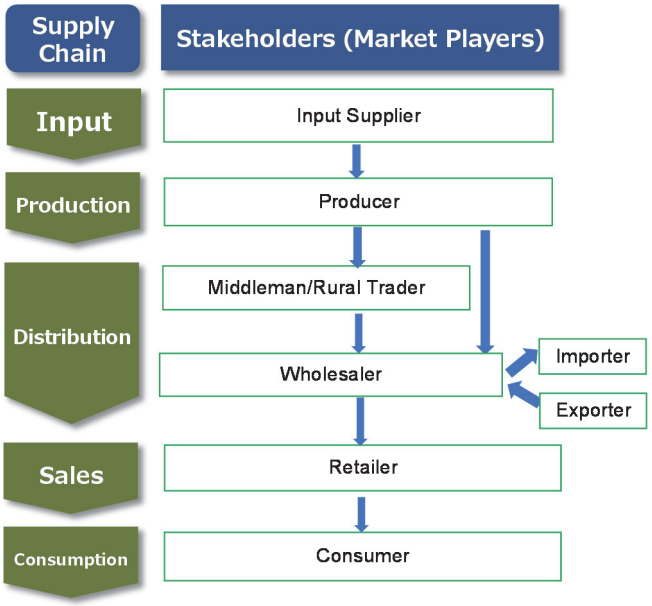
b. Production area

Uganda is one of the leading producers of onions in the East African region. It is mainly produced in areas 1,500 to 2,100 meters above sea level. The main production areas are in the eastern part of the country, including Kapchorwa, Kween, and Bukwo districts, and the western part, including Kabale, Kisoro, Kapchorwa, Kween, and Bukwo districts.

c. Supply chain

Figure3.3.17 shows a simplified supply chain of onion and, Photo 3.3.6 also shows a part of the supply chain. Onions harvested by the stalk are purchased by middlemen visiting the village and brought to the collection point. At the collection point, the onions are manually separated from the stalks into their fruit parts. The onions are then stored in a warehouse at the collection point until they can be purchased by distant distributors for shipment. In addition to being sold in nearby towns and cities, the onions were also shipped to Rwanda when there was an export trade.

In the collection point, children also worked as day laborers because school was closed. This is one of the negative impacts of school closure.



Source: Compiled by the survey team based on Key Informant survey and VC survey

Figure 3.3.17 Simplified onion supply chain

Production: Onion fields in the village

Short-distance distribution: Trucks unloading onions pulled by the stalk in the village.

Distribution: Workers separating fruit from stalks at a collection point on the edge of town.

Distribution: surplus stems (Sold as fertilizer)

Sales: Sold at a nearby market onion (edible plant, Allium cepa)

Sales: Onions sold in supermarkets in Kampala

Photo 3.3.6 Onion supply chain

d. Main Stakeholders

The major players in the supply chain are input suppliers, producers, middlemen, short distance distributors to markets in towns near the production area, long distance distributors to cities and remote towns such as Kampala, importers and exporters, and retailers. It has been pointed out that there is a lot of informal trade in onions and it has been reported that some middlemen in East African countries bordering to Uganda, have crossed the border into Uganda to make purchases.

5) Potato

In Uganda, potatoes are one of the staple crops for the next generation, as well as an important cash crop in the areas where they are produced. Production began in the west but has been expanded to other regions due to growing demand in the urban areas. The export volume is still small, and most of it is consumed domestically. Although seed potatoes are produced, they are not widely used, and many farmers use potatoes from the previous season as seed potatoes.

a. Cropping Season of Potato

Figure 3.3.18 shows the cropping calendar of potato in Kabale district, the survey area. There are two seasons: Season A, which is planted between March and April and harvested between June and July, and Season B, which is planted between August and September and harvested between November and December.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Season A			Planting									
						Harvesting						
Season B								Planting				
											Harvesting	

Source: Compiled by the survey team based on key informant survey and VC survey

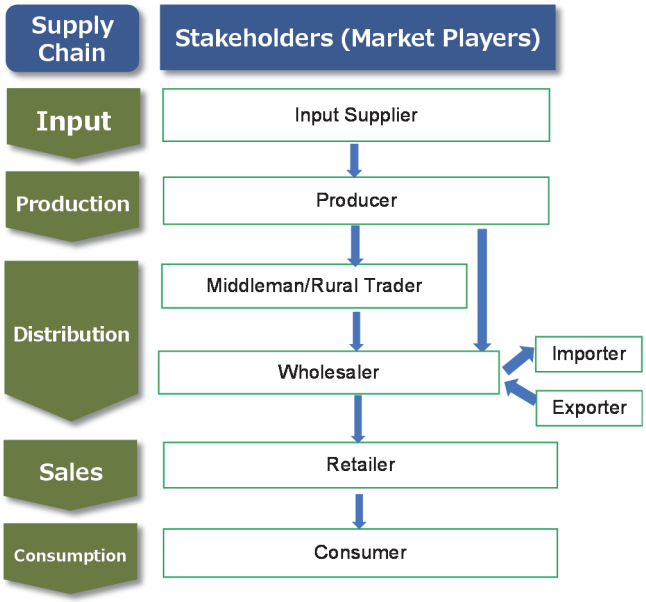
Figure 3.3.18 Cropping calendar of Potato in Kabale district

b. Production area

Potatoes are mainly produced in the western part of the country, including Kisolo and Isingiro districts, followed by the eastern part of the country, including Kabale and Kisoro districts.

c. Supply chain

Figure 3.3.19 shows a simplified potato supply chain. The Photo 3.3.7 also shows a part of the supply chain. The harvested potatoes are either collected by middlemen in the village or sold directly to a collection point in the town brought by a carrier to the town. From the collection point in town, the potatoes are shipped by short distance distributors to markets in nearby towns, and by long distance distributors to urban areas such as Kampala and other towns far from the production area. Then they are sold by retailers. When there was an export trade, the products were also shipped to Rwanda through distributors.



Source: Compiled by the survey team based on Key Informant survey and VC survey

Figure 3.3.19 Simplified potato supply chain

Production: Potato fields in the village

Distribution: distributor's warehouse in town

Sale: Sold at the market in town potato (Solanum tuberosum)

Photo 3.3.7 Potato supply chain

d. Main Stakeholders

The major stakeholders are input suppliers, producers, middlemen, short distance distributors who transport the products to markets in towns near the production area, long distance distributors who transport the products to cities such as Kampala and other remote towns, and retailers. Schools, hotels, hospitals, and other institutions are also major stakeholders in consumption. Government organizations, NGOs, etc. also play a role in supplying seed potatoes to growers.

6) Tomato

In the tomato supply chain, many growers sell to middlemen, brokers, and other vendors who sell to urban and rural wholesalers. Some growers who live near a market sell at the market themselves.

During the dry season from November to February, a small amount is exported to Kenya. A very small amount is also imported from the Netherlands to supply supermarkets and fine restaurants.

Tomatoes produced in the central part of the country are transported to the market in Kampala, while tomatoes from the eastern part of the country, where production is relatively large, are exported intra-regionally, such as to South Sudan.

a. Cropping Season of Tomato

Figure3.3.20 shows the cropping calendar for tomato in the study area, Luweero District. There are two seasons: season A, which is planted between March and April and harvested between July and August, and season B, which is planted between September and October and harvested between December and January. Tomatoes grown in the rainy season are generally of poorer quality than those grown in the dry season due to pests and diseases.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Season A			Planting					Harvesting				
Season B	Harvesting								Planting			Harvesting

Source: Compiled by the survey team based on key informant survey and VC survey

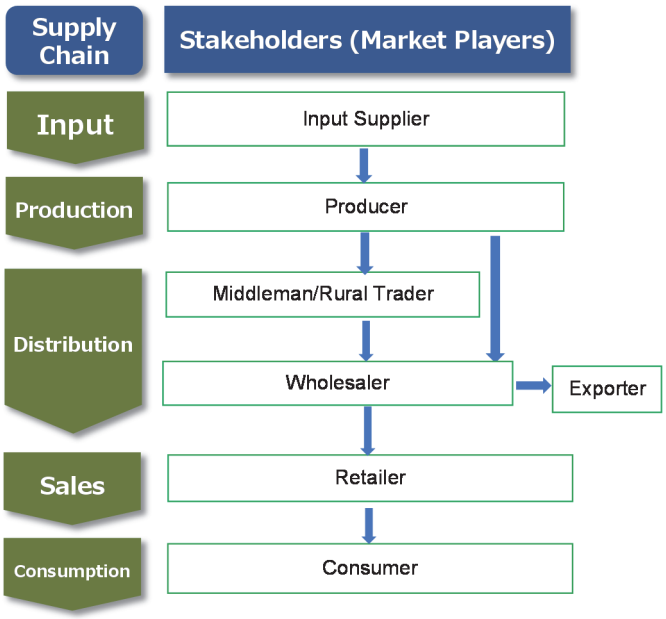
Figure 3.3.20 Cropping calendar of Tomatoes in Luweero District

b. Production area

Tomatoes are produced all over the country, especially in the central part of the country such as in Luweero, Mpigi, and Masaka districts. In the east, tomatoes are produced in Mbale and Kapchwora districts, while in the west, tomatoes are produced in Kabale and Kasese districts.

c. Supply chain

Figure 3.3.21 shows the simplified supply chain for tomatoes. The Photo 3.3.8 also shows a part of the supply chain. The harvested tomatoes are either collected by middlemen in the village or sold to the collection point in the town by transporters to the town. From the collection point in the town, the tomatoes are shipped by long distance distributors to urban areas such as Kampala and nearby towns. When export trade was going on, the products were also shipped to South Sudan through distributors.



Source: Compiled by the survey team based on Key Informant survey and VC survey

Figure 3.3.21 Simplified tomato supply chain

Production: Tomatoes growing in the village fields

Distribution: Tomato collection point

Sales: Tomatoes sold at the market in town

Sales: Tomatoes sold in supermarkets in Kampala

Sales: Ketchup made in Uganda sold in supermarkets in Kampala

Sales: Ugandan ketchup logo at supermarket in Kampala

Source: Survey team

Photo 3.3.8 Tomato supply chain

d. Main Stakeholders

The main stakeholders are input suppliers, producers, middlemen, short distance distributors who transport to markets in towns near the production area, long distance distributors who transport to cities and remote towns such as Kampala, and retailers.

7) Coffee

Coffee is the most important export commodity in Uganda for earning foreign currency. The Uganda Coffee Development Authority (UCDA) is responsible for marketing, research, and quality control of the coffee industry to maximize foreign exchange earnings.

As with other crops, most of the producers are small-scale farmers with an average of about 0.4 ha of land, and the yield from each coffee tree is about 0.5 kg. As mentioned above, about 80% of Ugandan coffee production is Robusta, and many of these producers grow the traditionally grown Robusta variety rather than improved varieties such as Colonial Elite.

As to the processing process, Arabica beans are also wet-processed, and while some producers' associations have specialized personnel for wet-processing and weighing, individual producers usually outsource the process. For Robusta varieties, producers sun-dry the beans after harvesting, which is a traditional dry process. In the survey area, farmers were drying green beans on sheets after harvesting, as shown in the Photo 3.3.9 in the following pages.

a. Cropping Season of Robusta Coffee

Figure3.3.22 shows the cropping calendar for Robusta coffee in the survey area, Luweero District. The main crop with the highest yield is harvested between September and October, while the fly crop harvest is harvested between April and May.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Main Crop									Harvesting			
Fly Crop				Harvesting								

Source: Compiled by the survey team based on key informant survey and VC survey

Figure 3.3.22 Cropping calendar of Robusta coffee in Luweero District

b. Production area

The Robusta variety, which accounts for nearly 80% of production in Uganda, is said to have originated around Lake Victoria, Uganda. The Arabica variety, on the other hand, was introduced from Ethiopia, where it is believed to have originated.

The production areas for Arabica coffee grown at high altitude are mainly in the eastern part of the country, around the Mount Elgon district, and in the western part, around the border with the DRC, in the Mount Rwenzori district.

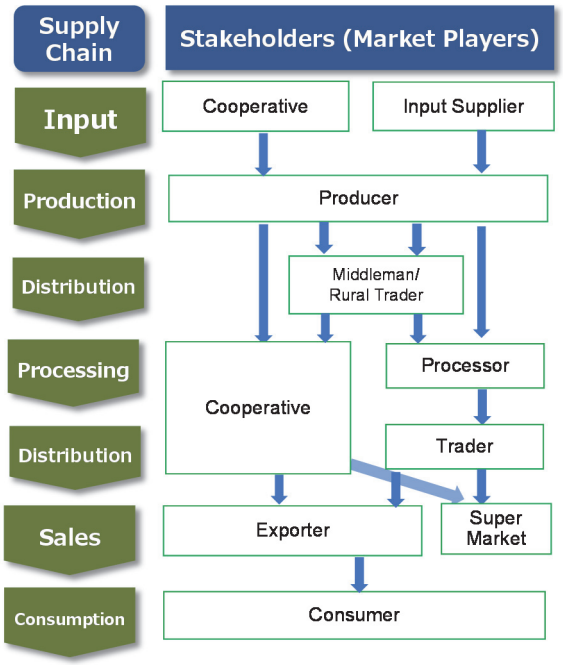
On the other hand, Robusta, which is produced in relatively flat areas up to 1,200 meters above sea level, is produced in the central, eastern, western and northwestern regions. As shown in Figure3.3.23, the coffee produced in each region is collected in Kampala, or some of the eastern coffee is collected directly in Kenya without going through Kampala, and then exported to the rest of the world. There is, however, a possibility that the distribution channels have changed since the publication of this report in 2012.

Source: UNDP Development of Inclusive Markets in Agriculture and Trade (DIMAT): The Market and Nature of Coffee Value Chains in Uganda, December 2012

Figure 3.3.23 Major coffee producing regions in Uganda and their distribution channels to the market

c. Supply chain

Figure 3.3.24 shows the results of interviews conducted mainly in the survey sites about the Robusta coffee supply chain. The Photo 3.3.9 also shows some of the supply chain. Some farmers participate in cooperatives, in which case they often receive inputs, including seeds and pesticides, from the association. In such cases, the association often purchases the crop after harvesting, and distributes it to exporters. On the other hand, producers who do not belong to an association often sell coffee through middlemen in the village to reach the processing companies, in the same way as other crops. For the domestic market, instant coffee is mainly distributed. Very small amount is distributed to urban cafes and supermarkets.



Source: Compiled by the survey team based on key informant survey and VC survey

Figure 3.3.24 Simplified Robusta coffee supply chain

Production: Coffee berries grown in the village

Processing: Coffee dried in the village

Distribution: Coffee bean aggregator

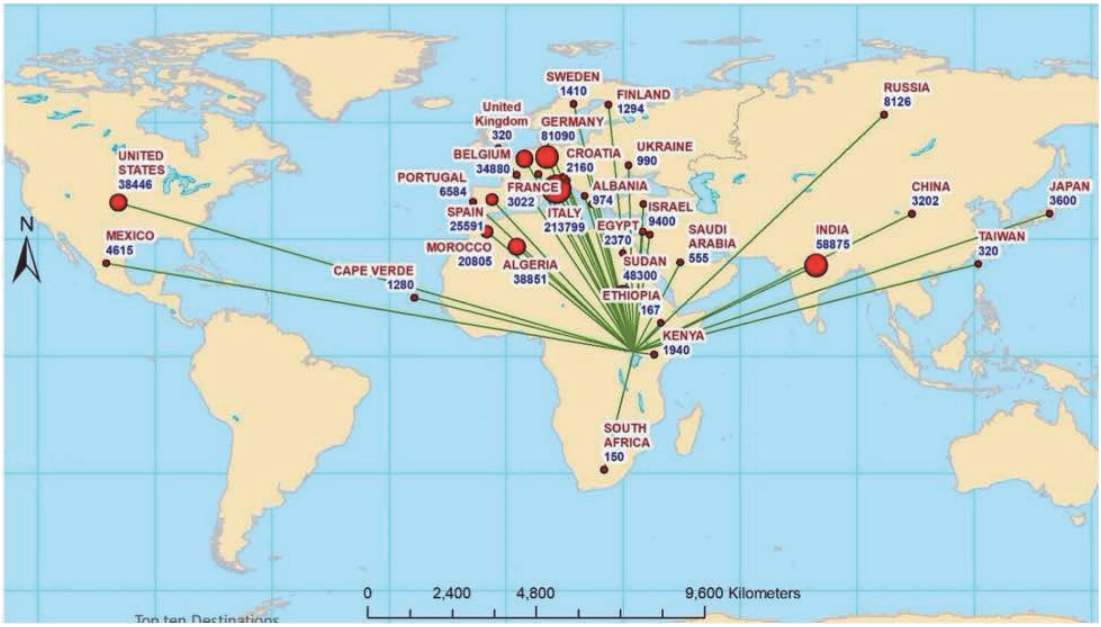
Processing: equipment for medium-sized processors
(The process of removing the outer skin and pulp and extracting the seeds.)

Processing: Green coffee beans after processing

Sales: Coffee made in Uganda sold at supermarket in Kampala
(Green beans are usually sold in supermarkets after being roasted.)

Photo 3.3.9 Coffee supply chain

Source: Survey team



Note: Figures in Table are the export volume of coffee in 60 kg bag equivalent.
Source: UCDA (Uganda Coffee Development Authority): MONTHLY REPORT, Jun 2021

Figure 3.3.25 Export Destinations of Ugandan Coffee

Figure 3.3.25 shows the export destinations of Ugandan coffee. Ugandan coffee is exported to European countries, the United States, Asia, and other parts of the world.

d. Main Stakeholders

The main stakeholders in coffee, as shown in Figure3.3.24, range from input suppliers, producers, processors, wholesalers, and exporters. One of the main features that distinguishes coffee from other crops is that the supply chain is managed by private coffee associations and organizations, mainly from processing to export.

Along with the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) and other ministries, government organizations such as the UCDA, NGOs such as the Uganda National Agroinput Dealers Association (UNADA), and coffee associations are important stakeholders. Many of these organizations have their bases in Kampala as most of the exports are based there. Some of the coffee produced in the eastern part of the country is, however, shipped through Mbale, Jinja, etc., rather than Kampala, thus, there are likely to be stakeholders in those areas as well.

