

**CENTRAL AMERICA AND
THE CARIBBEAN**

**DATA COLLECTION SURVEY
ON
FOOD VALUE CHAIN STRENGTHENING AND
AGRICULTURAL FINANCE
IN
CENTRAL AMERICA AND
THE CARIBBEAN**

FINAL REPORT

MARCH 2024

**JAPAN INTERNATIONAL
COOPERATION AGENCY (JICA)**

**SANYU CONSULTANTS INC. (SCI)
JAPAN ECONOMIC RESEARCH INSTITUTE INC.**

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LOCATION MAP



Basic Information of Target Countries (2019)

Content	Unit	Mexico	Guatemala	El Salvador	Honduras	Panama	Dominican Rep.						
Land Area	1000km ²	1,964.4	108.9	21.0	112.5	75.3	48.7						
GDP	MilUS\$	1,269,434	77,020	26,897	24,916	66,984	88,941						
GDP Growth Rate	%	△0.18	3.87	2.38	2.65	2.98	5.05						
GDP per capita	USD	9,950	4,639	4,168	2,556	15,774	8,282						
Population	Person	127,575,529	16,604,026	6,453,550	9,746,115	4,246,440	10,738,957						
Rural Population Ratio	%	19.56	48.56	27.25	42.27	31.94	18.17						
Number of people engaged in agriculture	Person	6,591,830	2,170,426	446,903	1,096,863	-	394,830						
Ratio of agriculture, forestry, and fisheries	%	12.50	31.30	16.30	29.50	14.40	8.80						
Arable land area	1000ha	96,106	3,856	1,196	3,511	2,259	2,429						
Arable land per farmer	ha/Cap	14.58	1.78	2.68	3.20	-	6.15						
Production Amount (1,000ton)	1	Sugarcane	59,334	Sugarcane	27,249	Sugarcane	7,681	Sugarcane (sugarcane)	5,409	Sugarcane	2,671	Sugarcane	4,896
	2	Maize	27,228	Banana	4,344	Maize	786	Oil palm (palm oil)	2,337	rice	372	Banana	1,209
	3	Orange	4,737	Oil palm (palm oil)	2,826	Sorghum	108	Banana	636	Banana	314	Papaya	1,176
	4	Sorghum	4,353	Maize	1,870	Beans (dried)	100	Maize	589	Rice (milled)	248	Plantain	1,027
	5	Tomatoes	4,272	melon	642	Coconut	71	Coffee (green beans)	472	Plantain	185	Rice	919
Export Amount (1,000ton)	1	Beer	3,655	Banana	2,586	Raw sugar	514	Banana	593	Banana	642	Banana	394
	2	Tomato	1,859	Raw sugar	1,025	Non-alcoholic beverages	258	Coffee (green coffee beans)	412	Palm oil	50	Raw sugar	158
	3	Avocado	1,153	Refined sugar	1,011	Sugar solution (nectar)	220	Melon	249	Raw sugar	44	Sugar solution (nectar)	127
	4	Chili pepper (fresh)	1,071	Palm oil	806	Flour, maize	67	Palm oil	222	Watermelon	28	Cacao beans	68
	5	Raw sugar	933	Sugar solution (nectar)	411	Confectionery	64	Sugar solution (nectar)	152	Pineapple	23	Wheat	56
Export Value (Million USD)	1	Beer	4,541	Banana	845	Raw sugar	173	Coffee (green bean)	955	Banana	138	Cigars	789
	2	Avocado	2,913	Coffee (green beans)	663	Non-alcoholic beverages	150	Banana	237	Distilled liquor	40	Bananas	246
	3	Tomatoes	2,163	Nutmeg, cardamom	650	Coffee (green beans)	112	Palm oil	144	Food prep nes	37	Cacao beans	183
	4	Distilled liquor	2,013	Palm oil	391	Confectionery	111	Melon	93	Palm oil	24	distilled spirits	97
	5	Fresh chili pepper	1,327	Refined sugar	370	Food prep nes	73	Raw sugar	50	Raw sugar	23	Tobacco (unprocessed)	91

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Acronyms and Abbreviations

Abbreviations	Original (English/ Spanish)
AI	Artificial Intelligence
ANACAFE	Asociacion Nacional del Cafe
ANTAD	Asociacion Nacional De Tiendas De Autoservicio
BANCO AGRICOLA	Banco Agricola de la República Dominicana
BANDESAL	Banco de Desarrollo de El Salvador
BANDEX	Banco de Desarrollo y Exportaciones
BCIE	Banco Centroamericano de Integración Económica
BDA	Banco de Desarrollo Agropecuario
BFA	Banco de Fomento Agropecuario
BH	Banco Hipotecario de El Salvador
BI	Business Interigence
CGAB	Camara Guatemalteca de Alimentos Y Bebida
CHN	El Crédito Hipotecario Nacional de Guatemala
FDE	Fondo de Desarrollo Económico
FEDECOCAGUA	Guatemala Federation of Coffee Growers Cooperatives
FIDEAGRO	Fideicomiso Especial del Sector Agropecuario
FIRA	Fideicomisos Instituidos en Relación con la Agricultura
FVC	Food Value Chain
GDP	Gross Domestic Production
ICT	Information and Communication Technology
IDB	Inter-American Development Bank
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IMF	International Mometary Fund
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
JT	Japan Tobbaco INC
KYC	Know Your Customer
LAC	Latin America and the Caribbean
MAG	Ministerio de Agricultura y Ganadería
MAGA	Guatemalan Ministry of Agriculture, Livestock and Food
MSMEs	Micro, Small & Medium Enterprises
ODA	Official Development Assistance
PRIEG	Política Regional de Igualdad y Equidad de Género del SICA
PRODEMORO	Programa de Desarrollo y Modernización Rural para la Región Oriental
REDIMIF	Red de Instituciones de Microfinanzas de Guatemala
SICA	Sistema de la Integracion Centroamericana
SME	Small and Medium-sized Enterprise
SOFOM	Sociedad Financiera de Objeto Múltiple
SSF	Superintendencia del Sistema Financiero
TSL	Two Step Loan
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
VC	Value chain

Unit Conversion

1 lb (pound)	0.453 kg
1 kilogram	2.205 pounds
1 gallon	litre 4.5461
1 litre	0.2200 gallon
1 inch (in.)	2.54 cm
1 foot (ft.)	30.5 cm
1 meter	3.279 feet
1 kilometer	0.621 mile
1 mile	1.601 kilometer
1 acre (ac)	ha 0.40468
1 hectare (ha)	2.471 ac

Currency conversion (as of February 2024: JICA designated rate)

Country	Unit	Yen	US\$
US	1 US\$	147.488	1.0000
Mexico	1 MXN	8.57721	0.0582
Guatemala	1 GTQ	19.3333	0.1311
Honduras	1 HNL	6.05826	0.0411
El Salvador	1 USD	147.488	1.0000
Panama	1 USD	147.488	1.0000
Dominican Republic	1 DOP	2.52617	0.0171

**Part I. OVERVIEW OF AGRICULTURAL SECTORS AND FINANCIAL SECTORS
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Part II. STUDY ON SUPPORT MEASURES BY JAPAN

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PART I: OVERVIEW OF AGRICULTURAL SECTORS AND FINANCIAL SECTORS IN THE SIX COUNTRIES SURVEYED

CHAPTER 1 OUTLINE OF THE SURVEY

1.1 Background

The Central American and Caribbean region is a major exporter of sugarcane, coffee, and other estate crops due in part to its easy access to the North American market, and a food value chain (FVC) has been formed based on large-scale farmers and export companies. On the other hand, the majority of farmers in the region are small farmers, partly because land reforms following the Central American conflict have led to land fragmentation. Some of these farmers are part of the value chain for export crops such as coffee, but there are also many farmers who sell fruits and vegetables to the domestic market.

In the region, the slow development of economic infrastructure due to civil war and other factors has been an obstacle, and natural disasters such as hurricanes and droughts are common. In addition, the majority of farmers are small in size, and their low-input, extensive farming style results in low yields, low quality, and low profits. Many of them migrate to other countries because they cannot make a living from farming alone. In order for small and medium-sized farmers and enterprises to make a profit under these circumstances, they need to participate in FVCs where they can expect to make more profit, and this requires increasing the added value of agricultural products in FVCs.

In order to build and strengthen FVCs, it is necessary to improve agricultural infrastructure, agricultural technology, and market access, etc. In addition, to make this possible, it is necessary to improve access to agricultural finance, management support, organization, and the creation of mechanisms to support these activities. By solving these issues, it is expected that small- and medium-scale producers will be able to increase their access to FVCs that are expected to be more profitable or participate in FVCs for new agricultural products to improve their livelihoods and stabilize their farming systems.

1.2 Purpose of the Survey

The objective of this survey is to collect and analyze information on the agricultural sector and financial institutions with a view to strengthening FVCs in Central America and the Caribbean region, with a view to future projects. In particular, JICA's support measures for the improvement of agricultural financial services will be examined by identifying specific support needs, regulations, government support measures, and key actors in agricultural finance. The project scheme to be proposed may include technical cooperation, but the following three types of financial cooperation are focused.

- 1) Yen loan Two-Step Loan (TSL) for agricultural financial services
- 2) Yen loan project for development of related agricultural infrastructure
- 3) Private Sector Investment and Finance (PSIF) in investment in bank loans or investment funds for private local financial institutions through cofinancing with the International Finance Corporation (IFC), the Inter-American Investment Corporation (IDB-INVEST), and others.

1.3 Survey Areas

In this survey, a literature review and basic information gathering survey (hereinafter referred to as "desk review") was conducted for Mexico, Guatemala, Honduras, El Salvador, Panama, and the Dominican Republic, which belong to the Central America and Caribbean region, and field surveys were conducted in four countries selected as potential candidate countries for financial cooperation projects, namely in Mexico, Guatemala, Panama, and the Dominican Republic.

1.4 Social and Economic Conditions in Each Country in the Survey Area

Table 1.4.1 shows the socioeconomic overview of the six countries surveyed. According to the World Bank income classification, Panama is classified as a high-income country, Mexico and the Dominican Republic as upper-middle-income countries, and Guatemala, Honduras, and El Salvador as lower-middle-income countries. Population growth rates vary widely from country to country, with El Salvador having the lowest at 0.51% and Guatemala having the highest at 1.73%. Honduras has the highest poverty rate at 14.78%, followed by Guatemala at 8.78%. For Mexico, El Salvador, Panama, and the Dominican Republic, the poverty rate is less than 2%.

In light of these economic conditions, it is possible that high-income countries such as Panama will soon no longer be eligible for loan project from Japan. Or these governments will have sufficient budgets and will have less need for loans. Conversely, low- and middle-income countries such as Honduras may be more questionable in terms of their eligibility for loan project. Thus, it is important to note that the possibility of loan project varies greatly depending on socioeconomic conditions, and such decisions must be based on specific information such as the intentions of the recipient government and the financial capacity of the borrowing bank. Information on financial institutions is discussed in Chapter 3.

Table 1.4.1 Socioeconomic Overview in the Six Countries Surveyed

Country (Year surveyed)	Group	Population	Pop. growth	GNI/Pop.	Poverty headcount	Gini Index
		million	%	\$/person	%	-
Mexico (2018)	Upper-middle	126.19	1.13	9,180	1.73	45.38
Guatemala (2014)	Lower-middle	15.31	1.73	3,550	8.78	48.28
Honduras (2019)	Lower-middle	9.75	1.64	2,390	14.78	48.17
El Salvador (2019)	Lower-middle	6.45	0.51	3,980	1.25	38.78
Panama (2019)	High	4.25	1.65	14,920	1.22	49.84
Dominican Republic (2019)	Upper-middle	10.74	1.05	8,100	0.57	41.92

Note: Income group is classified using World Bank's classification (2019), namely Low <1,026, Lower-middle 1,026~3,995, Upper-middle 3,996~12,375, High >12,375 based on GNI per capita in current USD

Source: World Development Indicators and PovcalNet, World Bank

CHAPTER 2 CURRENT STATUS AND ISSUES IN THE AGRICULTURE SECTOR

2.1 Agricultural Outlook

This section presents an overview of the current status of agricultural GDP share and agricultural production environment (climate, water resources, and agricultural land use) in the six Central American and Caribbean countries (Mexico, Guatemala, Honduras, El Salvador, Panama, and the Dominican Republic) covered in this study, using existing statistical data.