3.3.3 Impacts of COVID-19 on FVC and Underlying Factors

In order to collect information on the impact of COVID-19 on FVC, a field survey was conducted in November 2021.

The survey methodology was selected from key informant interviews with MAAIF officials and government agency representatives, questionnaire survey of each VC player, and group discussions (mainly with farmers) and individual interviews as appropriate. On account of travel restrictions to Uganda and severe travel restrictions within Uganda due to COVID-19, though implementation of the survey for not only survey team members but local consultants were limited, the information was collected effectively through group discussions held during the survey team's trip.

The results of the surveys for each crop are described below.

(1) Impacts on Respective Crop FVC: Rice

The JICA field survey was conducted in November 2021. The interviews were conducted to key informants in charge of agriculture at MAAIF headquarters and regional district offices, and to interviews with rice VC stakeholders: producers, processors, distributors, retailers, and consumers. The advice by key informants was fully taken into consideration when the survey methodology was set up. The VC survey covered the villages of Buwanga and Bugodhandala in southeast part, which are the major rice producing areas in Uganda, as well as nearby consumption areas. The rice retailers and

consumers were intensively interviewed in Kampala. The distributors were divided into two groups according to scale of their operations, i.e. short-distance distributors whose activities are limited to the nearby the production area, and long-distance distributors who undertake the transportation of relatively large quantities of rice to the Kampala market and other remote places. The survey method was selected from a questionnaire survey, group discussions, and individual interviews as appropriate. The results of the survey are as follows.

Group discussion with rice growers

Individual interviews with rice millers


Individual interviews with medium-scale rice millers


Individual interviews with medium-scale rice millers (rice warehouse)

Photo 3.3.10 Field survey of rice

The JICA survey team covered mainly the paddy cultivation area of the Bugweri district. Due to time constraints caused by COVID-19 travel restrictions, the JICA survey team could not visit the northern part of the country, where upland NERICA rice is cultivated. The study was carried out with supports of the survey by local consultants via remote control taking into consideration the advice of JICA experts for the PRiDe (Promotion of Rice Development Project) Phase 2.

1) Impact on overall VC

Impact on VC stage

The results of the key informant survey and VC survey are shown in Table 3.3.8

Table 3.3.8 Impact on each VC stage on rice

VC stage	2020		2021		Background, factor	Period
	Level of Impact	Impact	Level of Impact	Impact		
Input	Small	・Increase in prices of input materials, decrease in sales volume ・The impact on farmers' income and expenditure is not clear.	Medium	・Decrease in sales volume ・The impact on farmers' income and expenditure is not clear.	・The retail price of fertilizers and pesticides increased due to higher import prices in 2021. In addition, sales volume decreased due to the decline in farmers' purchasing power. ・In addition, there are many rice producers who do not apply fertilizers and pesticides, therefore it was difficult to conclude that COVID-19 was the cause of the decline in fertilizer and pesticide sales.	From first production period in 2021 to present
Production	Small	・There is almost no impact on the production volume. ・Difficulty in raising funds for peasants	Small	・There is almost no impact on the production volume. ・Difficulty in raising funds for peasants	・The relationship between rice production volume and COVID-19 was not confirmed, because rice production was largely influenced by weather conditions. ・Rice is a labor-intensive crop thus labor shortages are especially likely to occur during planting, weeding, and harvesting, there was, however, no information that COVID-19 caused labor shortages. ・Overall, there was no labor shortage in the production areas due to COVID-19, but there was a decline in wages for day laborers. There was a slight downward trend in producer prices, but no relationship with Covid-19 could be confirmed. ・Some smallholders borrowed money from rice millers or landowners and repaid in cash or rice after harvest. It is feared that the difficulty in raising funds for smallholders will persist even after the convergence of COVID-19.	From first production period in 2020 to Present
Processing	Medium	・Decrease in the amount of rice milling	Medium	・Decrease in the amount of rice milling	・Some producers were unable to bring their unhulled rice to the rice millers due to movement restrictions caused by the lockdown. Temporary storage of unhulled rice was necessary, but due to the lack of sufficient unhulled rice storage in rural areas, there were concerns about quality deterioration if the storage period became longer. ・There are many producers in debt to rice millers. Rice millers with high quality rice processing facilities and technology are	From first production period in 2020 to Present

					not always selected. Rather, producers are attracted to rice millers that have the financial resources and good loan conditions. These mills naturally receive a larger volume of unhulled rice during the harvest season. ・There is a small range in the producer price of milled rice, but the correlation with milling quality could not be confirmed. ・Small rice millers use mill-top or Engelberg-type rice millers, which tend to have a high rate of broken rice. ・The quality of milled rice is generally good, as many medium-sized rice millers use rubber roll one-pass mills. However, the producers do not have the means to transport the unhulled rice to the distant towns where the rice mills are located. ・According to the survey conducted by MAAIF in 2012, 74% of the rice millers out of 1,060 were engaged in rice milling services.	
Distribution	Medium	・Decrease in distribution volume Enhancing demand for unhulled rice warehouses	Medium	・Decrease in distribution volume Enhancing demand for unhulled rice warehouses	・It was reported that the smooth distribution of harvested paddy rice was hindered because the lockdown period coincided with the harvesting period of the first crop in 2021, and the paddy rice was temporarily stored in the farmers' residence. ・If the moisture content is appropriate, long-term storage in unhulled warehouses is possible. Losses do not occur as in the case of fruit and vegetable crops, where freshness is required, but there were demands for unhulled warehouses.	From first production period in 2020 to Present
Sales	Medium	・Decreasing trend in sales volume in urban areas	Medium	・Decreasing trend in sales volume in urban areas	・According to the interviews conducted in some of the markets in Kampala, rice is considered an expensive staple food grain, and there has been a shift in demand to cheaper grains among people who have lost their jobs. ・Uganda has been importing rice from Asian countries for a long time, and domestic rice has always been exposed to competition from imported rice. In the past few years, low-priced Tanzanian Supa rice has been distributed and some of the vendors mix Tanzanian rice with Ugandan rice. It is difficult for consumers to distinguish between the two. ・There is a possibility that the import volume of Tanzanian milled rice will grow as a result of COVID-19, thus, it is essential to improve the quality of Ugandan domestic rice and to implement policies related to rice.	From first production period in 2020 to Present

Consumption	Medium	・Decline in sales and consumption of domestic rice	Medium	・Decline in sales and consumption of domestic rice	・Rice is produced as a cash crop. ・Sales volume to large consumers such as schools, churches, and public facilities declined. ・In the survey conducted in Kampala, there were voices of people switching their staple food from rice, which is considered expensive, to other staple foods, that are cheaper on account of reduced income. ・The problem of the increasing in amount of imported rice is on the rise, which is causing problems lowering producer prices.	From first production period in 2020 to Present

Source: Key informant survey results, VC survey

Impact Considerations

a. Decrease in sales volume and consumption

As far as considering the results of the market interviews, the rice demand has tended to decline due to incomes decrease of rice consumers living in urban areas. In addition, influx of Tanzanian rice of lower prices has also affected the demand of local rice and producer prices. Challenge is to improve the quality of local rice and improve import policies for rice such as restrictions on informal rice imports and monitoring of regular rice imports following the international tax agreement.

b. Decrease in the amount of rice milling due to movement restrictions

In the survey area, it was recognized that farmers were unable to take their paddy to rice mills due to movement restrictions caused by lockdown. In order to encourage VCs to distribute rice throughout the year, it is necessary to develop grain storage that allow for a certain amount of buffer stock.

c. Deterioration in the farming conditions of producers

Smallholders were getting funds for farming from rice millers, landlords, etc. The survey, however, identified that the millers and landholdings were not able to get sufficient funds from lenders due to the impact of COVID-19. This is likely to have an impact on current farmers' cash flow, cultivation, and other aspects of farming in general.

2) Change in VC

Impact of COVID-19 to the rice VC is limited except for decreased amount handled and distributed by VC due to shrinking rice demand in urban areas.

(2) Impacts on Respective Crop FVC: Maize

VC surveys (questionnaires, group discussions, and individual interviews) for each stakeholder of Maize VC were conducted for producers, millers, and short-distance distributors, in Buyondo village, central Luweero district; Kiyuuya village, Masindi district; Waiga village and nearby towns. As with rice, the survey for long distance distributors, retailers and consumers was conducted in Kampala in addition to the above. The following results are based on the key informant survey and the VC survey conducted in the above areas.

1) Impact on overall VC

Impact on VC stage

In Table3.3.9, the results from the key informant survey and VC survey for each VC process are organized into the impact of COVID-19 and its background and factors.

Table 3.3. 9 Impact on each VC stage on maize

VC stage	2020		2021		Background, factor	Period
	Level of Impact	Impact	Level of Impact	Impact		
Input	Small	・Decrease in sales volume	Medium	・Increase in prices of input materials, decrease in sales volume	・Import prices of fertilizers and pesticides rose mainly in 2021, causing retail prices to soar. In addition, sales volume decreased due to lower purchasing power of producers. ・The rising prices of fertilizers and pesticides increased production costs. It was difficult to conclude that there was relationship between changes in profitability and COVID-19 as some of the maize producers applied fertilizers and pesticides though inadequately.	From first production period in 2021 to present
Production	Small	・Almost no effect on production volume	Small	・Almost no effect on production volume	・Maize production was greatly affected by the weather, and the weather was very good in 2020 which resulted in the rich harvest of maize crop. ・As a result of the closure of schools and public facilities, which are major customers, and the return of people who lost their jobs to rural areas, the population of urban areas declined. Because of the above reasons, the sales volume of maize in urban areas temporarily dropped below normal. ・In rural areas, the young generation returning from urban areas and children out of school temporarily supplemented the domestic labor force. As a result, there was no labor shortage in the production areas as a whole, but there was a decline in wages for day laborers in some areas. ・In 2021, drought damage resulted in lower yields and higher producer prices.	From first production period in 2020 to Present
Processing	Medium	・Decrease in processing volume	Medium	・Decrease in processing volume	・Not only during the lockdown period, socioeconomic activities in urban areas tended to be sluggish in general, which resulted in a temporary drop in demand. As a result, the distribution volume from production areas to urban areas decreased and the receiving volume at flour millers was lower than	From first production period in 2020 to Present

					normal.	
Distribution	Medium	・Decrease in distribution volume	Medium	・Decrease in distribution volume	・Not only during the lockdown period, socioeconomic activities in urban areas tended to be sluggish in general, resulting in a temporary drop in demand. As a result, the distribution volume from production areas to urban areas decreased and the receiving volume at flour millers was lower than normal. ・It was reported that the producer and wholesale prices of maize tended to decline during year 2020, but increased in 2021 due to the drought. The price reached to the level more than before COVID-19. ・Since even during the Covid-19 situation, the transportation of food was not restricted, the impact on the volume of distribution between cities was limited.	From first production period in 2020 to Present
Sales	Medium	・Decrease in sales volume	Medium	・Decrease in sales volume	・In a survey conducted in peri-urban district in Kampala, many respondents told that they had changed their staple food to cheaper one, such as maize flour.	From first production period in 2020 to Present
Consumption	Small	・Decrease in consumption by large customers such as schools, and by dwellers in peri-urban areas, and regional cities	Small	・Decrease in consumption by large customers such as schools, and by dwellers in peri-urban areas, and regional cities	・In Uganda, more than 80% of the population lives in rural areas. Therefore it can be said that the impact of COVID-19 on the consumption structure of Maize was minor though there was a temporary decrease in demand in urban areas,	From first production period in 2020 to Present

Source: Key informant survey results, VC survey

Impact Considerations

a. Decrease in sales volume, processing volume, and distribution volume due to reduced demand from large consumers

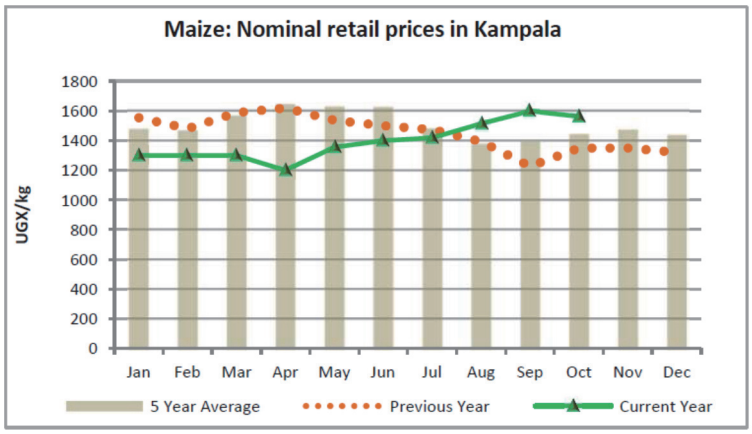
Due to the spread of COVID-19 infection, the demand for maize flour decreased due to large consumers such as schools and churches. Changes in the quantity demanded by workers who lost their jobs in urban areas and temporarily returned to rural areas have also been reported. The decrease in demand is thought to have resulted in a decrease in distribution, processing, and sales. Although GOU did not regulate the transfer of foodstuffs during the COVID-19 disaster, it did cause a decrease in the volume of sales, processing, and distribution in urban areas.

b. Production volume and producer prices

According to the results of group discussions and interviews in the VC survey, the study area was blessed with good weather and a good harvest in 2020. In 2021, it was reported that drought occurred but the production was at normal level. As with other crops, there were no labor shortages in the production areas. In addition, producer prices did not show a significant change from normal in 2020. This may be due to the fact that maize is a more shelf-stable crop than horticultural crops when dried and processed, and that it is one of the least expensive grains for low-income people to purchase, as indicated by interviews with low-income people in urban areas who told they had switched their staple food to less expensive maize flour. There were reports of a slight increase in prices in 2021. This may have been due to drought damage in the first crop season.

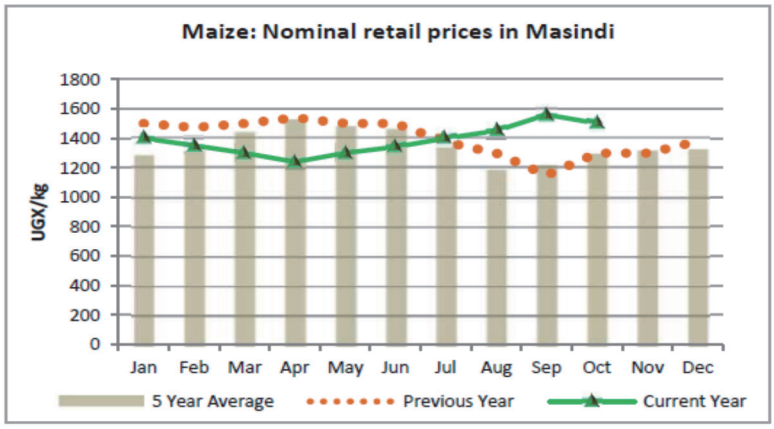
c. Consumer price

Figure 3.3.26 and Figure3.3.27 show the monthly retail price trends for the year 2020 and 2021 and the last five years in Kampala and Masindi, the specialty area of maize. Fluctuations in the price of maize in both regions show a similar pattern: in 2020, the price level was almost the same as the average price of the last five years; on the other hand, in the first half of 2021, the price was slightly lower than the normal price, and in the second half, the price increases. This is thought to be due to the aforementioned drought.



Notes: Current Year: 2021, Previous Year: 2020, 5 Year Average: 5Annual averages from 2016year to2020 year
Source: USAID FAMINE EARLY WARNING SYSTEMS NETWORK (FEWS NET): UGANDA Price Bulletin, December 2021

Figure 3.3.26 Price trend of Maize in the capital Kampala



Notes: Current Year: 2021, Previous Year: 2020, 5 Year Average: 5Annual averages from 2016year to2020 year
Source: USAID FAMINE EARLY WARNING SYSTEMS NETWORK (FEWS NET): UGANDA Price Bulletin, December 2021

Figure 3.3.27 Price trend of Maize in Masindi

2) Change in VC

COVID-19 did not result in any major changes in the flow of VCs in maize, as mentioned above, there was, however, a decrease in the volume handled and distributed by each VC due to shrinking demand.

(3) Impacts on Respective Crop FVC: Plantain

VC surveys (questionnaires, group discussions and individual interviews) for each stakeholder of plantain VC were conducted in Buyondo village, central Luweero district, Kiina-nyakatooma village, Kabale district, Kahondo village and nearby towns for producers and short distance distributors from villages to towns and collection points. For long distance distributors, retailers and consumers, the survey was conducted in Kampala in addition to the above. The results of the key informant survey and the VC survey in the above areas are as follows.

1) Impact on overall VC

Impact on VC stage

In Table3.3.10, the results from the key informant survey and VC survey for each VC process are organized into the impact of COVID-19 and its background and factors.