2.1.1 Agriculture GDP Share

Table 2.1.1 shows the three-year average GDP and GDP shares by sector for the six countries surveyed for the period 2018-2020. In all countries, the services sector has the highest share at around 60%, followed by industry and manufacturing, while agriculture has a generally low share (<10%) compared to other sectors. On the other hand, in Guatemala and Honduras, the share of agriculture GDP is around 10%, indicating that it remains an important industrial sector, especially in rural areas.

Table 2.1.1 GDP and GDP Share in the Six Countries Surveyed (Average of Last Three Years)

Country	GDP	Agriculture	Industry	Manufacturing	Services
	\$ billions	% of GDP	% of GDP	% of GDP	% of GDP
Mexico	1,193	3.5	30.5	17.3	60.1
Guatemala	76	9.7	22.0	14.0	62.0
Honduras	26	11.3	26.5	16.3	57.7
El Salvador	27	5.0	24.4	15.2	60.6
Panama	62	2.5	27.1	5.6	67.0
Dominican Republic	87	5.6	30.7	14.5	56.7

Source: Average data from 2018 to 2020, World Development Indicators, World Bank

2.1.2 Agricultural Production Environment

Agricultural production is greatly influenced by the environmental condition. This section provides an overview of climate, water resources, and land use that particularly affect agricultural production.

1) Climate

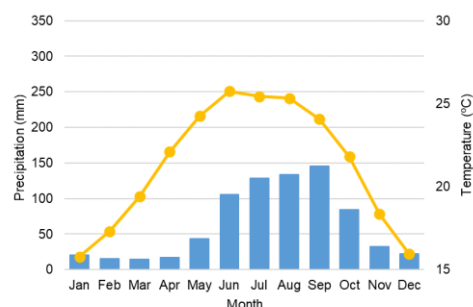
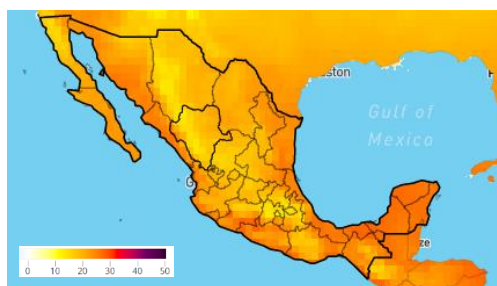
Table 2.1.2 provides an overview of climatic conditions in the six countries surveyed. Most of the Central American and Caribbean countries have tropical to subtropical maritime climates with high temperatures and humidity. The inland mountainous and highland areas have a temperate climate with relatively low temperatures. All countries have wet (winter) and dry (summer) seasons, and temperatures and rainfall are affected by El Niño/La Niña and other climatic phenomena.

The six countries surveyed are also vulnerable to hurricanes, which have often caused extensive damage due to recent climate change and have had a negative impact on the agricultural sector. Furthermore, the effects of climate change in the form of sea level rise are becoming more apparent in areas facing the sea, and the loss of coastal zones and existing flood plains is a future challenge.

Table 2.1.2 Summary of Climatic Conditions in the Six Countries Surveyed

Mexico
Average annual temperature (1991~2020): 21.3°C Annual rainfall (1991~2020): 764mm
Mexico's climate is characterized by large regional variations due to its diverse topography and geographic location. The country's average annual temperature is 20.6°C, with average monthly temperatures ranging from 15°C (January) to 25°C (June). By region, temperatures range from 15°C to 20°C in the central highlands and from 23°C to 27°C in the coastal lowlands. In the south, seasonal temperature fluctuations are negligible, while in the northern regions, summer temperature fluctuations range from 10°C to 30°C. The country's average annual precipitation is 725 mm, with consistent rainfall throughout the year, mainly concentrated between June and October. In the northern regions, rainfall is less than 50 mm per month throughout the year, while the southern regions and the central highlands have a distinct rainy season from June to October, with the southernmost regions averaging 550 mm per month.
Note that from July through October, both the Atlantic and Pacific coasts of Mexico are susceptible to hurricanes. The weather is also strongly influenced by El Niño, resulting in relatively cool and rainy weather in winter and hot and dry

conditions in summer.



Annual average temperature by region (1991~2020) Monthly precipitation and average temperature (1991~2020)

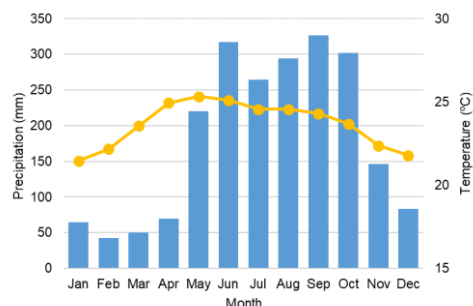
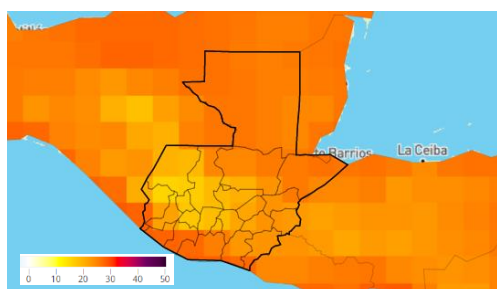
Guatemala

Average annual temperature (1991~2020): 23.7°C

Annual rainfall (1991~2020): 2172mm

Guatemala has a tropical climate in the lowlands and coastal areas and a temperate climate in the central highlands, characterized by a rainy season (May to October) and a dry season (November to April). Although there are few seasonal temperature differences, the temperature varies considerably depending on the altitude, ranging from the lowlands (basins) of the Pacific Coast and Peten regions to the highlands of the interior at elevations of about 4,000 meters above sea level. The rainy season begins with the formation of the Tropical Convergence Zone, and from the end of August, there are squalls and heavy rainfall. The rainy season is interspersed with several weeks of "Canicula," a temporary break in the rainy season during which there is no rainfall.

In addition, the rainy season is susceptible to hurricanes, which often cause extensive damage.