Table 3.3.10 Impact on each VC stage on plantain

VC stage	2020		2021		Background, factor	Period
	Level of Impact	Impact	Level of Impact	Impact		
Input	Small	・There will be little or no impact as production materials can be procured within the region.	Small	・There will be little or no impact as production materials can be procured within the region.	・Plantain is planted and renewed by multiplying the division, and no fertilizer or pesticide application is used, thus the crop is less susceptible to shortages of production materials. ・Even in large-scale corporate farms, COVID-19 has little impact on the input and production stages because the crops are grown without fertilizers or pesticides.	-
Production	Small	・ Almost no impact on production volume ・Drastic decline in producer prices	Small	・Almost no impact on production volume ・Drastic decline in producer prices	・The effects of COVID-19 could not been confirmed. 2020 and 2021 were bumper years. ・There is no shortage of farm labor. ・As plantain cannot be stored, the price of the crop fell sharply due to a good harvest and sluggish demand from cities and towns. In addition, some producers were unable to hire the necessary laborers, which affected their harvest and production in the following years. ・As a crop that is harvested almost all year round, it is available even during lockdowns and is a high value-added food crop for rural food security.	From first production period in 2020 to Present
Processing	-	-	-	-	・ The majority of plantains are distributed to the market unprocessed. ・A small portion is being processed into plantain chips and plantain wine. Wine was affected by the suspension of business at bars and hotels.	-
Distribution	Large	・ Due to	Large	・ Due to sluggish	・Due to sluggish demand, distribution	From first

		sluggish demand, vendors are no longer coming to the farms in the village. ・ Exports will also be affected.		demand, vendors are no longer coming to the farms in the village. ・Exports will also be affected.	from the village to the town's vendors and from the town's collection point to Kampala and other towns has decreased. ・ The majority is distributed and consumed domestically, but a very small amount is transported to Europe by air. These seems to be affected by the difficulty in exporting.	production period in 2020 to Present
Sales	Large	・ Significant decrease in price and volume.	Large	・ Significant decrease in price and volume.	・Plantains are grown in many parts of the country. Due to sluggish demand in towns and the inability to store them for long periods of time, the specialty areas had large inventories during the lockdown and prices dropped significantly.	From first production period in 2020 to Present
Consumption	Medium	・ Self-consumption in rural areas, where most of the population lives, increased. ・ Decreased consumption in large customers such as schools and urban peri-urban areas, and rural towns.	Medium	・ Self-consumption in rural areas, where most of the population lives, increased. ・ Decreased consumption in large customers such as schools and urban peri-urban areas, and rural towns.	・The amount of self-consumption is thought to have increased due to the return of families from urban areas and the increase in the number of families due to the closure of schools. ・The amount of plantains purchased and consumed has decreased due to a decrease in the population in the town and a decrease in demand due to weak purchasing power in the peri-urban area of Kampalaa (Plantain have shifted to cheaper Maize flour).	From first production period in 2020 to Present

Source: Key informant survey results, VC survey

Impact Considerations

a. Decrease in sales volume and distribution volume due to reduced consumer demand

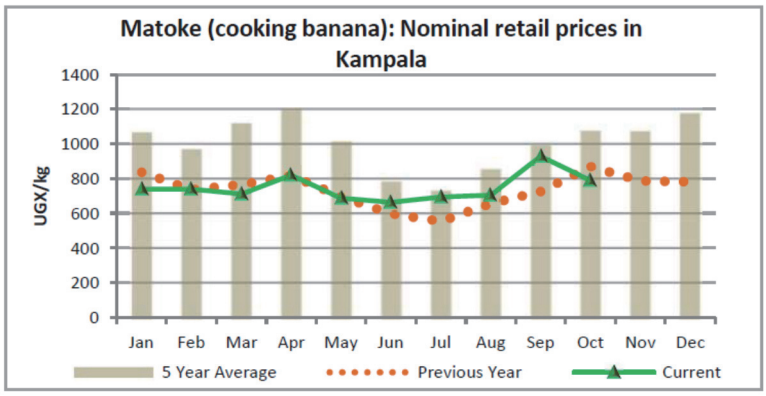
Plantain is Ugandan flagship crop, and is widely grown in rural areas for both home consumption and as a source of cash income. For self-consumption, it is said that consumption in rural areas has increased as more people return to their villages. On the other hand, in urban areas, some consumers switched to cheaper staple foods such as maize flour, and the sales volume is said to have been declining. In the survey, retailers in Kampala reported a significant decrease in sales volume and distribution.

b. Production volume and producer prices

In the study area, the year 2020 was blessed with good weather and a bumper crop, and the production in 2021 was also steady. Since Plantain is a perennial crop, it is less labor intensive to cultivate than other crops, and as with other crops, no labor shortage occurred. Due to the good harvests, reduced demand in consumer areas, the impact of COVID-19 on the transportation network, and the fragile nature of plantain, villages accumulated stocks and producer prices fell significantly.

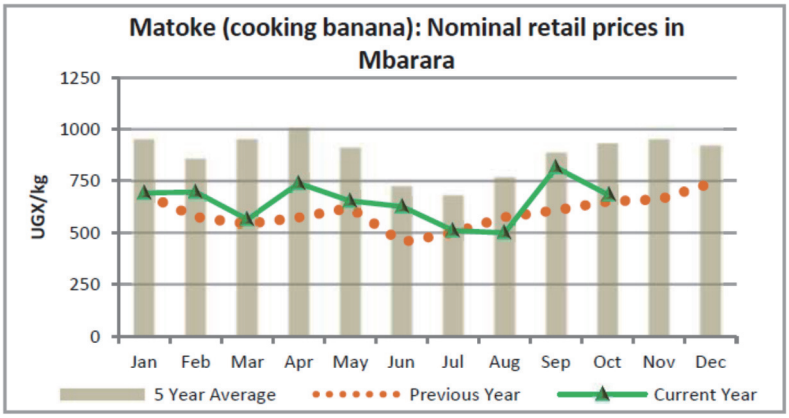
c. Consumer price

Figures 3.3.28 and Figure 3.3.29 show the trend of retail prices in Kampala, the capital city, and in Mbarara, the western part of the country where plantains are grown, for 2021and 2020. Both of which are significantly below the five-year average. The same trend was observed in the VC survey conducted in Mbale, approximately two hours drive from Kampala and Mbarara. It seems that a decrease in demand in consumption areas and oversupply caused by a good harvest is the reason for it.



Notes: Current Year: 2021, Previous Year: 2020, 5 Year Average: 5Annual averages from 2016year to2020 year
Source: USAID FAMINE EARLY WARNING SYSTEMS NETWORK (FEWS NET): UGANDA Price Bulletin, December 2021

Figure 3.3.28 Price trend of plantain in the capital city Kampala



Notes: Current Year: 2021, Previous Year: 2020, 5 Year Average: 5Annual averages from 2016year to2020 year
Source: USAID FAMINE EARLY WARNING SYSTEMS NETWORK (FEWS NET): UGANDA Price Bulletin, December 2021

Figure 3.3.29 Price trend of plantain in Mbarara

2) Change in VC

COVID-19 did not result in any major changes in the flow of VCs in Maize itself, but as mentioned above, there was a decrease in the volume handled and distributed by each VC due to shrinking demand.

(4) Impacts on Respective Crop FVC: Tomato

VC surveys (questionnaires, group discussions, and individual interviews) with each VC stakeholder of tomato were conducted in Bubengwa village and nearby towns in central Luweero district for farmers, processors, and short-distance distributors from villages to towns and collection point, and in Kampala in addition to the above for long-distance distributors, retailers, and consumers. The following results are based on the key informant survey and the VC survey conducted in the above areas.

1) Impact on overall VC

In Table 3.3.11, the results from the key informant survey and VC survey for each VC process are organized into the impact of COVID-19 and its background and factors.

Impact on VC stage

In Table3.3.11, the results from the key informant survey and VC survey for each VC process are organized into the impact of COVID-19 and its background and factors.

Table 3.3.11 Impact on each VC stage on tomato

VC stage	2020		2021		Background, factor	Period
	Level of Impact	Impact	Level of Impact	Impact		
Input	Small	・Decrease in sales volume ・ Impact of rising input prices on farmers' income and expenditure	Medium	・ Increase in prices of input materials, decrease in sales volume ・ Impact of rising input prices on farmers' income and expenditure	・According to input dealers, purchase and sales prices have increased since 2021, mainly due to higher import prices. Sales volume is thought to have decreased due to a decrease in farmers' income. ・In tomato production, the use of pesticides and fertilizers is essential for cultivation. Thus, it is considered that farmers have been affected by the rising cost of inputs.	From first production period in 2020 to Present
Production	Small	・ Almost no effect on production volume ・ Decline in producer prices (due in large part to the deteriorating security situation in South Sudan)	Small	・ Almost no effect on production volume ・ Decline in producer prices (due in large part to the deteriorating security situation in South Sudan)	・As for the production volume, the effect of weather was more significant and the effect of COVID-19 was not seen so much. ・The year 2020 was blessed with good weather and a good harvest. ・On the other hand, prices were sluggish due to a large decrease in export demand caused by the political unrest in South Sudan, as well as a decrease in demand in urban areas due to COVID-19. As a result, there was an oversupply in the vegetable market, and producer prices fell. ・There was no shortage of labor, and people who returned to their parents' homes from town and children who stayed at home due to the extended closure of schools were also considered as day laborers. ・It is believed that farmers are in a difficult situation due to the impact of both COVID-19 and the fact that exports to South Sudan would have been significantly reduced. It is concerned that this will have an impact even after COVID-19 is settled. ・ There was no crop conversion among the	From first production period in 2020 to Present

					surveyed farmers.	
Processing	-	-	-	-	・Although Ugandan-made tomato ketchup is also available in supermarkets, the amount of tomato ketchup is estimated to be small. ・The majority of tomatoes are sold unprocessed, and tomato cultivation is widespread as a cash crop in the near metropolitan area and near regional cities.	From first production period in 2020 to Present
Distribution	Medium	Decrease in distribution volume (due in large part to the cessation of exports to South Sudan due to political instability)	Medium	Decrease in distribution volume (due in large part to the cessation of exports to South Sudan due to political instability)	・In Luweero, the survey area in the central part of the country, there were three main patterns: export to South Sudan (cessation due to political instability), transportation to urban areas such as Kampala, and consumption in local towns. As a result of the worsening of the situation in South Sudan, the demand for tomato has decreased before the outbreak of COVID-19, and the demand in cities and towns has decreased due to the lockdown. ・Production will increase at an annual rate of 3-5% over the five-year period 2015-2019, reaching 44,000 tons in 2019 with a planting area of 0.8 million hectares.	From first production period in 2020 to Present
Sales	Large	Decline in sales prices	Medium	Decline in sales prices	・The sales price decreased due to the above-mentioned decrease in demand. ・As a result, the vegetable market was oversupplied during the harvest season, and selling prices fell. After that, prices gradually recovered, and after the second lockdown, prices returned to almost normal range.	From first production period in 2020 to July 2020
Consumption	Medium	Decrease in consumption	Medium	Decrease in consumption	The consumption volume decreased due to the closure of restaurants and hotels, and the decrease in income of consumers in towns and cities.	From first production period in 2020 to Present

Source: Key informant survey results, VC survey

Impact Considerations

a. Decrease in sales volume and distribution volume due to reduced consumer demand

Tomatoes are one of Ugandan major horticultural and cash crops. In an interview in the Kampala market, comments were made that COVID-19 had caused a significant drop in the price and demand for tomatoes. In addition, the decline in consumer purchasing power and the closure of hotels and restaurants due to the lockdown are also expected to have a significant impact. These declines in demand are thought to be the result of lower consumer demand leading to lower demand in the market, which in turn led to lower demand for distribution and processing volumes. Although GOU did not regulate the distribution of food products under COVID-19, it is presumed that the volume of distribution decreased because of the aforementioned decline in demands.

b. Production volume and producer prices

According to the VC survey, the survey area had a bumper crop in 2020 due to good weather, and production declined in 2021 due to drought. As with other crops, there were no labor shortages. The good harvest, lower demand in consumer areas, the impact of COVID-19 on the transportation network, and the fragile nature of tomatoes led to a buildup of inventories in villages and a significant drop in producer prices in 2020, which continued into 2021. One potential way to avoid a significant drop in demand and prices for tomatoes is to develop a processing industry. Although there are many issues to be addressed, such as the need for year-round supply in order to ensure stable operation of processing plants, the development of the processing industry is also expected in the future.

c. Deterioration in the operation of farming

In the study area, the impact of COVID-19 added to the significant decrease in trade with South Sudan, resulting in a significant decrease in demand and producer prices. This is likely to have affected current farmers' cash flow, cultivation, and other aspects of farming in general, and furthermore, it is feared that it will affect farmers' post-COVID-19 farming.

d. Consumer price

A survey of consumer prices in the capital city, Kampala, reported that prices declined in 2020 and gradually recovered, returning to almost normal price ranges after the June-July lockdown in 2021.

2) Change in VC

There was no significant change in the VC structure. There were, however, reports of a significant reduction in the frequency of middlemen coming to buy from farmers due to weak demand in Kampala and local towns following the situation where exports to South Sudan have stopped. There was also a reduction in the volume of transactions and frequency of purchases by distributors who transport the products from the nearest town to Kampala and other areas. Due to the shrinking demand, there was a decrease in the volume handled and distributed by each VC.

(5) Impacts on Respective Crop FVC: Onion

The VC survey (questionnaire, group discussion and individual interview) for each stakeholder of onion VC was conducted in Rwabaremeera village, Rugarama village and nearby towns of western Kabale district for farmers, processors and short distance distributors from villages to towns and local collection point. For long distance distributors, retailers and consumers, the survey was conducted in Kampala in addition to the above. The following results are based on the key informant survey and the VC survey conducted in the above areas.

1) Impact on overall VC

Impact on VC stage

In Table 3.3.12, the results from the key informant survey and VC survey for each VC process are organized into the impact of COVID-19 and its background and factors.

Table 3.3.12 Impact on each VC stage on onion

VC stage	2020		2021		Background, factor	Period
	Level of Impact	Impact	Level of Impact	Impact		
Input	Small	・Decrease in sales volume	Medium	・Increase in prices of input materials, decrease in sales volume	・According to information from input dealers, purchase and sales prices have increased mainly due to the rise in import prices since 2021. It is thought that the sales volume has decreased due to the decrease in farmers' income. ・In addition, a certain number of farmers in the study area purchased and used fertilizers and pesticides other than compost. Thus, it is likely that the price hike had an impact for farmers. ・It is necessary to check the use of compost in other areas as the reason for not using compost as fertilizer is mainly because it is difficult to transport compost due to the hilly terrain in this area. ・The main large-scale production areas are in the Sebei region at the foot of Mount Elgon (in the districts of Brambri, Sironko, and Mbale) and in the southwest (in the districts of Kabale and Kisoro). ・It does not require advanced cultivation techniques, but it require the availability of seeds and fertilizers, and labor for transplanting from the nursery. ・Support is needed for seed procurement, irrigation water supply, and agricultural technology. Fungicide imports have been on the rise in recent years.	From first production period in 2020 to Present
Production	Small	・There was almost no impact on the production volume, but there was some planting shift.	Small	・There was almost no impact on the production volume, but there was some planting shift.	・In terms of production volume, the impact of weather is greater than the impact of COVID-19. In the second season in 2020, the weather was favorable and there was a good harvest of vegetables in general, including onions. ・On the other hand, export demand due to the blockade of the Rwandan-Ugandan border from 2019 year ・In addition to the decrease in prices, the decrease in demand in Kampala and town due to COVID-19	From first production period in 2020 to Present

		・Decline in producer prices (due in large part to the border closure with Rwanda)		・Decline in producer prices (due in large part to the border closure with Rwanda)	caused a significant slump in prices. Interviewees in the western Kabale district indicated that the vegetable market was oversupplied, resulting in lower producer prices. ・There was no shortage of labor, and people who returned home from town and children who stayed at home due to the extended closure of schools were considered day laborers, resulting in a downward trend in wages. ・It is believed that farmers are in a difficult situation due to the impact of both COVID-19 and the fact that exports to Rwanda would have decreased significantly. It is concerned that this will have an impact even after COVID-19 is settled. ・There were also farmers who shifted their cropping to other crops such as potatoes. ・Onion production increased at a rate of 3% per annum during the 5 five year of 2015~2019 years. The production volume is 30,7000 tons for a planting area of 90.4,000 ha. ・ JICA has been supporting market-oriented agriculture by farmer groups in the Acholi region of northern Uganda. Vegetable production, including onions, has also been implemented.	
Processing	-	-	-	-	・Onions are easily rotten, therefore they can be stored for a long time by drying them immediately after harvesting. Dryers are not used in Uganda.	-
Distribution	Medium	・ Decrease in distribution volume	Medium	・ Decrease in distribution volume	・In the western part of Kabale district, there were three main patterns: export to Rwanda, transport to urban areas such as Kampala, and consumption in neighboring towns. ・ As a result of the border lockdown and the suspension of exports to Rwanda (starting in 2019), demand in cities and towns has decreased, resulting in a significant drop in distribution. In addition, trucks from Kampala used to operate round-trip, transporting goods to Rwanda on the outbound route and onions and other products from the western region on the	From first production period in 2020 to Present

					return trip, but since the outbound transportation is no longer available, it is now a one-way trip and costs have risen significantly. ・As a result, the frequency of the arrival of middlemen from towns in rural areas has greatly decreased. ・Compared to green and yellow vegetables, which compete for freshness, there is less cargo damage during transportation, and long-distance transportation is possible. Import volume of onions from Tanzania is on the rise.	
Sales	Medium	・Temporally increase in sales prices	Medium	・Temporally increase in sales prices	・In Kampala market, prices rose in the six months immediately following the 2020 lockdown due to a decrease in supply of both domestic and imported products. Prices have normalized after this period. ・Since onions are prone to rot, it is necessary to establish a collection and shipping system through farmer grouping, add value through quality control, improve post-harvest processing technology, and improve the marketing skills of farmers.	From first production period in 2020 to August 2020
Consumption	Medium	・ Decrease in consumption	Medium	・ Decrease in consumption	・The consumption volume decreased due to the closure of restaurants and hotels, and the decrease in income of consumers in towns and cities. ・Domestic consumption of onions has increased nationwide. However, based on the crop statistics issued in 2019, per capita available supply is 8 kg.	From first production period in 2020 to Present

Source: Key informant survey results, VC survey

Impact Considerations

a. Decrease in sales volume and distribution volume due to reduced consumer demand

Onions, the same as tomatoes, are a major horticultural crop and cash crop in Uganda. During interviews at the Kampala market, it was reported that the price and demand for onions had dropped significantly after the initial price spike due to a large drop in supply. This is not only due to the decline in consumers' living standards and their return to their villages, but also due to the closure of hotels and restaurants due to the lockdown. These declines in demand are thought to be the result of lower consumer demand leading to lower demand in the market, which in turn led to lower demand for distribution and processing. Although GOU did not impose any ban on the transportation of food products under COVID-19, it is presumed that the distribution volume decreased by a certain amount due to the decline in demand.

b. Production volume and producer prices

The VC survey showed that 2020 was a good year with good weather and a bumper crop, while production declined in 2021 due to drought. As with other crops, there were no labor shortages. Due to the good harvest, halted exports to Rwanda, lower demand in consumption areas, and the impact of COVID-19 on the transportation network, villages built up inventories and producer prices fell significantly in 2020.

c. Deterioration in the operation of farming by producers

In the study area, the impact of COVID-19 was added to the significant decrease in trade with Rwanda, resulting in a significant decrease in demand and producer prices. This is likely to have affected current farmers' cash flow, cultivation, and other aspects of farming in general, and furthermore, there is concern that farmers' post-COVID-19 farming will also be affected. Another point that may improve the farming conditions of onion growers to increase the life of the products through warm air processing, which is an issue that should be considered in the future.

d. Consumer price

According to a survey of consumer prices in the capital city of Kampala, prices rose during the first lockdown in 2020, then gradually fell and settled to normal levels during the second lockdown in 2021.

2) Change in VC

There was no significant change in the VC structure. However, due to the weak demand in Kampala and towns following the situation where exports to Rwanda have stopped, there were reports that the frequency of middlemen who came to buy from farmers has been greatly reduced. There was also a reduction in the volume of transactions and frequency of purchases by distributors who transport the products from the nearest town to Kampala and other areas. Due to the shrinking demand, there was a decrease in the volume handled and distributed by each VC.

(6) Impacts on Respective Crop FVC: Potato

VC surveys (questionnaires, group discussions, and individual interviews) with each VC stakeholder for potatoes were conducted in Ahakatale and Kibale villages and nearby towns in western Kabale district for farmers, processors, and short distance distributors from villages to towns and collection points. In addition to the above, the survey was conducted in Kampala for long distance distributors, retailers and consumers. The following results are based on the key informant survey and the VC survey conducted in the above areas.

1) Impact on overall VC

Impact on VC stage

Table 3.3.13 shows the results from the key informant survey and VC survey for each VC process, divided into COVID-19 impact and its background and factors.

Table 3.3.13 Impact on each VC stage on potato

VC stage	2020		2021		Background, factor	Period
	Level of Impact	Impact	Level of Impact	Impact		
Input	Small	・Decrease in sales volume	Medium	・Increase in prices of input materials, decrease in sales volume	・According to the information from input dealers, purchase and sales prices have increased mainly due to the increase in import prices since 2021. The sales volume is thought to have decreased due to the decrease in farmers' income as well. ・Since a certain number of farmers use fertilizers and pesticides, the increase in input prices is expected to have had some impact on farmers' income. ・It is necessary to check the use of compost in other areas as the reason for not using compost as fertilizer is that it is difficult to transport compost due to the hilly terrain in this area. ・The farmers use harvested potatoes as seed potatoes since seed potatoes are not widely available. ・Irish potatoes are a cash crop with a growing domestic demand. In rural areas, it is also an important food crop for food security. Sixty percent of the total production is grown in the highlands of the southwestern districts of Kabale and Kisoro. The highlands of the Kigezi and Bugisu subregions in the foothills of Mount Elgon have also been traditionally planted. Production is growing in the central part of the country around the provincial cities of Ankole, Rwenzori, and Sebei.	From first production period in 2021 to Present
Production	Small	・Almost no effect on production	Small	・Almost no effect on production Decline in producer prices (due in large part to the border closure with Rwanda)	・As to the production volume, the effect of weather was more significant, and the effect of COVID-19 was observed only slightly. ・Lower export demand due to the sealing of the Rwandan-Ugandan border starting in 2019 as well as lower demand in Kampala and towns due to COVID-19, have led to a significant drop in producer prices. ・It is believed that farmers are in a difficult situation due to the impact of both COVID-19 and the fact that exports to Rwanda would have decreased significantly. It is concerned that this will have an impact even after COVID-19 is settled. ・There was no shortage of labor. People who returned home from town and children who stayed at home due to the extended	From first production period in 2020 to Present

					closure of schools were considered day laborers, resulting in a downward trend in wages.	
Processing	-	Decline in producer prices (due in large part to the border closure with Rwanda)	-	-	・Basically, no processing is done. However, since the crop is perishable, appropriate storage facilities are required.	-
Distribution	Medium	-	Medium	・ Decrease in distribution volume	・In Kabale district, there were three main patterns: exporting to Rwanda, transporting to urban areas, and shipping to neighboring towns. ・Distribution volume was declined due to the suspension of exports to Rwanda and lower demand in cities and towns due to the lockdown. In addition, trucks from Kampala used to transport goods to Rwanda on the outbound route and potatoes from the western region on the inbound route. Since the outbound transportation is no longer available, the cost of one-way transportation has increased significantly. ・As a result, the frequency of the arrival of middlemen from towns in rural areas has greatly decreased. ・In the interview from a distributor, some people told that the volume of imports from Kenya has decreased significantly.	From first production period in 2020 to Present
Sales	Large	・ Decrease in distribution volume	Large	・ A significant drop in prices ・ Decrease in demand	・As a result of the above-mentioned decrease in demand, prices have fallen sharply. According to the interview survey, prices are recovering but have not returned to the price level before COVID-19. ・The demand from restaurants and hotels in urban areas such as Kampala has decreased significantly. As a result, there were not able to sell all of products and some of them were disposed.	From first production period in 2020 to August 2020
Consumption	Large	・ A significant drop in prices	Large	・ Decrease in consumption	The consumption volume decreased due to the closure of restaurants and hotels, and the decrease in income of consumers in towns and cities.	From first production period in 2020 to Present

Source: Key informant survey results, VC survey

Impact Considerations

a. Decrease in sales volume and distribution volume due to reduced consumer demand

Potatoes are Uganda's leading horticultural crop and a cash crop. Recently, it is also being considered as one of the staple foods. Although it is beginning to be considered as a staple food, it is not as established as cereals, and if people's households cannot afford it, cereals will take precedence and will likely not be purchased. Therefore, it is inferred that COVID-19 had a significant impact on them.

Interviewees at a market in the capital city of Kampala reported a significant drop in the price and demand for potatoes. This is not only due to the decline in consumers' living standards and their return to their villages, but also due to the closure of hotels and restaurants on account of the lockdown.

These declines in demand can be attributed to the impact of lower consumer demand leading to lower demand in the market, which in turn led to lower demand for distribution and processed quantities. Although GOU did not impose any ban on the transportation of food products under COVID-19, it is presumed that the distribution volume decreased by a certain amount due to the decline in demand.

b. Production volume and producer prices

According to the results of the group discussion and interviews in the VC survey, the study area had a bumper crop in 2020 due to good weather, and production declined in 2021 due to drought. As with other crops, there was no labor shortage.

Due to good harvests, the stoppage of exports to Rwanda as well as onions, lower demand in consumer areas, and the impact of COVID-19 on the transportation network, inventories built up in villages and producer prices dropped significantly in 2020 and continued to be low in 2021.

c. Deterioration in the farming conditions of producers

In the study area, the impact of COVID-19 was added to the significant decrease in trade with Rwanda, resulting in a significant decrease in demand and producer prices. It is inferred to have an impact on current farmers' cash flow, cultivation, and other aspects of farming in general, and furthermore, there is concern that it will affect farmers' post-COVID-19 farming.

d. consumer price

According to a survey of consumer prices in the capital city of Kampala, prices have not returned to pre-COVID-19 prices in 2021, although they have declined in 2020 and are on the way to recovery.

2) Change in VC

There was no significant change in the VC structure. However, due to the weak demand in Kampala and towns following the situation where exports to Rwanda have stopped, there were reports that the frequency of middlemen who came to buy from farmers has been greatly reduced. There was also a reduction in the volume of transactions and frequency of purchases by distributors who transport the products from the nearest town of the production area to Kampala and other areas. Due to the shrinking demand, there was a decrease in the volume handled and distributed by each VC.

(7) Impacts on Respective Crop FVC: Coffee

The coffee survey was conducted based on a key informant survey to MAAIF officer and Uganda Coffee Development Authority (UCDA), and a document provided by UCDA titled "Rapid Assessment of the Impact of the COVID-19 on the coffee Sub-Sector in Uganda February, 2021" (UCDA 2021).

VC survey (questionnaire, group discussions, and individual interviews) to each VC stakeholder was conducted on farmers and processors for Robusta coffee.

Since the coffee value chain has been established by the private sector, and since the latest trends are likely to be reflected in the above report, the content of the literature is mainly cited and summarized below.

1) Impact on overall VC

Impact on VC stage

Table 3.3.14 summarizes the results from the literature review (UCDA 2021) and the key informant survey and VC survey for each VC process, divided into the impact of COVID-19 and its background and factors.

Table 3.3.14 Impact on each VC stage on coffee

VC stage	2020		2021		Background, factor	Period
	Level of Impact	Impact	Level of Impact	Impact		
Input	Large	・Increase in prices of input materials, decrease in sales volume	Medium	・Increase in prices of input materials, decrease in sales volume	・The price of input materials has been rising, which has affected farmers' farming activities.	From first production period in 2020 to Present
Production	Medium	・Reduction in the amount of input materials used	Medium	・ Reduction in the amount of input materials used ・Decrease in production volume ・ Worsening access to financial services	・There was a bumper crop in 2019, and production declined in 2020. ・It is indicated that the main reasons for the decline in production due to COVID-19 may be lower productivity due to reduced availability of inputs, loss of access to agricultural extension services, and worsened access to financial instruments due to higher interest rates and movement restrictions. ・In the Robusta coffee growing areas, the number of employees has been reduced. This may be due to the fact that children are not in school and they help farm work which resulted in increasing the domestic labor force. Adding to that, mobility restrictions make it difficult for day laborers to come to their work places. ・ The producer price is largely equivalent to the international price.	From February 2020 to August 2020
Processing	Medium	・Decrease in production volume	Medium	・Decrease in processing volume ・Decrease in profit	・The amount of processing is also decreasing along with the decrease in production. ・ Profit declined due to higher costs such as higher transportation and financing costs, and lower revenue from lower processing volume.	From first production period in 2020 to Present
Distribution	Medium	・Worsening access to financial services	Medium	・ Decline in distribution volume and rise in transportation	・The amount in distribution volume has decreased due to lockdown and other restrictions on movement. ・ The unit price for distribution increased due to restrictions on movement.	From first production period in 2020 to Present

				costs		
Sales	Small		Small	・No effect	・The price is linked to international prices and is not expected to be affected by COVID-19.	From first production period in 2020 to Present
Consumption	Small	・Decrease in processing volume	Small	・Almost no effect	・In Uganda, coffee consumption is not widespread, with only very small amounts consumed through supermarkets sales and in urban cafes. ・Cafes that sell coffee were greatly affected by the lockdown, night curfews, and the decrease in foreign tourists. However, since their consumption is a very small amount from the entire consumption, the impact is considered to be small.	From first production period in 2020 to Present

Source: Key informant survey results, VC survey

Impact Considerations

a. Decreased production compared to 2019

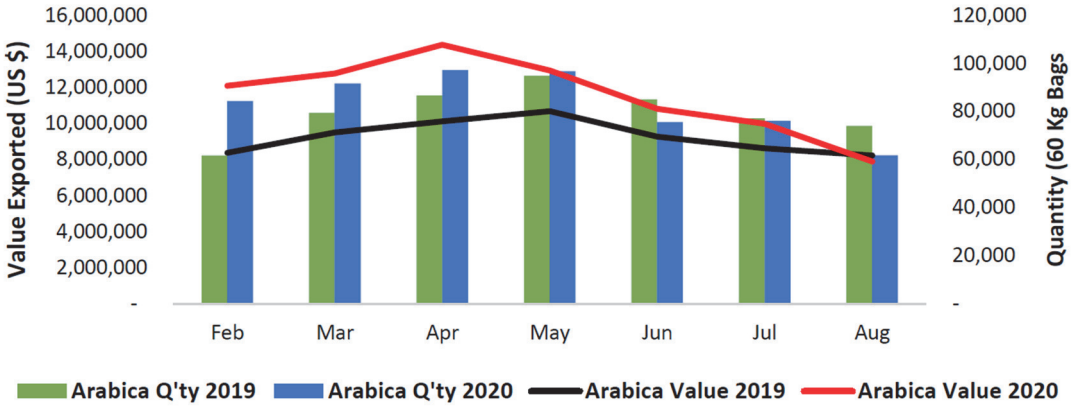
In 2019, Uganda had a bumper crop of coffee; in 2020, production declined compared with the amount in 2019 , this is, however, not likely to be due to COVID-19.

b. Impact of price increase of input materials

There was an increase in the price of inputs, which put pressure on farmers' profits. As a result, farmers refrained from using inputs, which may have been one of the reasons for the decline in production.

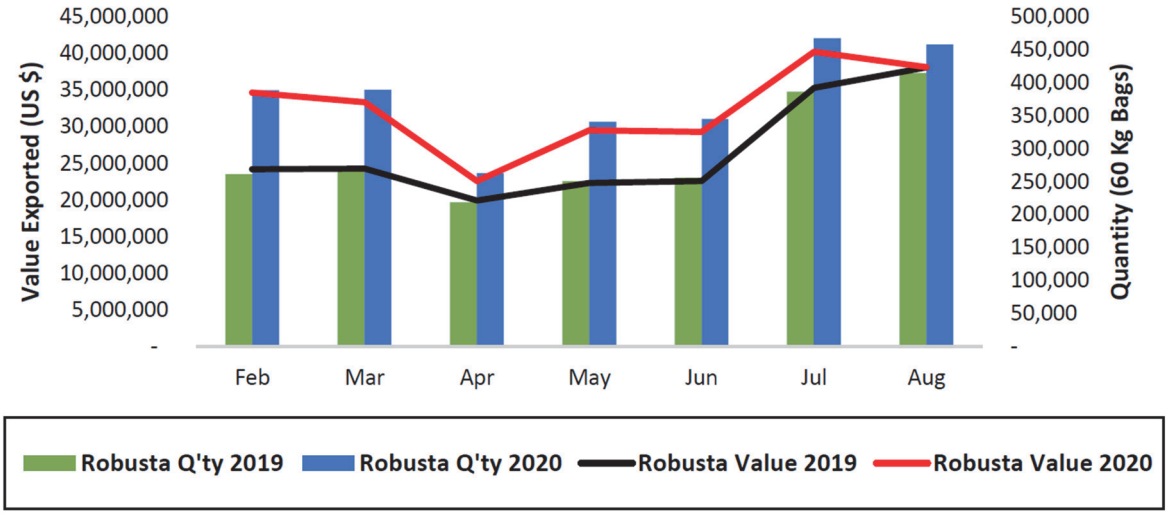
c. Sales price, etc.

Uganda is one of the world's leading producers of Robusta coffee, Uganda is, however, a price taker of internationally determined prices. Not only the export unit price, but also the producer unit price is largely determined by it. Figure 3.3.30 and Figure 3.3.31show the export volume and export price (60 kg bag of green beans) of Arabica and Robusta varieties for 2019 and 2020 (from February to August). The 2020 prices for both Arabica and Robusta are higher than that of 2019 prices in almost all periods.



Source RAPID ASSESSMENT OF THE IMPACT OF THE COVID-19 ON COFFEE SUB SECTOR IN UGADA

Figure 3.3.30 Trends in Arabica Coffee Export Volume and Export Price



Source RAPID ASSESSMENT OF THE IMPACT OF THE COVID-19 ON COFFEE SUB SECTOR IN UGADA

Figure 3.3.31 Export Volume and Export Price of Robusta Coffee

d. Export volume

As for the green bean export volume of Robusta variety, as shown in Figure 3.3.30, the impact of COVID-19 cannot be measured as the amount in 2020 is higher than that of 2019. Also for Arabica, as

shown in Figure 3.3.31, the impact of COVID-19 cannot be measured from an overview of the export volume from January to August 2020.

2) Change in VC

The VC for coffee was already established and did not change significantly due to COVID-19. There may have been, however, some confusion in the distribution side, especially when the lockdown in 2020 came into effect. There was also a reduction in the amount of processing and distribution due to lower production, and a corresponding reduction in the number of employees at processors and distributors.

3.3.4 Impacts on each VC Stage

(1) Overview of Influence on FVC

The impact on the overall FVC is shown in Table 3.3.15. Purchasing power of the consumer areas decreased due to the decrease in income of consumers and the closure of hotels and restaurants. As a result, the amount of products purchased by middlemen and handled by processors tended to decrease, which made the producer prices of plantains and horticultural crops fall as they are perishable product to store for long period. In addition, as already mentioned, the closing of borders with neighboring countries and the worsening security situation in neighboring countries have also had a significant impact on the change in producer prices.

In rural areas, there were good harvests and sufficient crops, especially in 2020, therefore there were no problems with self-sufficiency, including for families returning from cities and towns. On the other hand, as to the producer price, the combination of lower demand in urban areas, and oversupply in rural areas, and disruption of distribution due to movement restrictions contributed to the decline in prices of plantain and horticultural crops.

Although the impact of disruptions to distribution and a reduction in cultivation area for cereals by smallholders have been reported, no major decline in either producer or consumer prices has been reported.

Other impacts, and details, are as described in the following Table 3.3.15.

Table 3.3.15 Impact on overall FVC, background, and timing

VC stage	Impact	Background, factor	Period
Input	・Decrease in supply ・Supply delay ・Difficulty in accessing supplies	・Increase in import prices ・Movement restrictions ・Price hike of input materials	Mainly from first production period in 2021 to Present
Production	・Decline in producer prices ・Deterioration in farming conditions ・Post-harvest losses (Plantains, tomatoes, onions, potatoes) ・Decrease in cultivation of small crops (rice) ・Temporary conversion of crops (horticultural crops)	・Reduction/change in demand ・Distribution obstruction ・Movement restrictions ・Lenders' lack of funds to be borrowed by farmers	From first production period in 2020 to Present
Processing	・Decrease in processing volume (Maize) ・Decrease in the amount of rice milling	・Reduction in demand	From first production period in 2020 to Present
Distribution	・Decrease in distribution volume ・Decrease in exports ・Waste agricultural products (plantain, horticultural crops)	・Reduced demand/shrinking market ・Distribution obstruction ・Border closures and deteriorating security at export destinations	From first production period in 2020 to Present

		・Increasing in logistics costs	
Sales	・Decrease in sales volume ・Lower selling prices (plantain, tomatoes, onions, potatoes)	・Reduction in demand ・Decrease in distribution volume	From first production period in 2020 to August 2020
Consumption	・Decline in consumption by general consumers (urban areas and towns) ・Decrease in consumption by large customers	・Decline in income ・Movement restrictions ・Population decline in urban areas and towns (residents returning to villages) ・Decrease in demand from large customers	From first production period in 2020 to Present

Source: Survey team

Based on the crop-specific considerations and questionnaire survey results summarized in the previous sections, the results at each VC stage across crops is analyzed. The sample size of the questionnaire survey conducted is shown in Table 3.3.16 below.
Due to the limited sample size of the questionnaire survey, however, some of the questionnaire items did not fully reveal the trends in some cases, which were comprehensively judged and described based on the contents of key informant interviews and literature review.