Average annual temperature by region (1991~2020) Monthly precipitation and average temperature (1991~2020)

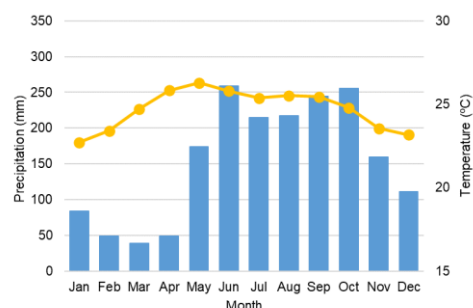
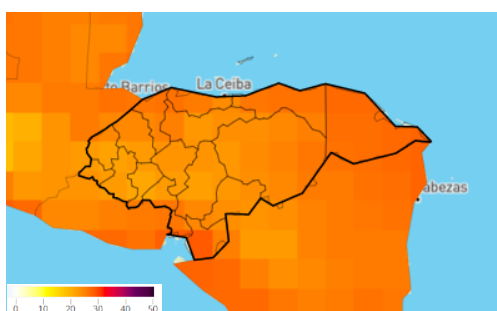
Honduras

Average annual temperature (1991~2020): 24.7°C

Annual rainfall (1991~2020): 1856mm

The climate of Honduras is divided into two main regions: the inland highlands and the coastal areas. The coastal areas have a hot and humid tropical climate with an average annual temperature ranging from 26°C to 29°C. The highlands have a temperate climate with an average annual temperature ranging from 16°C to 24°C. Average annual precipitation is lowest in the central mountainous interior (800-2,000 mm) and highest along the Caribbean coast (+2,000 mm), which receives more rainfall throughout the year. The Pacific coast and inland highlands have a dry season (summer) from November to April, a rainy season (winter) from May to October, and a temporary rainy season break period (1-4 weeks) in July/August (Canicula). In most cases, El Niño reduces rainfall and raises temperatures, while La Niña increases rainfall and lowers temperatures.

The region is susceptible to hurricanes from June to November, and in recent years has been severely affected by Hurricanes Eta and Iota in 2020 (over 4 million people were affected).



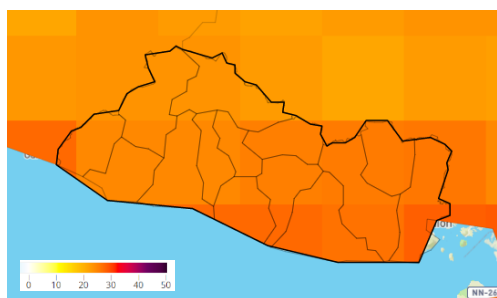
Average annual temperature by region (1991~2020) Monthly precipitation and average temperature (1991~2020)

El Salvador

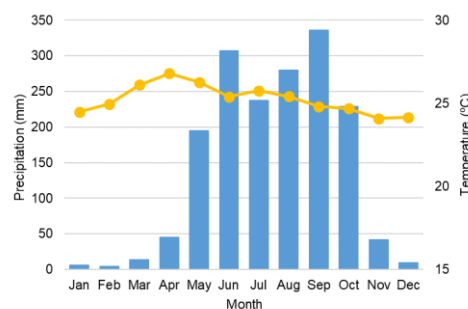
Average annual temperature (1991~2020): 25.2°C
 Annual rainfall (1991~2020): 1704mm

El Salvador has a tropical climate, with a typical rainy season (May-October) and dry season (November-April). Average annual precipitation ranges from 1,100 to 1,500 mm in the interior valleys and 1,800 to 2,500 mm in the mountains, while the Pacific coastal areas receive about 1,700 mm. Average temperatures nationwide range from 22°C (December) to 25°C (April). Monthly precipitation varies from 10 mm in February to 358 mm in September. Rainfall occurs throughout the year, with peaks between June and September.

El Salvador is particularly sensitive to the adverse effects of climate change due to its topographical conditions and exposure to both Pacific and Caribbean/Atlantic weather systems. As such, it has been identified as one of the most vulnerable countries in Latin America with respect to climate-related disasters, often suffering from hurricanes and tropical storms, resulting in widespread flooding, landslides, and damage to the agricultural sector. In addition, 307 km of Pacific coastline has already experienced sea level rise and is expected to lose between 10 and 28% of the country's coastal zone territory by the end of the century. These coastal areas are home to more than 30% of the population and are highly vulnerable to a combination of sea level rise and El Niño events. In addition, sea level rise of 78 mm has been observed since the 1950s, further affecting coastal zones and existing flood plains.



Average annual temperature by region (1991~2020)



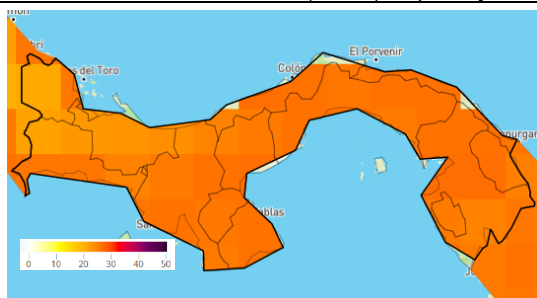
Monthly precipitation and average temperature (1991~2020)

Panama

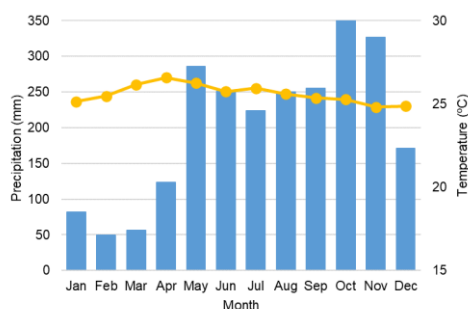
Average annual temperature (1991~2020): 25.6°C
 Annual rainfall (1991~2020): 2434mm

Panama has a hot and humid tropical climate throughout the year, with a long rainy season from May to January and a short dry season from January to May. During the rainy season, the entire country receives approximately 250 to 700 mm of rainfall. The country's average annual temperature is 27°C and the average total rainfall is 1,900 mm per year (depending on the region and altitude). The national maximum average temperature ranges from 31.1°C to 34.5°C, and the minimum temperature ranges from 20.1°C to 22.4°C.

The Darien Isthmus occasionally experiences severe storms and wildfires. Climate change in Panama is primarily driven by the El Niño Southern Oscillation (ENSO), tropical cyclones, and sea surface temperatures.