Table 3.3.16 Number of samples of the questionnaire survey

VC Process	Rice	Maize	Plantain	Tomato	Onion	Potato	Coffee	Sum
Input	12							12
Production	27	24	14	13	14	15	12	119
Processing	6	6	-	-	-	-	5	17
Distribution	7	5	3	3	5	7	7	50
	13							
Sales	23							23
Restaurant	5							5
Consumption	29							29
Sum	-							255

Source: Survey team

(2) Impacts on Input Stage and Underlying Factors

1) Overview

At the input stage, since most of the input materials are imported products, the impact of soaring import prices has caused price hikes and inventory shortages at local input material stores. (Especially in 2021). This has had an impact on farmers' procurement and on their balance of payments.

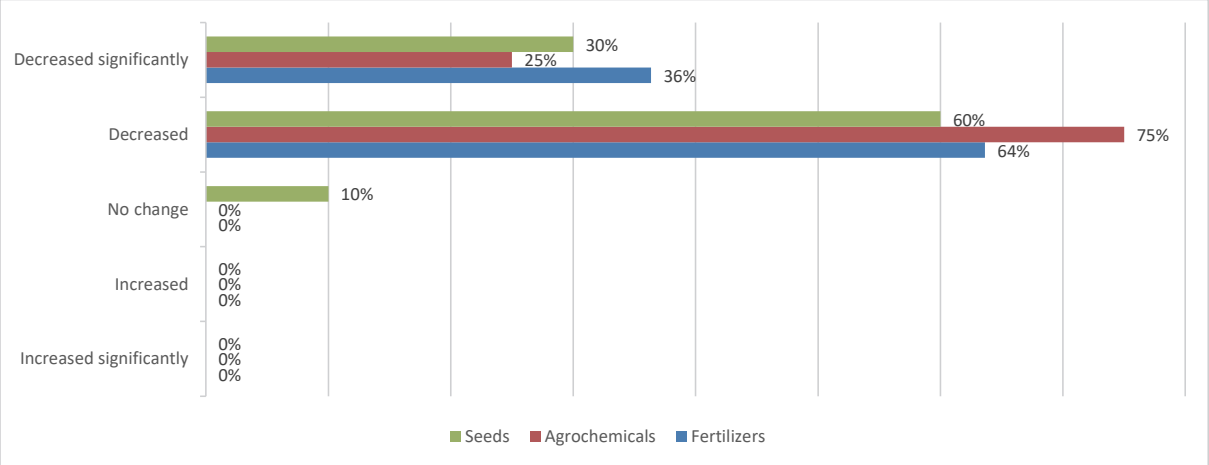
The overall impact, however, is expected to be limited due to the following reasons: the land in Uganda is fertile; many farmers rely on compost (called "organic" by Ugandans) instead of chemical fertilizers; many have limited financial means to purchase the minimum amount of pesticides.

It is also noted that the study sites reported that rice and tomato cultivation tend to use more scientific fertilizers and pesticides, and that more inputs are used for cultivation in hilly areas where it is difficult to transport compost.

Analysis of the questionnaire survey results

As shown in Figure 3.3.32, 100% of dealers in the questionnaire survey for pesticides and fertilizers,

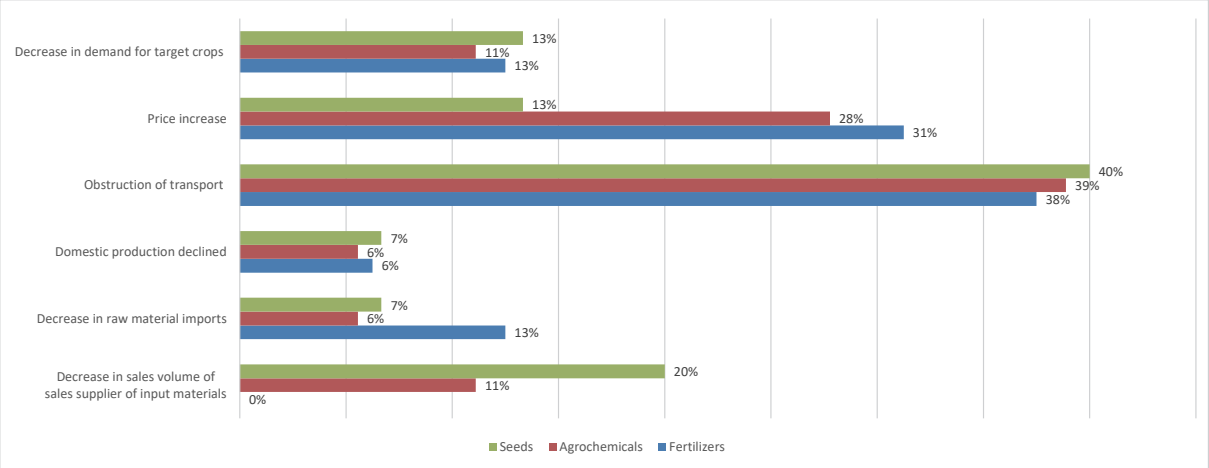
and 90% of dealers for seeds indicated that a significant decrease in sales volume had occurred or was occurring.



Source: Survey team

Figure 3.3.32 Changes of sales volume of input materials

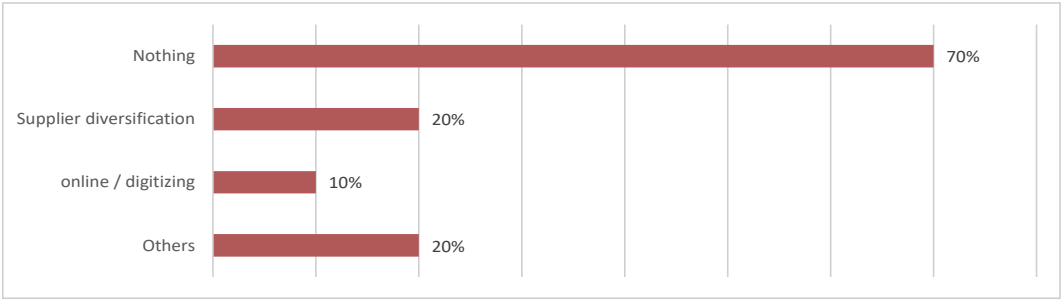
The reasons for this were shown in Figure3.3.33, which are disruptions in transportation networks, higher prices, and lower demand for crops, for seeds, pesticides, and fertilizers.



Source: VC survey

Figure 3.3.33 Factors behind the decrease in the sales volume of input materials

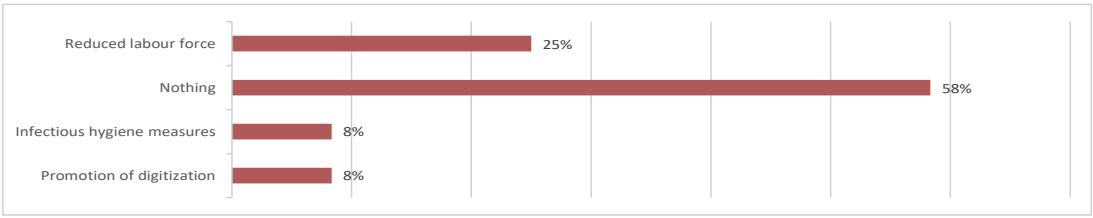
As shown in Figure 3.3.34, 70% of the vendors did not take any measures in terms of procurement. According to the interview results, no major restrictions were imposed on the distribution of input materials during the lockdown. This and the fact that it is difficult for dealers to take measures may have influenced the results.



Source: VC survey

Figure 3.3.34 Measures taken against COVID-19 in terms of procurement for input dealers

As shown in Figure 3.3.35, 58% of the respondents to the questionnaire survey indicated that no special action was taken, and in 25% of the cases, the number of employees was reduced.



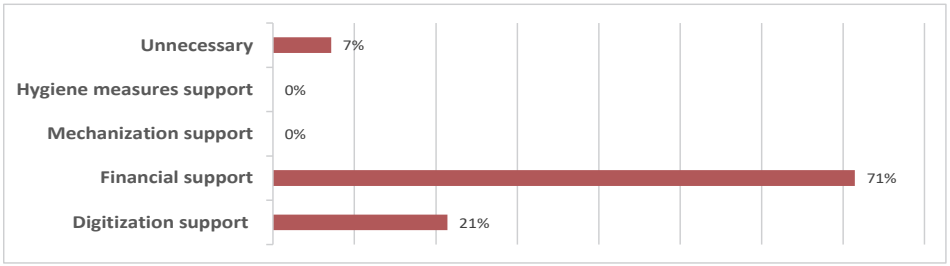
Source: VC survey

Figure 3.3.35 Measures taken against COVID-19 in terms of business for input dealers

2) Challenges, Needs and Perspective

Even in Uganda, where the use of inputs is limited, the problem of insufficient land to share with children when they inherit land due to population growth has arisen, therefore the area of land owned and cultivated by each person is becoming smaller. In addition, as the area per capita tends to shrink, it is a challenge to improve the yield per unit area of low productivity farmland so that it can be used as farmland. The need to increase the yield per unit of land is expected to increase the dependence on inputs such as high-quality seeds and chemical fertilizers. It may be necessary for the government to consider securing stable supplies of inputs and distributing them to farmers.

In addition, the input stores in rural areas are privately owned and operated, making them vulnerable to financial difficulties in times of emergency. As shown in Figure 3.3.36, the largest number of respondents asked the government for financial support, suggesting that there is a need for financial arrangements such as agriculture-related loans.



Source: VC survey

Figure 3.3.36 Needs by input dealers

(3) Impacts on Production Stage and Underlying Factors

1) Overview

In terms of production, COVID-19 had almost no impact on the surveyed crops. It is confirmed that weather had a significant impact in 2020 and many regions had good weather and bumper crops, emerging from the drought-induced crop failures of around 2016-2019.

In rural areas, people from Kampala and other urban and suburban towns returned to their villages due to the lockdown and curfew associated with COVID-19. They were added to the labor force. Furthermore, schools in Uganda have been closed other than a few grades since March 2019 lockdown and children, who cannot go to school, are being incorporated into the labor market. As a result, there has been an oversupply of day laborers, resulting in lower unit prices and making it easier for farmers to hire day laborers. This led some farmers to further increase their production.

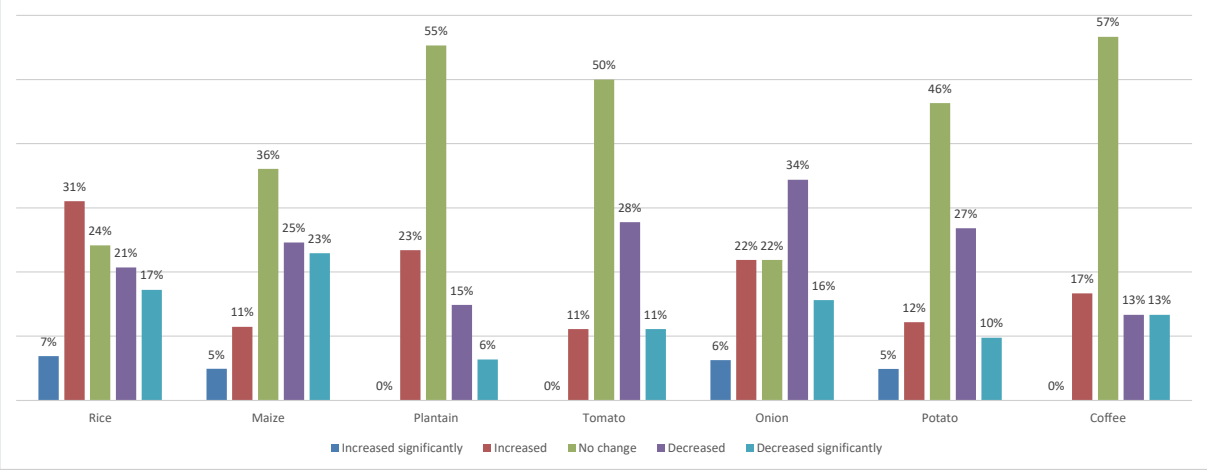
On the other hand, there were farmers who were unable to borrow sufficient funds, which forced them to reduce the size of their cultivated land and the number of day laborers, resulting in a drop in yield. This is because smallholders borrow the necessary funds for production (land, wages for day laborers, purchase of inputs, etc.) from landowners and processors, and pay them back in cash or in kind after harvesting, the source of the funds, however, became short of funds due to the impact of the COVID-19.

Though many farmers reported that producer prices have fallen, this is due to the fact that demand had fallen significantly because of the border issues even before COVID-19 was issued and the impact of the decline in demand due to COVID-19 was also added in such a situation. The border with Rwanda is closed from 2019 and the with South Sudan stopped due to public peace instability. In the interview survey, the inability to export was also cited as a factor in the decline in demand and prices, as well as the impact of COVID-19, which resulted in a decline in demand due to population decline in urban/suburban towns, closure of hotels and restaurants, and closure of schools.

As to the price decline, there are concerns that it will have a medium- to long-term impact on the cash flow and other farming activities of producers in the following years.

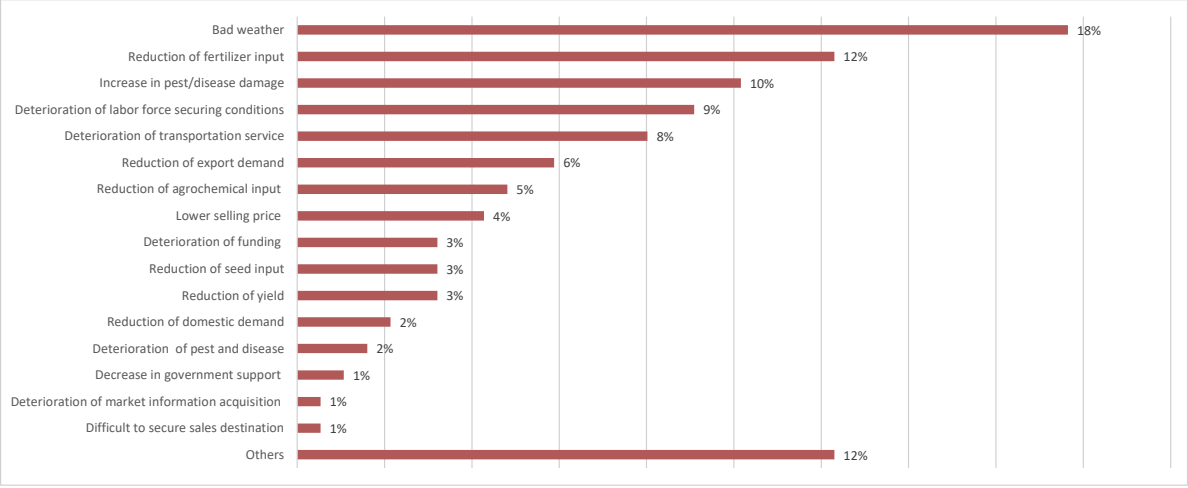
Analysis of the questionnaire survey results

In terms of production, as mentioned earlier, the weather had a significant impact. Figure 3.3.37 shows the changes in the production of each crop during the Covid-19 outbreak. As shown in Fig. 3.3.38 and Fig. 3.3.39, the largest number of producers cited weather as a factor in both the decrease and increase in production.



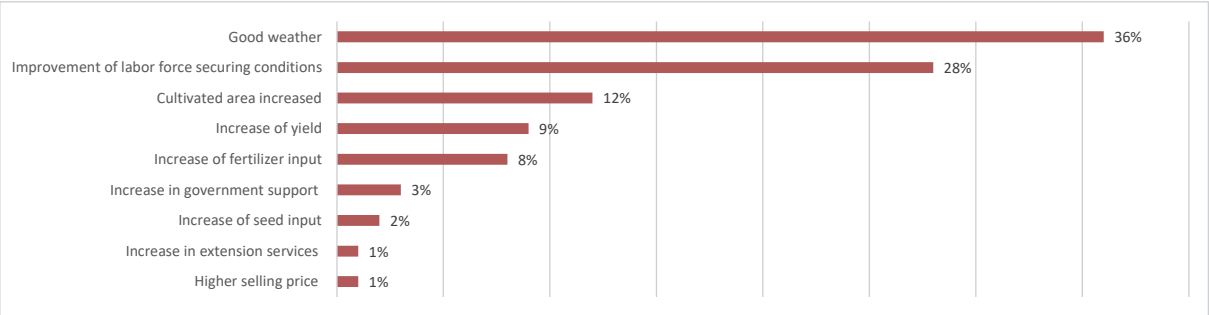
Source: VC survey

Figure 3.3.37 Change in crop production of farmers



Source: VC survey

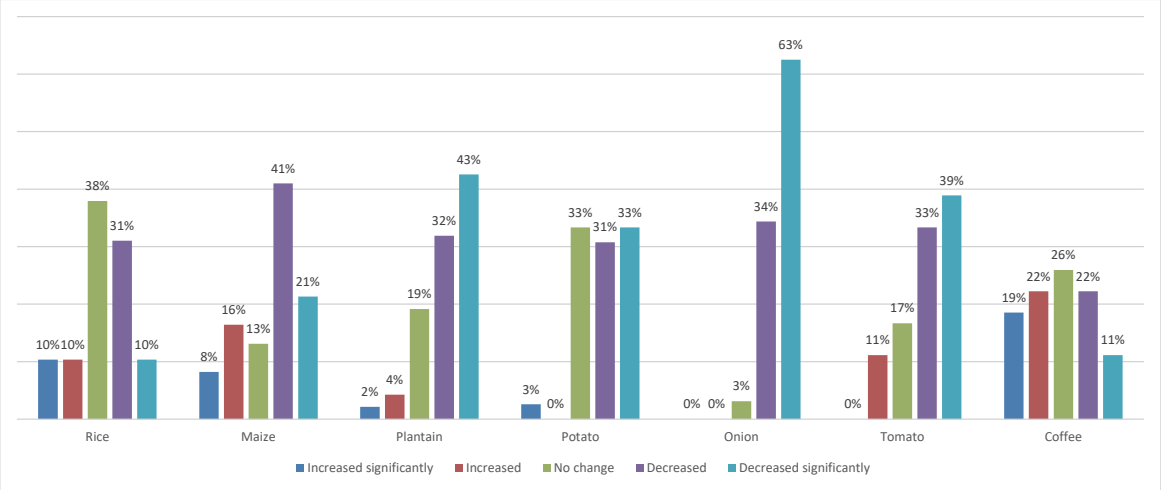
Figure 3.3.38 Factors of decrease in crop production volume and sales volume



Source: VC survey

Figure 3.3.39 Factors of increase in crop production volume and sales volume

Figure 3.3.40 shows the results of the questionnaire survey asking about changes in producer prices. For many crops, the majority of respondents indicated that producer prices have fallen or fallen significantly. In particular, 75% of the producers of plantain, which are easily damaged, 72% of the producers of tomatoes, 97% of the producers of onions, and 64% of the producers of potatoes reported a decline in producer prices.

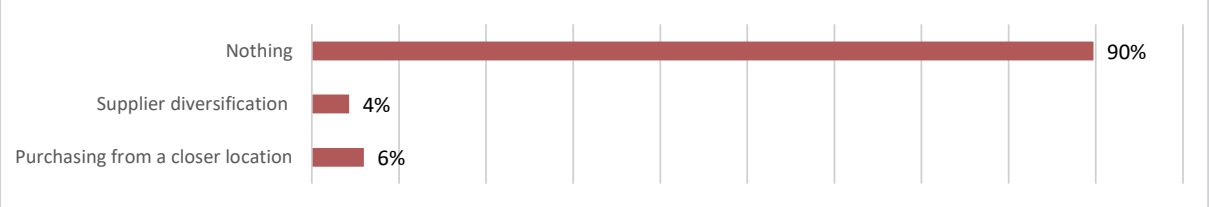


Source: VC survey

Figure 3.3.40 Change in crop sales price of farmers

There were some difficulties in obtaining inputs due to higher prices and interruptions in transportation networks. Although it depends on the crop, there are many crops that do not use a lot of inputs, therefore in general, the impact can be said not significant.

Figure 3.3.41 shows what measures farmers have taken to procure inputs. 90% of the farmers answered that they have not taken any particular measures to procure inputs. While it may have been difficult for them to go to distant places to buy inputs due to travel restrictions, another factor seems that not many inputs were used in the first place, and thus the need to take action did not arise.

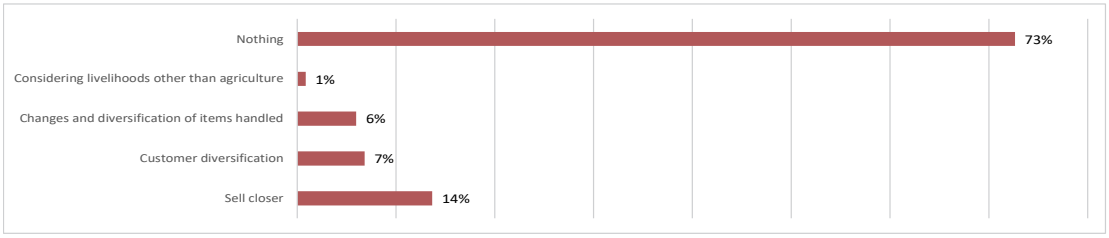


Source: VC survey

Figure 3.3.41 Measures taken against COVID-19 in terms of procurement for farmers

As shown in Figure 3.3.42, most of the farmers did not take any specific measures, in the group

discussion held during the field survey, it was, however, reported that some farmers sold their crops in the vicinity, and that some crops such as onions, which are cash crops and cannot be used as staple food even if they remain unsold, were converted to other crops.



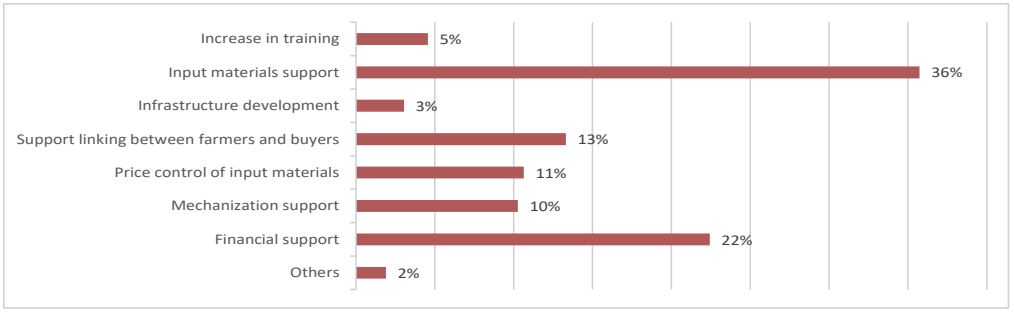
Source: VC survey

Figure 3.3.42 Measures taken against COVID-19 in terms of sales for farmers

2) Challenges, Needs and Perspective

The effects of weather and border blockades are uncontrollable for VC players, even in such cases, it, however, is important to secure financial surplus to overcome financial difficulties and ensure smooth farming in the following years.

Therefore, there is a need for farmers themselves to be able to obtain market information and sell their products at appropriate prices, to be able to make appropriate crop conversions when necessary, and to be able to get agricultural loans and other loans with low interest, rather than being funded by processors with high interest. As shown in Figure3.3.43, in the questionnaire survey, financial support and support in obtaining inputs are requested.



Source: VC survey

Figure 3.3.43 Needs by farmers

In addition, in the event of price collapse due to oversupply, rice in unhulled form and maize in dried form can be stored for a certain period of time in relatively mild climates place, Uganda, as long as there are warehouses that can protect them from direct sunlight and rainfall. The need for these warehouses was also raised as a need by farmers.

At the same time, it is necessary to improve productivity and post-harvest processing by disseminating cultivation and post-harvest processing technologies, so that farm profits are improved.

(4) Impacts on Processing Stage and Underlying Factors

1) Overview

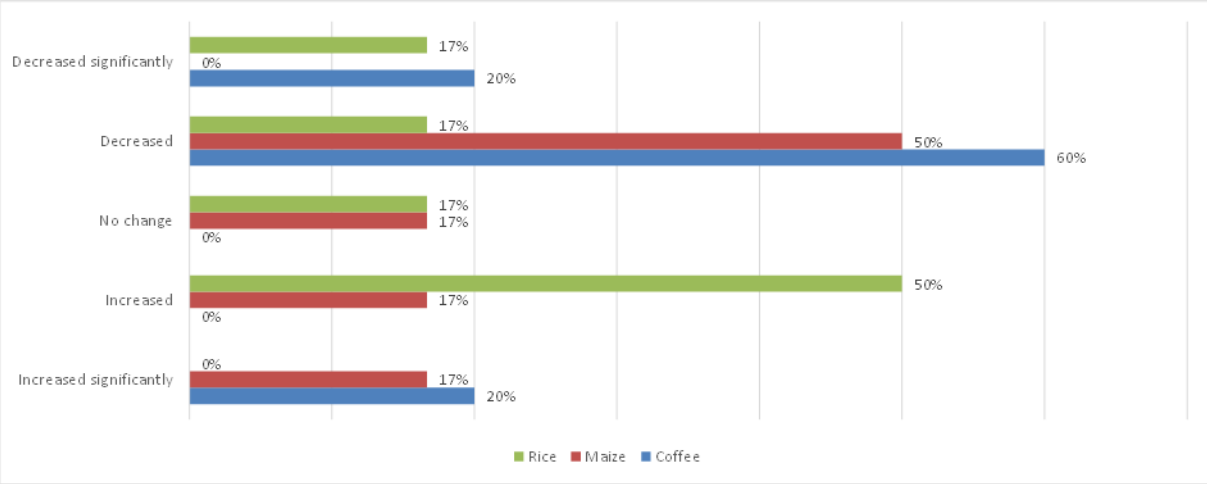
Among the target crops, rice, maize, and coffee, which are primary processed, are applicable as processing in Uganda. The amount of processing of each crop will rise and fall in line with the decline in demand. With regard to the impact of COVID-19, for rice and maize, the impact may be due to population decline in urban and rural towns and the closure of hotels and restaurants.

As to the processing of tomatoes and potatoes, there are some companies that process tomatoes into ketchup and potatoes into potato chips, however, it is a small amount compared to the overall volume. Plantains are sold almost entirely unprocessed, and wine is also produced in the west.

Onions were not treated with warm air drying, as far as studied in the survey area. Therefore, it is shipped as a short-lived and easily damaged crop.

Analysis of the questionnaire survey results

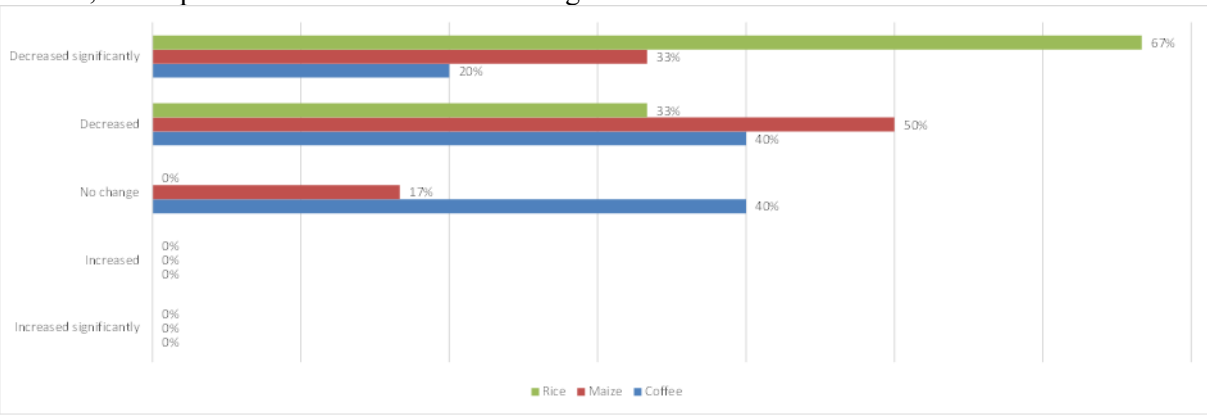
The reduction in the amount of rice and maize brought in by farmers due to restrictions on their behavior in the lockdown is thought to have caused a temporary reduction in the volume of sales. As for the selling prices, the responses varied from trader to trader, but 50% of the traders said that the selling price of maize, 80% of the traders said that the selling price of coffee, and 34% of the traders said that the selling price of rice decreased as shown in Figure3.3.44. There were also a certain number of vendors who answered that rice prices increased. It was difficult to determine a clear trend based on the responses alone, as there may be factors such as the harvest of the year and competition among rice mills.



Source: VC survey

Figure 3.3.44 Change of sales price of processed products

A temporary decrease in the amount of rice/maize procured brought in by farmers did occur. Figure 3.3.45 shows the interviews with processors on the volume of processing handled. The results of the questionnaire survey also showed that all processors of rice, 83% of processors of maize, and 60% of processors of coffee reported that the volume of processing was significantly reduced or decreased. Some reported that during the lockdown, farmers were not able to deliver their crops to the processing stations, so the processors went around collecting them.



Source: VC survey

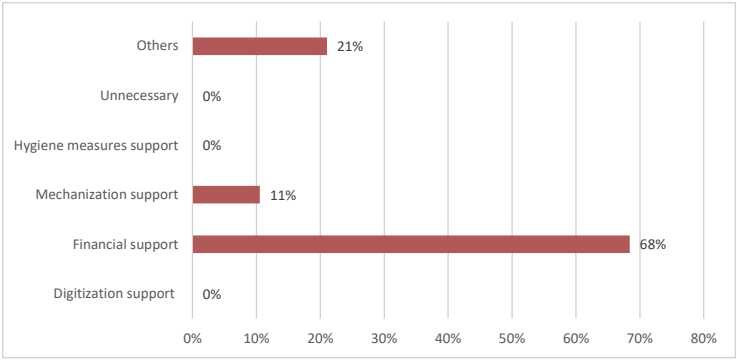
Figure 3.3.45 Change of volume of processing products

2) Challenges, Needs and Perspective

Tomatoes could avoid a certain amount of food loss in emergencies if they could be converted to processed products.

Potatoes and onions are also vegetables with limited shelf life, although not as limited as tomatoes. Potato requires processing into potato chips and the onion requires warm air drying treatment.

As for the support needed, Figure 3.3.46 shows that 68% of the respondents requested loans and other finance-related support.



Source: VC survey

Figure 3.3.46 Needs by processors

(5) Impacts on Distribution Stage and Underlying Factors

1) Overview

Immediately after the outbreak of COVID-19, from April to June 2020, wholesalers and logistics companies were also greatly affected by the temporary closure of markets and shortened business hours, resulting in a decrease in distribution volume. Thereafter, although the transportation of foodstuffs was allowed, the decrease in long-distance distribution volume from production areas to cities continued for a certain period of time due to sluggish demand in urban areas.

The effect of COVID-19 seems to worsened profits more, in the situation where the decrease in distribution volume due to the border blockade and the inability of distributors to cross the border continuing even before the outbreak of COVID-19. The Photo 3.3.11 shows a general store in Kabale, a town near the border with Rwanda. At the back of the store, there is a large warehouse. These goods are purchased from the capital Kampala and sold to distributors from Rwanda.

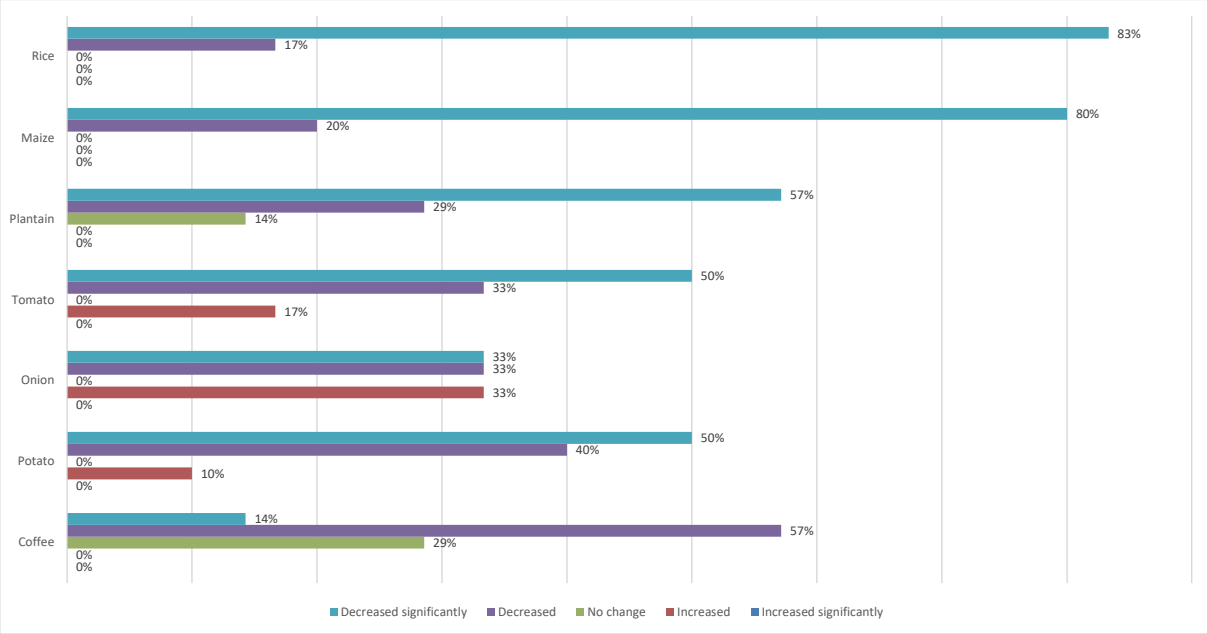
The volume of distribution from villages to towns has also decreased due to sluggish demand for crops since the outbreak of COVID-19.

Photo 3.3.11 Warehouse of a general store in Kabale, a town near the western border

Analysis of the questionnaire survey results

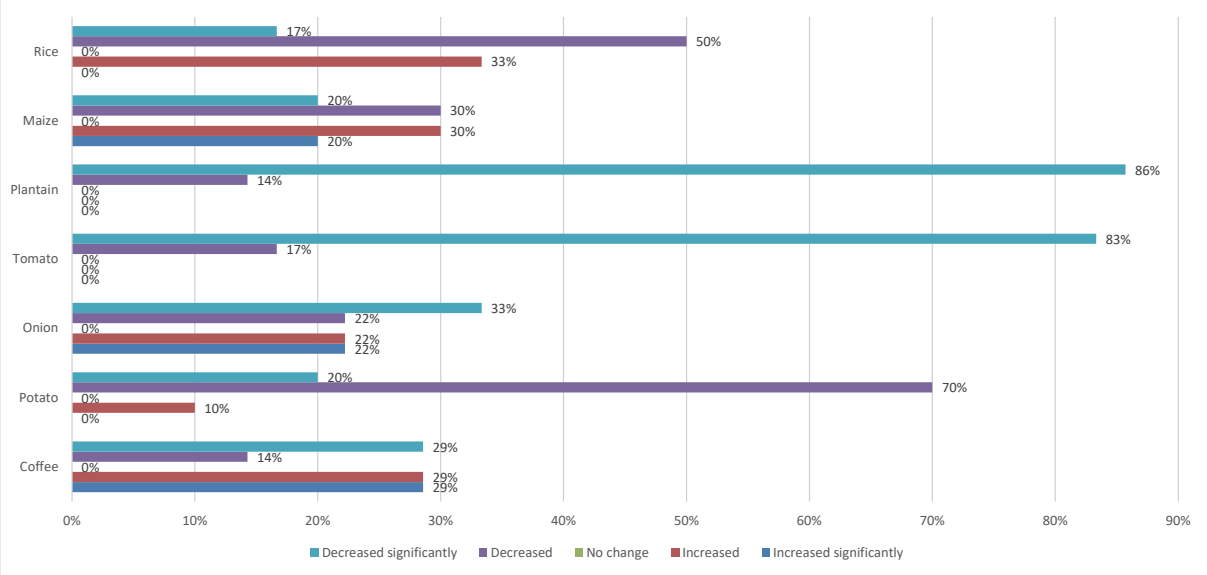
There was a decrease in the volume of sales to urban markets and to large customers such as schools, restaurants, hotels, and commercial establishments due to a temporary reduction in demand in urban areas. As Figure 3.3.47 shows, more than 80% of the distributors in most of the crops in the questionnaire survey also reported a significant decrease or reduction in the volume of distribution. In addition, as Figure 3.3.49 shows, many respondents indicated that the cause of this decline was a decrease in demand,

indicating that the decline in demand in cities and towns had an impact.