Average annual temperature by region (1991~2020)



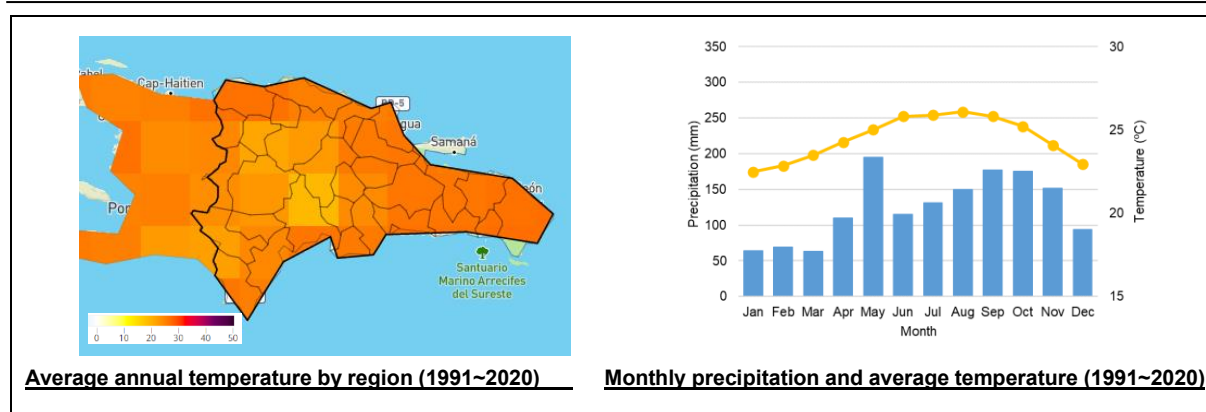
Monthly precipitation and average temperature (1991~2020)

Dominican Republic

Average annual temperature (1991~2020): 24.5°C
 Annual rainfall (1991~2020): 1495mm

The Dominican Republic has a tropical climate, with warm and humid weather all year round. Average seasonal temperatures range from 20-25°C in the winter months (December-February) to 25-27°C in the warmer months of June-August and September-November. The rainy season is from May to November, with most areas receiving at least 100-200 mm of rainfall per month.

Climate variability in the Caribbean is strongly influenced by the El Niño Southern Oscillation (ENSO), with hotter and drier than average June-August conditions in El Niño and cooler and wetter conditions in La Niña. The Dominican Republic is in the center of the Atlantic hurricane belt, with cyclones and hurricanes occurring frequently in August, September, and October. Hurricane development is strongly associated with ENSO, with more frequent hurricane activity associated with La Niña and less frequent in El Niño years.



Source: World Bank, Climate Change Knowledge Portal

2) Water Resources

Table 2.1.3 shows the water resource availability, water resources per capita, and the percentage of water use by sector (agriculture, industry, and domestic water) in the six countries surveyed. The amount of available water resources per capita varies widely by region, with Panama having the highest amount of water resources per capita at 30,000 m³ /person/year and the Dominican Republic having the lowest at 2,000 m³ /person/year.

The agricultural sector uses the most water of the industrial sectors. The same is true for the six countries surveyed, with the Dominican Republic having the highest share of water use in the agricultural sector at 83.3%. Mexico and Honduras follow with 75.7% and 73.3%, respectively. As for Panama, industrial water use is virtually nonexistent, with domestic water use accounting for the majority of water use.

The six countries surveyed, which are located in the Central America and Caribbean region, are relatively rich in water resources compared to other countries. However, the Dominican Republic's low per capita water resources and high share of water use by the agricultural sector suggest that upgrading agricultural water use (e.g., irrigation improvement, water conservation, and reuse) is one effective way to make effective use of the country's water resources.

Table 2.1.3 Water Resource Availability and Use in the Six Countries Surveyed (2018)

Country	Water resources km /yr ³	Water resource per capita m /inhab/yr ³	Water withdrawal km /yr ³	Water withdrawal by sector		
				Agriculture	Industrial	Municipal
				%	%	%
Mexico	461.9	3,660	88.8	75.7	9.6	14.7
Guatemala	127.9	7,416	3.3	56.7	18.2	25.1
Honduras	92.2	9,613	1.6	73.3	7.1	19.6
El Salvador	26.3	4,091	2.1	67.6	10.0	22.4
Panama	139.3	33,351	1.2	36.8	0.5	62.7
Dominican Republic	23.5	2,211	9.1	83.3	7.3	9.4

Source: AQUASTAT

3) Agricultural Land Use

Table 2.1.4 shows agricultural land use in the six countries surveyed. In Mexico, El Salvador, and the Dominican Republic, agricultural land accounts for about half of the total land area, while in Guatemala, Honduras, and Panama, it accounts for about 30%. Comparing the area of orchard land where perennial crops such as coffee and other fruit trees are cultivated with the area of land cultivated with annual crops (hereinafter referred to as "cultivated land"), only Guatemala has a larger area of orchard land. In addition, the area of permanent pasture and grazing land is about three times larger than the area of cultivated land in Mexico and Panama, and about twice as large as the area of cultivated land in Guatemala and Honduras. In El Salvador and the Dominican Republic, on the other hand, the area of

permanent pasture and grazing land is as large as or smaller than that of cultivated land, indicating that land use varies greatly from country to country.

Table 2.1.4 Agricultural Land Use Area and Its Composition in the Six Countries Surveyed (2019)

Country	Country Area	Agricultural Area		Arable Land	Permanent Crops	Meadows & Pastures
	000 ha	000 ha	%	000 ha	000 ha	000 ha
Mexico	196,438	96,106	48.9	19,400	2,729	73,977
Guatemala	10,889	3,856	35.4	862	1,183	1,811
Honduras	11,249	3,511	31.2	1,020	576	1,915
El Salvador	2,104	1,196	56.8	721	160	315
Panama	7,532	2,259	30.0	565	185	1,509
Dominican Republic	4,867	2,429	49.9	877	355	1,197

Source: FAOSTAT

Figure 2.1.1 shows the irrigation development rates for the six target countries. The irrigation coverage in Mexico and the Dominican Republic exceeds the world average of 22% (red line in the figure), while the coverage in El Salvador and Panama is low at less than 5%. The six countries are located in tropical and subtropical maritime climates with hot and humid agricultural production environments, and rainfed agriculture is the basis of agricultural production systems in all countries.

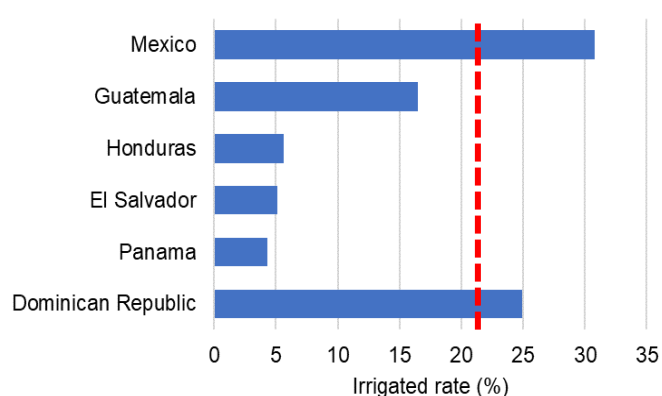


Figure 2.1.1 Irrigation Development Rates in the Six Countries Surveyed (2019)

Source: FAOSTAT

Note: The red line in the figure is the global average.

2.2 Agribusiness Sector Workers

This section outlines the actors in the agriculture-related sector in the six countries covered by this study. The study targets FVCs, which encompass agricultural production, processing, and distribution. Therefore, not only farmers (producers) but also various types of agriculture-related micro, small, and medium-sized enterprises (MSMEs) in FVCs are mentioned in this section.

2.2.1 Producers

Figure 2.2.1 shows the rural-urban population ratio in the six countries surveyed; as of 2018, the urban population exceeded the rural population in all countries, indicating increasing urbanization. In particular, for Mexico and the Dominican Republic, the rural population is less than 20%, and there are concerns about a shortage of labor force in agriculture, the main industry in rural areas, in the future as the working population migrates to cities. Therefore, mechanization (including ICT) for agricultural intensification and labor saving will be further required in the future to realize sustainable agricultural development.

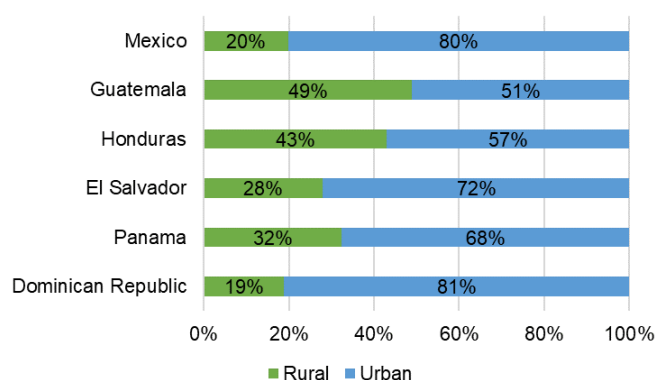


Figure 2.2.1 Rural-Urban Population Ratio in the Six Countries Surveyed (2018)

Source: FAOSTAT

Table 2.2.1 shows the number and composition of agricultural workers in the six countries surveyed, with Guatemala and Honduras, where the share of the agriculture sector in GDP is relatively high, accounting for approximately 30% of all workers. In the Dominican Republic, on the other hand, the share of agricultural workers is low, at less than 10%.

In all countries, male agricultural workers account for 80% to 90% of the total male workforce. In Panama, on the other hand, more than 20% are women, indicating that women play an important role in the country's agriculture sector.

Looking at the employment patterns of agricultural labor, the number of self-employed farmers and employees is similar in Mexico, Guatemala, and El Salvador. On the other hand, in Honduras, Panama, and the Dominican Republic, the number of self-employed farmers is two to three times the number of employees. In these countries with a large number of self-employed farmers, the size of the farming operation is likely to be family-based or relatively small.

Table 2.2.1 Number of Agricultural Workers and Their Composition in the Six Countries Surveyed (2019)

Country	Employment in agriculture, forestry and fishing		Share of employment		Status of employment	
	Total	Share	Female	Male	Employees	Self-employed
	000 persons	%	%	%	000 persons	000 persons
Mexico	6,809.8	12.5	11.5	88.5	3,108.0	3,701.8
Guatemala	2,208.6	31.3	10.3	89.7	1,145.5	1,063.1
Honduras	1,130.4	29.5	10.5	89.5	381.9	748.1
El Salvador	473.8	16.3	8.6	91.4	220.7	253.1
Panama	276.6	14.4	24.4	75.6	72.0	204.6
Dominican Republic	409.4	8.8	6.7	93.3	97.3	312.1

Source: FAOSTAT

Figure 2.2.2 shows the percentage of people engaged in agriculture, livestock, forestry, and fisheries in five of the six countries surveyed, excluding Panama. In all countries, more than 90% of the respondents are engaged in agriculture, livestock, and related service industries, while the percentages of those engaged in forestry and fisheries (including aquaculture) are negligible. Therefore, it is desirable to focus on the downstream (i.e., processing and distribution) of FVCs in this study, since the scale of financial needs of fishery (including aquaculture) producers is considered to be smaller than those of agriculture and livestock.

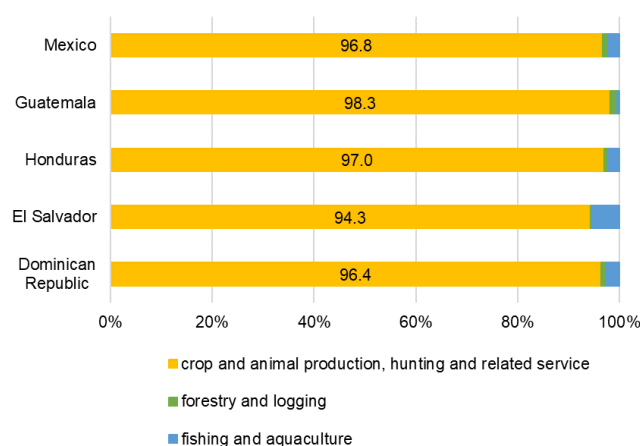


Figure 2.2.2 Percentage Engaged in Agriculture by Type in the Six Countries Surveyed (2019)

Source: FAOSTAT

2.2.2 Agriculture-related MSMEs

According to the IDB's "MSME Financing Instruments in Latin America and the Caribbean During COVID-19" (May 2020, p. 5), the small and medium-sized microenterprise (MSME) sector in Latin America and the Caribbean is 99.5% of the number of businesses, estimated to account for 60% of employment and 25% of GDP. The World Bank's Enterprise Surveys were used to estimate this data, and MSMEs are defined as "enterprises with less than 100 employees". However, since only "registered enterprises with 5 or more employees" are captured in the statistics, informal micro businesses, self-employed persons, freelancers, and agricultural workers are not included.