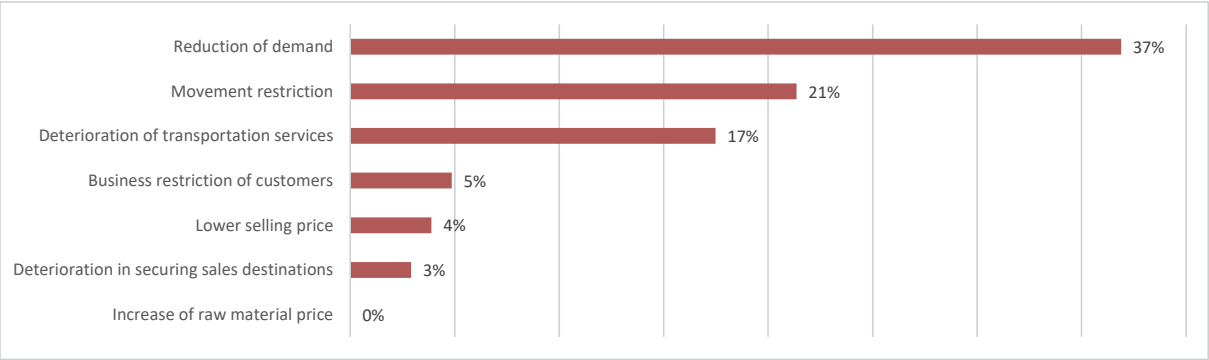
Source: VC survey

Figure 3.3.47 Change of crop sales volume of distributors



Source: VC survey

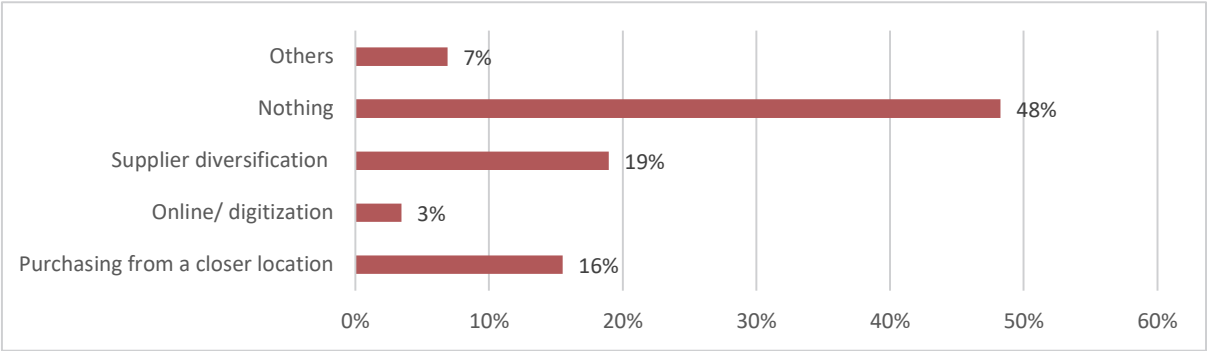
Figure 3.3.48 Change of sales price of crops of distributors



Source: VC survey

Figure 3.3.49 Factors of decrease in distributor sales price

As shown in Figure 3.3.50, some crops were temporarily disrupted in procurement due to movement restrictions during lockdown.



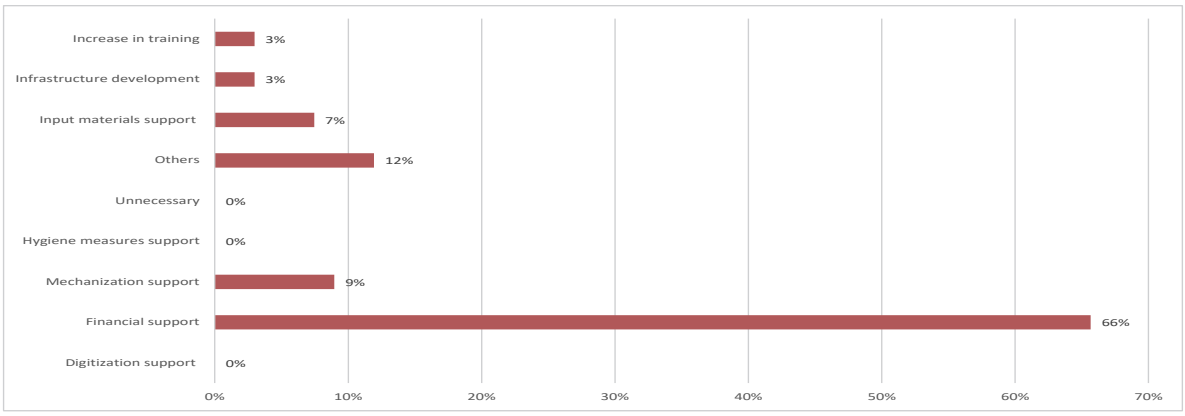
Source: VC survey

Figure 3.3.50 Change of distributers on procurement

2) Challenges, Needs and Perspective

The distributors who transported goods from Kabale district used to load goods to be shipped from Kampala to Rwanda or to towns along the border on the outward trip, and on the return trip, they would load onions and potatoes from Kabale to Kampala. However, due to the closure of the border, there were no more cargoes bound for Rwanda, therefore the company could only operate on a one-way basis, resulting in a decrease in income. In addition, the fact that they were only able to operate on the return trip meant that they had to raise their freight rates significantly, and as a result, their distribution volume also decreased. Thus, the border issue and the outbreak of COVID-19 have caused problems with distribution volume and prices. The normalization of distribution volume and prices through the reopening of borders and trade is awaited.

Similar to other VC players, there were many requests for financial support, with 66% of the vendors in the survey asking for it as shown in Figure 3.3.51 .



Source: VC survey

Figure 3.3.51 Needs by distributors

(6) Impacts on Sales Stage and Underlying Factors

Retailer

1) Overview

The decline in demand due to declining consumer incomes, especially in urban markets, led to a decrease in sales volume. In addition, there was a decrease in sales volume due to the closure of hotels, restaurants, etc., and some of those who had large amounts of business with these facilities were reported to have been severely affected.

Lower selling prices were seen especially for Plantains, tomatoes, and onions, which can be damaged quickly, and for potatoes, which are one of the staple foods but more expensive than cereals. The price of maize flour generally did not drop significantly, probably because it is one of the cheapest staple foods, and thus was also the backstop of demand shifts.

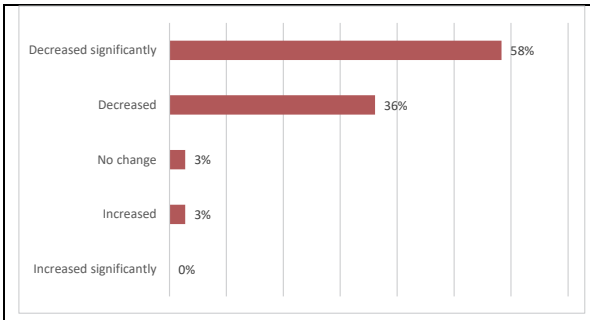
In terms of purchasing, the number of distributors was reduced due to the disruption of the distribution network. There were also cases where people sold their products not in the market but on roadsides near their residences due to restrictions on people's movement, and some retailers told that they slept in the market due to warnings from the government and the eyes of neighbors.

In the local town market, demand was also declining due to the decline in the town's population.

Analysis of the questionnaire survey results

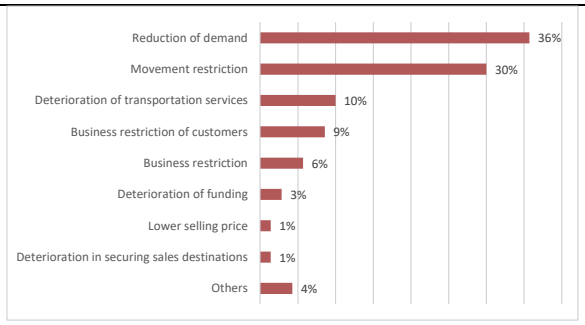
There was a decrease in sales volume due to the closure of hotels and restaurants, especially in the urban markets, and a decrease in consumer income in the peri-urban areas. The degree and duration of the impact varied from crop to crop. As shown in Figure 3.3.52, a significant decrease and decline in sales volume was reported by 94% of the vendors. Sluggish demand was the most significant factor for the decline in sales volume, cited by 36% of the vendors, followed by movement restrictions, cited by 30% as shown in Figure 3.3.53.

The frequency and volume of purchases by customers also decreased or decreased significantly, as shown in Figure 3.3.54 and Figure 3.3.55, respectively.



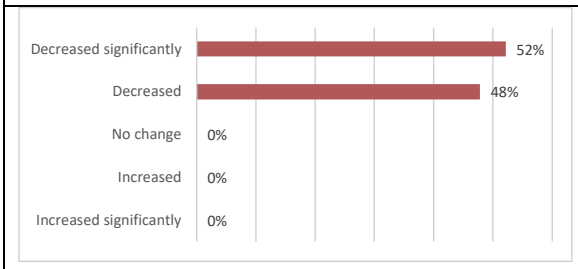
Source: VC survey

Figure 3.3.52 Change of Sales Volume



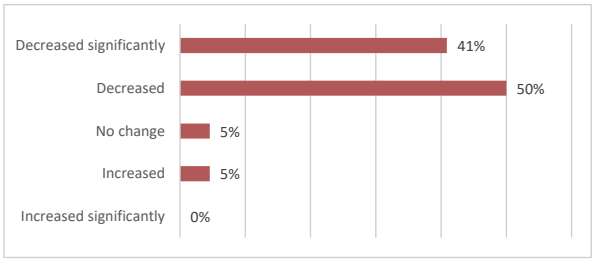
Source: VC survey

Figure 3.3.53 Factors of decreasing volume



Source: VC survey

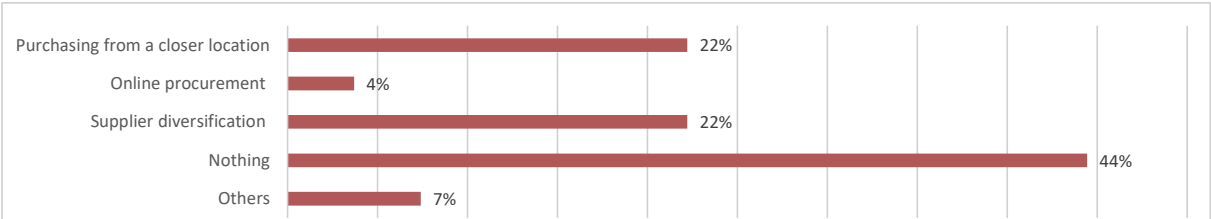
Figure 3.3.54 Change of customer's frequency of purchasing products



Source: VC survey

Figure 3.3.55 Change of consumer's unit price

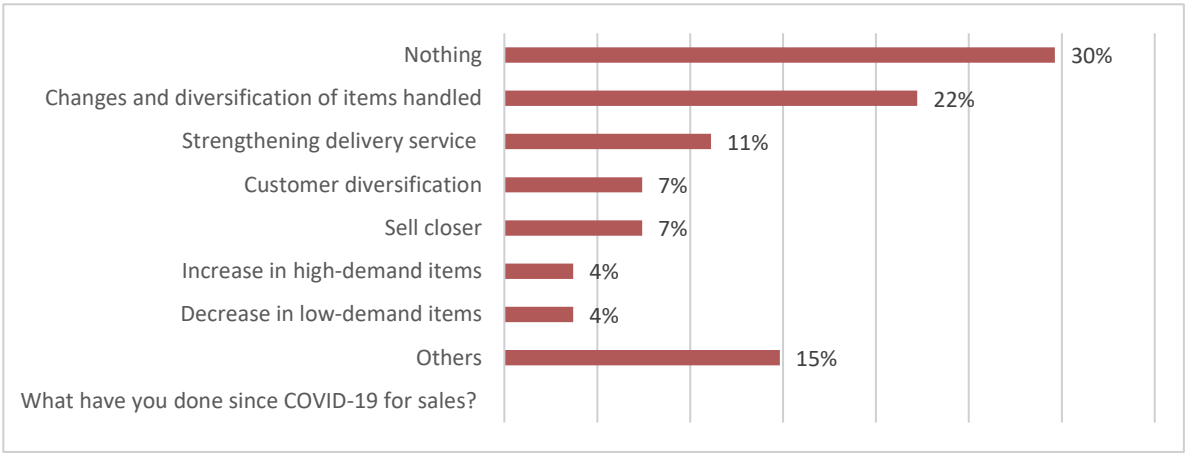
As demand decreased, the quantity procured by distributors also decreased. Figure 3.3.56 shows that some of the procurers responded to the disruption caused by COVID-19 by starting to purchase from closer suppliers or increasing the number of suppliers.



Source: VC survey

Figure 3.3.56 Change of procurement of retailers

Figure 3.3.57 shows the response to COVID-19, which included changing the products handled and providing delivery services.



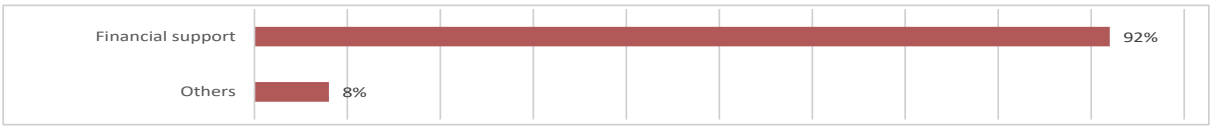
Source: VC survey

Figure 3.3.57 Measures taken against COVID-19 in terms of sales for retailers

2) Challenges, Needs and Perspective

In light of the market structure in Uganda, it seems to be difficult to develop such a system in the near future, it will, however, be necessary to develop e-commerce (online sales and telephone sales) to prevent person-to-person contact.

As regard to support needed, in the interview responses, 92% of the requests were for loans and other financial support as shown in Figure3.3.58.



Source: VC survey

Figure 3.3.58 Needs by retailer

Restaurant

1) Overview

In Uganda, the curfew after 19:00 was enforced continuously from April 2021, when the first lockdown was implemented, until January 2022; severe curfew restrictions were issued immediately after the COVID-19 outbreak, and the impact was very significant. The responses to the survey clearly reflect the impact of the curfew. In addition, the increase in purchase prices was also observed.

As mentioned in the next chapter, the household demand for tomatoes and onions did not drop significantly, the closure of restaurants and hotels caused, however, an overall drop in demand.

2) Challenges, Needs and Perspective

It is necessary to start or expand delivery services.

(7) Impacts on Consumption Stage and Underlying Factors

1) Overview

Uganda continues to have a strict infection control policy compared to other African countries. While it has curbed infections, its negative impact has had a significant economic impact, especially hitting urban dwelling consumers in Uganda, where, as in other developing countries, there are few permanent workers who can earn a steady salary.

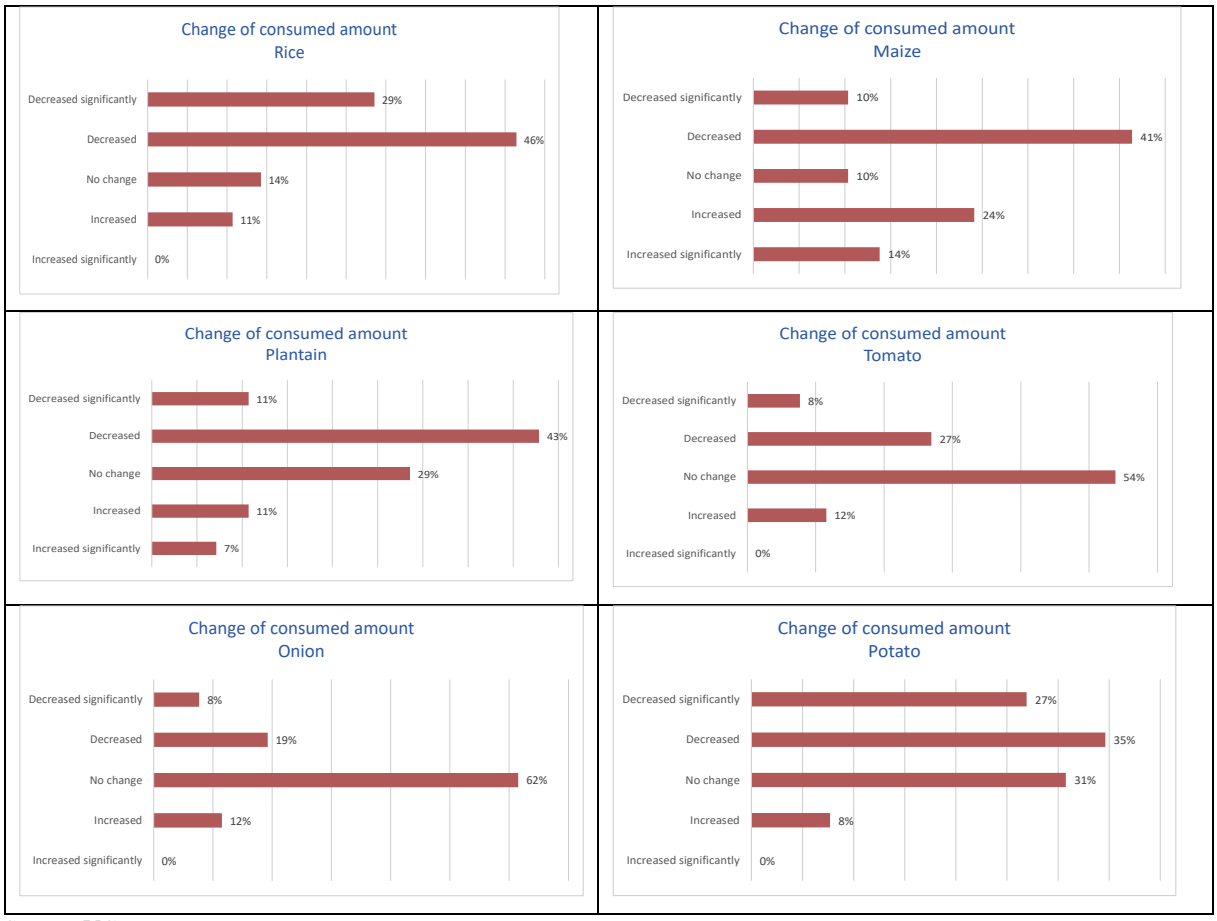
According to the results of a survey conducted at Busega Market and Kalerwe Market, which are visited

by middle class and poor people in Kampala, many respondents reported that they had lost their jobs, their income had decreased. As a result, they had moved their houses to cheaper areas, and had reduced the number of meals. They also reported that they have changed the items they buy from relatively expensive foods such as meat and rice to cheaper ones such as maize flour.