Luis Felipe Lopez-Calva, UNDP's Regional Director for Latin America and the Caribbean, noted that MSMEs play an important role in the region as providers of employment and supply of products and services¹. MSMEs, which account for most of the companies in the region, include a certain percentage of agriculture-related businesses (non-farm agribusinesses). This "agribusiness" is generally described as follows.

" Agribusiness is a concept that encompasses agriculture and related businesses and industries. In a narrow sense, agriculture is understood as farming and stockbreeding based on land use, but the concept of agribusiness, with agriculture at its core, encompasses the sectors that supply production materials such as seeds, fertilizers, agricultural machinery, feed, pesticides, and fuel; the food industry sector that processes agricultural products; the distribution sector that handles transportation, storage, trade, wholesale, and retail sales; and the food service sector including restaurants and the financial sector. The concept was first proposed by John H. Davis and Ray A. Goldberg of Harvard University in the U.S. in 1957, and then has spread worldwide." (Source: The Encyclopedia of Japan, <https://kotobank.jp/word/アグリビジネス-24817>)

If we focus on "agribusinesses" that form the FVC and apply the definition of MSME applied in the above-mentioned World Bank Enterprise Surveys as "registered companies with between 5 and 100 employees" (in Mexico, however, it is defined as manufacturing companies with 250 or fewer employees and service companies with 100 or fewer employees.), it can be inferred that most businesses called "agribusiness" fall under the MSME category.

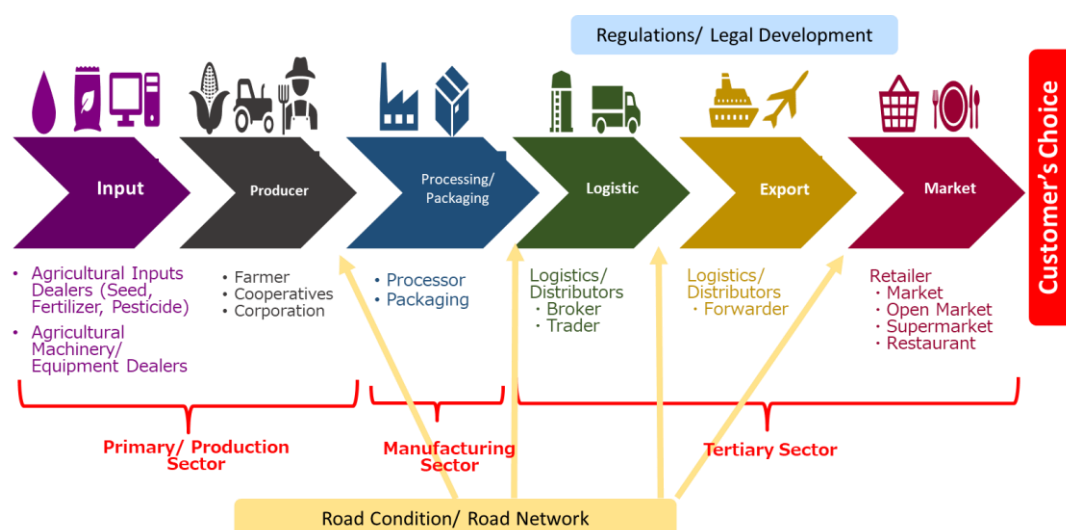


Figure 2.2.3 Overall Food Value Chain

Source: JICA "Final Report Data Collection Survey on Human Resource Development Needs for Economic & Social Transformation in Cuba".

(February 2022, Japan Economic Research Institute, Oriental Consultants Global, Sanyu Consultants), p.3-47 Figure 3.2-35

Table 2.2.2 provides basic information on the corporate sector, the MSME sector, and agribusiness in the six countries covered by this survey. Although a rigorous analysis is difficult due to the lack of enterprise statistics in each country, "agribusiness" forms at least a part of the MSME sector, which accounts for the majority of employment in each country, although the percentage of the number of businesses is small, except in Honduras.

¹ Source: UNDP website Article dated April 21, 2021 <https://www.undp.org/latin-america/blog/small-businesses-big-impacts-supporting-productive-smes-engine-recovery-lac>

Table 2.2.2 Overview of the Corporate Sector in the Six Countries in this Survey in Central America and the Caribbean

	Guatemala	Honduras	El Salvador	Mexico	Dominican Republic	Panama
All domestic companies						
Number of businesses (Thousands)	1,673	4	23	4,100	72	47
Sales per company (US\$)	52,876	20,914	1,703,700	-	-	-
Profit per company (US\$)	n.a	1,298	n.a	-	-	-
Assets per company (US\$)	119,652	n.a	2,676,700	-	-	-
Number of employees per company (persons)	n.a	4.6	29.2	-	-	-
Average annual employee salary (US\$)	4,000	n.a	n.a	-	-	-
MSME						
Definition of MSME	-	-	-	Employee of 250 (100 for Services) or less	-	-
Percentage of total number of businesses (%)	-	-	-	99.7	-	-
Percentage of GDP (%)	-	-	-	35.5	-	-
Percentage of total employees (%)	51	59	50	50	38	67
Laws and Regulations Related to MSME Support	Vice ministerio de Micro y PyME (2000)	CONAMPYME (2000)	CONAMYPE (1996)	SPYME (2000)	PRPMPYME (2000)	AMPYME (2000)
Agribusiness						
Percentage of companies (%)	5	36	6	1	-	0
Sales per company relative to average of all businesses (times)	3.2	0.7	1.7	-	-	-
Average annual employee salary vs. all business average (times)	4.1	0.8	0.6	-	-	-
Percentage of companies owned by women (%)	23	56	15	-	-	-
Ecosystem (maturity)	Quetzaltenango	Copan, El Paraiso, Lempira, Olancho	Cabanas, Chalatenango, La Union, Morazan, San Miguel	-	-	-
Ecosystem (high potential)	Escuintla, Zacapa	Valle	La Libertad, San Salvador, San Vicente, Sonsonate	-	-	-
Information Source	SAT	SENPRENDE	DIGESRYC	INEGI	NSO	MEF
fiscal year	2018	2018	2014-18	2018	2016	2016

Sources: Prepared by the JICA Survey Team based on various statistical sources, including IFC (2021) Digital Entrepreneurship and Innovation, UNDP website, OECD Financing SMEs and Entrepreneurs 2022: An OECD Scorecard - 30. Mexico, etc.