Analysis of the questionnaire survey results

Those who cannot afford to live on their own, such as residents of the periurban areas, have also been substituting their consumption. In addition to rice, which is a relatively expensive staple food, there were also cases of people substituting cooking bananas for maize flour, which is a cheaper staple food. These are particularly common immediately after the COVID-19 outbreak, but the effects may be prolonged as many people are unable to return to their regular jobs due to restrictions on movement, school closures, etc.

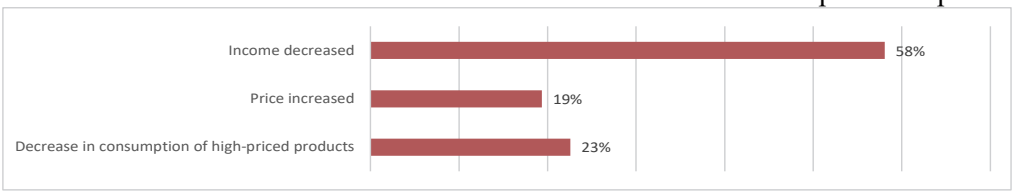
The following Figure 3.3.59 shows the change in consumption of each crop from interviews with household consumers conducted in the market. Rice, maize, plantain, and potatoes show a significant downward trend, while tomatoes and onions show a trend of little change in consumption. Rice, maize, and plantain, which are typical staple foods, are likely to have decreased due to a decrease in the number of meals eaten by consumers. The factor for the large decrease in rice is that rice is a high-grade staple food, and the decrease in the number of meals may have led to a reduction in consumption or substitution with cheaper staples. Potatoes, although a staple food, are not as well known as cereals, and it is thought that demand for potatoes was more likely to be substituted, resulting in a larger decline. The reason why the household demand for tomatoes and onions did not decrease significantly is that their consumption was not as large as that of staple foods, and because they are indispensable as ingredients for stews that appear on the dinner table along with Ugandan grains. The overall slump in demand for tomatoes and onions is thought to be due to the closure of hotels and restaurants.



Source: VC survey

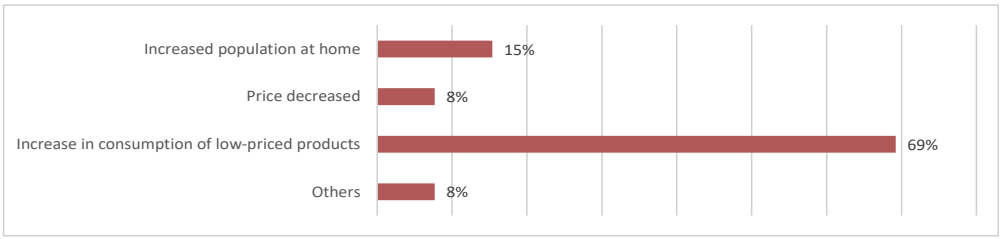
Figure 3.3.59 Change of consumption volume

Figure 3.3.60 shows the factors for the decrease regarding the crops that decreased in consumption, citing the decrease in income. Conversely, Figure 3.3.61 shows the factors for the increase related to the crops that increased in consumption, citing the low price of the crops. From these results, we can read a decrease in consumer income and a shift in demand to low-priced crops.



Source: VC survey

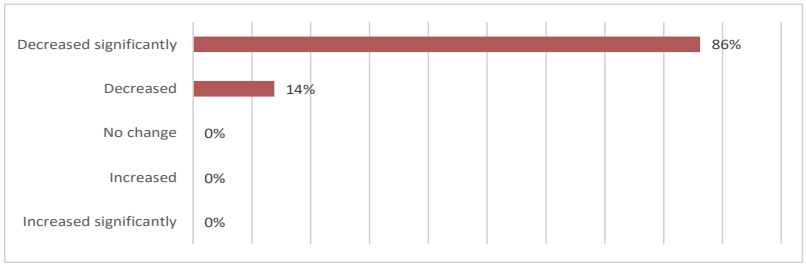
Figure 3.3.60 Factors of decreasing consumption volume



Source: VC survey

Figure 3.3.61 Factors of increasing in consumption volume

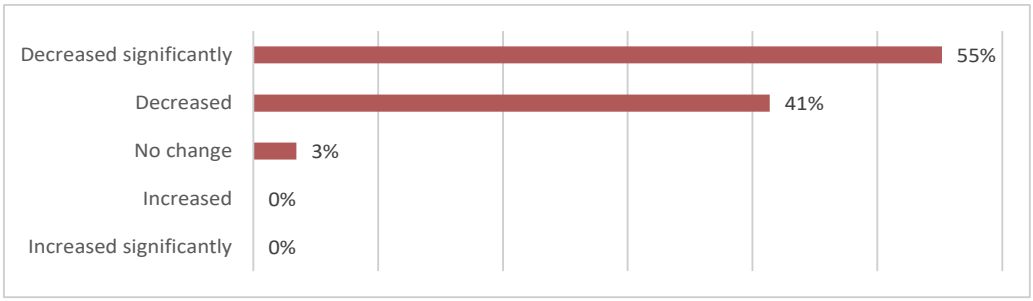
Similar to the change in consumption, the impact is likely to be prolonged due to occupational and income status immediately after the COVID-19 outbreak. As shown in Figure 3.3.62, a decrease in income was cited by all consumers interviewed. Examples of relocation to less expensive areas were also heard in the interviews.



Source: VC survey

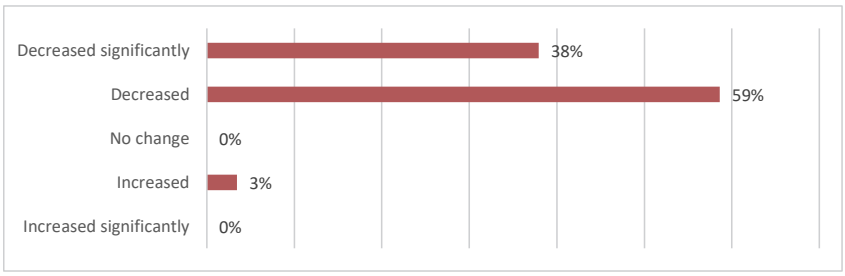
Figure 3.3.62 Change of income

As shown in Figure 3.3.63 and Figure 3.3.64, the frequency and unit price of grocery purchases have also decreased. Other examples include moving to areas with lower housing costs and eating less frequently.



Source: VC survey

Figure 3.3.63 Change of purchasing frequency

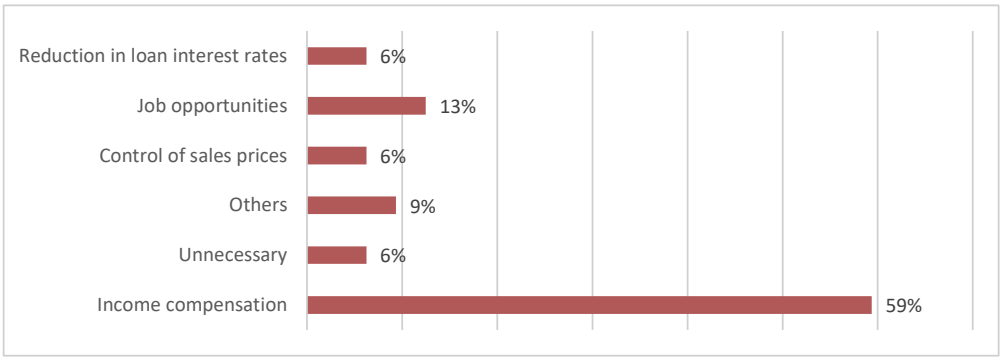


Source: VC survey

Figure 3.3.64 Change of unit price per shopping

2) Challenges, Needs and Perspective

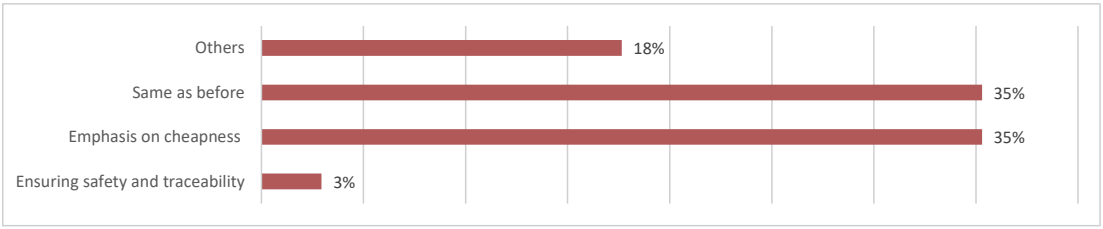
The effects of COVID-19 are still continuing, and those who do not have regular jobs are expected to continue to suffer. As shown in Figure 3.3.65, many of the respondents asked for compensation for lost income from work.



Source: VC survey

Figure 3.3.65 Consumption preferences kept in mind by consumers in the future

The survey results shown in Figure 3.3.66 show that many respondents are trying to save money. It will not be easy to continue living in the cities when they do not have the purchasing power to buy food even if the price of food is reduced. Moving to the countryside in rural areas where agricultural products are plentiful is one option, however, it is not an easy task due to the fact that people have their own lifestyles and aspirations. Since it is necessary to maintain the urban population for the economic recovery after COVID-19, further livelihood support by the government will be essential.



Source: VC survey

Figure 3.3.66 Needs by consumers

3.3.5 Impacts on FVC in the Country

(1) Common and Differentiated Effects by Crops and Underlying Factors

On the basis of the analysis conducted, impacts of the seven target crops in Uganda at each VC stage are shown in Table 3.3.17 in each VC stage.

Table 3.3.17 Impact of target crops by crop type, distribution type and VC stage

	Crops						
	Distribution among corridor		Distribution within corridor			Domestic distribution	Extraterritorial distribution
	Cereals/ staple food	Cereals/ staple food	Horticulture	Horticulture	Horticulture	/Export crop	Export crop
	Maize	Rice	Irish Potato	Onion	Tomato	Plantain	Coffee
Input	Medium	Medium	Medium	Medium	Medium	Small	Large
Production	Small	Small	Small	Small	Small	Small	Medium
Processing	Medium	Medium	-	-	-	-	Medium
Distribution	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Sales	Medium	Medium	Large	Medium	Medium	Large	Small
Consumption	Small	Medium	Large	Medium	Medium	Medium	Small

Source: VC survey results

(2) Underlying Factors of Vulnerability in FVC in the Country

As has been mentioned, the impact of the spread of COVID-19 infection in Uganda was observed at each step of the FVC process, the impact was relatively small in rural areas where people had their own crops for consumption. On the other hand, the impact was large in urban and rural towns where people did not grow crops, except for a few wealthy people who had regular jobs. This is especially true for those who live in the peri-urban areas. In particular, the vulnerable groups living in the peri-urban areas are considered to have been affected to a greater extent.

The above impacts were also accompanied by reduced demand at schools, hotels, and restaurants, which are large consumption destinations, and the impacts were transmitted to markets, distribution, and processing, resulting in lower producer prices for farmers. This is expected to have an impact on farming, especially for vulnerable smallholders, and this is also a concern for the impact on farming after COVID-19.

The main drivers of vulnerability in the Ugandan FVC, both in terms of the impact COVID-19 has had on the FVC so far and the FVC challenges behind these impacts, are as follows.

- Vulnerability to changes in the market environment
- Low profitability of agricultural production
- Lack of private business development in the agricultural sector
- Underdeveloped financial support system for farmers and small businesses

(3) How Resilient FVC Should be in the Country

The following is how resilient FVC should be, taking into account the above vulnerability factors.

- Formulating FVCs resilient to changes in the market environment

After the outbreak of COVID-19, a lockdown was implemented in Uganda for more than four months. As mentioned above, as a result of stagnant socio-economic activities in urban areas and a decline in consumer purchasing power, the volume of agricultural products purchased by middlemen decreased, and farmers were left with a surplus of harvested products. Although COVID-19 was a special case that caused unforeseen disruptions to the smooth distribution of FVCs, it is hoped that the potential risk of change in the market environment will be analyzed, and that it will be used as an opportunity to promote agro-industrialization that takes advantage of the strengths of Ugandan agriculture. In addition, increasing the number of agricultural warehouses and stockpiling capacity will not only support the smooth operation of FVCs, but will also enable the stockpiling of buffer stocks, which will be significant for food security.

- Value addition in agricultural production

For a strong FVC, it is essential to maintain a market environment that allows farmers to continue

farming without unnecessary worries, and to improve their capacity. For traditional crops such as plantain and maize, it is desirable to improve profitability by increasing yields and reducing production costs. With the exception of coffee, most of Uganda's agricultural products are currently produced for domestic consumption, it is, however, important to introduce new highly profitable cash crops to enter the domestic and regional markets as well as the European and American markets. A good example is horticultural crops (especially dried fruits), whose export volume to Europe has grown remarkably in recent years.

- Promoting partnership with the private sector

Collaboration with the private sector is indispensable for the resilience of Uganda's FVCs. It is an urgent task to establish a market environment in which the private sector can participate in the distribution of agricultural products and earn a reasonable profit under market principles by establishment of a legal system and implement essential government services. Particularly in the rice market, the quality of milled rice after processing is significantly lowered due to the very old processing equipment owned by the rice miller and processing industry. There are many improvements that need to be made to increase producer rice prices, such as upgrading rice milling machines or installing rotary shifters (sieves).

- Consideration of financial support for FVC stakeholders

Although it is not easy to introduce institutional finance by the government, short-term loans, mainly to producers and processors, would be effective for the stable development of FVCs in the future.
In addition, the following Table 3.3.18 are some examples of projects/measures that could help strengthen the resilience of FVC in Uganda.

Table 3.3.18 (Reference) Ongoing/completed projects/measures in Uganda toward resilient FVC

Good practices	Implementer (VC stage)	Content, background, and factors referred to as good practices
Exclusion of the transportation of foodstuffs from the designation of movement restriction	GOU（Distribution）	GOU has adopted an extremely proactive policy toward COVID-19, not only with the temporary lockdown, but also with the night curfew and the closure of schools from the first lockdown in 2021 until January 2022. However, with regard to the transportation of foodstuffs, people engaged in the agricultural sector were designated as Essential Workers, and the transportation of agricultural products by truck or motorcycle was permitted on a special basis. As a result, it is considered that the impact on the distribution side has been greatly reduced.
Small-scale solar-powered irrigation system	FAO (Production)	To enhance agricultural adaptation to climate change through the establishment of small-scale irrigation systems in Uganda, FAO has been implementing small-scale irrigation projects in collaboration with MAAIF with financial support from the European Union (EU) since 2012. One of the initiatives will be the installation of a small-scale solar-powered irrigation system in Kalungu District, which belongs to the Central Region of Uganda. This small-scale irrigation program is also being implemented in the West Nile and Karamoja districts and other areas affected by drought damage and other climate changes. The solar system is considered to be efficient because the best days for power generation are sunny days when plants need water the most.
Project to predict climate change and improve food security	FAO, WFP, EU（Production）	FAO and WFP, with the support of 4 million Euros from the EU, are implementing a project called (Pro-Resilience Action project) with the aim of improving food security in Karamoja district, which has one of the highest poverty rates in Uganda. "Pro-Resilience Action project "Pro-ACT") to improve food security in Karamoja district, which has one of the highest poverty rates in Uganda. In all of Karamoja region, the project is working towards building a system that enables households to take action to mitigate risks through early prediction and warning of weather patterns, such as drought.

(4) Adaptation and Counter Measures in the Country and Potential Cooperation

The following Table 3.3.19 shows measures to deal with the factors of impact (direct factors) and the existence of vulnerabilities (background: medium- to long-term).

Table 3.3.19 Adaptation/overcoming measures and support measures

Affecting factors / VC vulnerabilities	Objectives	Period	Countermeasure	Necessary action	Target crop	Target VC
Low producer prices Lack of market information for farmers Unprofitable agricultural production	Increased income for producers	Mid-term	Strengthening of links with producers and dealers Increasing production by improving yields of traditional crops Increasing production by increasing the cropping area and cropping intensity Conversion of crops to more profitable cash crops	Distribution of quality seeds, fertilizers, and pesticides Strengthening of agricultural technical guidance Promoting agricultural testing and research (setting up exhibition plots) Creating a system that enables farmers to obtain market information on their own Raising farmers' awareness (Market strategy and crop group selection based on agricultural statistics and market analysis) Formulation of government plans that contribute to the formation of production areas (onions are a good example)	All crops	Production
Insufficient market information possessed by producers	Improving producers' ability to negotiate prices	Short term	Distribution of market information at representative locations throughout the country Monitoring of international market prices	Establishing a market information network using ICT Establishment of quality standards and optimization of pricing Spread of scales	Major crops	Production and distribution (middleman)
High post-harvest losses	Minimizing losses during crop storage	Mid-term	New construction and expansion of grain storage Establishment of grain storage management organization and its rules	Development of grain storage for crops (rental fees are charged) Logistics system construction	Major crops	Production Distribution Sales
Sluggishness in the food processing industry	Establishing a food processing business	Mid-term	Development of food processing industry	Financial support for processors Renewal of processing equipment	Horti-cultural crop	processing
Weak competitiveness against imported products	Branding over imports	Mid-term	Create products with unique characteristics Consideration of high quality and attractive packaging	Branding / Packaging	All crops	Production Processing Distribution Sales
Low market competitiveness of domestic rice	Improving the quality of domestic rice to increase domestic demand	Mid-term	Strengthen domestic rice production	Training of rice millers Guidance on production technology and quality improvement of domestic rice	Rice	All VC