2.3 Production

This section refers to food crops, horticultural crops, industrial crops, and livestock products as agricultural production. The information in this section will overview the situation using statistics for 2019, the most recent year prior to the Corona disaster.

Table 2.3.1 shows the top 10 crops in terms of harvested area in the six target countries. The top crops harvested in each country are staple food crops (maize, sorghum, rice, beans, and edible bananas). The second most heavily harvested crops are the industrial crops, with sugarcane and coffee leading the list in all countries. Country-specific crops such as nutmeg and cardamom (spices) in Guatemala and agave in El Salvador, which is used to make fiber, are also higher ranked in each country. As for horticultural crops, fruit trees (oranges, avocados, mangoes, etc.) and bananas in particular dominate the harvested area in all six target countries.

Table 2.3.1 Top 10 Harvested Area in Six Target Countries (2019)

	Mexico	Guatemala	Honduras	El Salvador	Panama	Dominican Republic
1	Maize	Maize	Coffee, green	Maize	Rice, paddy	Rice, paddy
2	sorghum (Sorghum)	Coffee, green	Maize	Coffee, green	Maize	Cocoa, beans

	Mexico	Guatemala	Honduras	El Salvador	Panama	Dominican Republic
	bicolor)					
3	Beans, dry	Beans, dry	Oil palm fruit	Beans, dry	Sugar cane	Sugar cane
4	Sugar cane	Sugar cane	Beans, dry	Sugar cane	Plantains and others	Coffee, green
5	Coffee, green	Oil palm fruit	Sugar cane	sorghum (Sorghum bicolor)	Coffee, green	Coconuts
6	Wheat	Rubber, natural	sorghum (Sorghum bicolor)	Apples	Beans, dry	Plantains and others
7	barley	Bananas	Rice, paddy	Olives	Oil palm fruit	Avocados
8	Oranges	Nutmeg, mace and cardamoms	Bananas	Yautia (cocoyam)	Bananas	Beans, dry
9	Mangoes, mangosteens, guavas	Sesame seed	Oranges	Agave fibres nes	Cocoa, beans	Maize
10	Avocados	Melons, other (inc. cantaloupes)	Plantains and others	Rice, paddy	Oranges	Bananas

Note): Food crops, Horticultural crops, Industrial crops Source): FAOSTAT

Table 2.3.2 shows the top 10 commodities in terms of production value in the six target countries. When agricultural production is ranked by production value, the livestock products with the highest production value (beef cattle, poultry, dairy cattle, poultry eggs, etc.) are listed as commodities. In Mexico, in particular, with its vast grazing lands, beef cattle is the top agricultural product. The top agricultural products in the other countries are bananas in Guatemala, coffee in Honduras, poultry in El Salvador, rice in Panama, and sugarcane in the Dominican Republic, respectively.

Table 2.3.2 Top 10 Products by Production Value in the Six Countries Covered (2019)

	Mexico	Guatemala	Honduras	El Salvador	Panama	Dominican Republic
1	Meat, cattle	Bananas	Coffee, green	Meat, chicken	Rice, paddy	Sugar cane
2	Meat, chicken	Sugar cane	Oil palm fruit	Maize	Bananas	Papayas.
3	Maize	Meat, cattle	Milk, whole fresh cow	Sugar cane	Milk, whole fresh cow	Pineapples
4	Milk, whole fresh cow	Rubber, natural	Maize	Milk, whole fresh cow	Eggs, hen, in shell	Meat, chicken
5	Meat, pig	Coffee, green	Bananas	Coffee, green	Sugar cane	Rice, paddy
6	Eggs, hen, in shell	Meat, chicken	Beans, dry	Eggs, hen, in shell	Plantains and others	Milk, whole fresh cow
7	Avocados	Maize	Eggs, hen, in shell	Beans, dry	Maize	Avocados
8	Sugar cane	Eggs, hen, in shell	Sugar cane	Meat, cattle	Pineapples	Plantains and others
9	Chillies and peppers, green	Oil palm fruit	Tobacco, unmanufactured	Meat, pig	Coffee, green	Coconuts
10	Tomatoes	Melons, other (inc. cantaloupes)	Melons, other (inc. cantaloupes)	sorghum (Sorghum bicolor)	Tomatoes	Cocoa, beans

Note: Food crops, Horticultural crops, Industrial crops, Livestock Source: FAOSTAT

2.3.1 Food Crops (Cereals, Potatoes and Legumes)

Table 2.3.3 shows the production value and production value per unit area for the top three food crop commodities in the six target countries. The food crop commodities vary according to the staple food of the country. In Mexico, Guatemala, Honduras, and El Salvador, where tortillas are the staple food, maize and beans dominate, while in Panama and the Dominican Republic, where rice is the staple food, rice dominates. The production value of food crops is lower than that of other agricultural products, with the following production values per unit area: maize < beans < rice < plantain.

While these food crops play an important role in the food security of each country (and that is why they are so important), they are in most cases simpler than the FVCs of horticultural and industrial crops, which are described below, and are characterized by the difficulty of value addition.

Table 2.3.3 Production Value of the Top Three Food Crop Harvested Area in the Six Target Countries (2019)

Country		Type of Crop	Area Harvested	Production Value	Production Value per area
			Ha.	current 000 US\$	US\$/ha
Mexico	1	Maize	6,690,449	5,515,353	824
	2	sorghum (Sorghum bicolor)	1,324,783	748,671	565
	3	Beans, dry	1,207,395	676,932	560
Guatemala	1	Maize	864,991	375,369	434
	2	Beans, dry	263,896	200,759	761
	3	sorghum (Sorghum bicolor)	23,816	9,775	410
Honduras	1	Maize	321,309	159,148	495
	2	Beans, dry	165,919	136,127	820
	3	sorghum (Sorghum bicolor)	19,149	5,812	304
El Salvador	1	Maize	264,510	247,598	936
	2	Beans, dry	98,078	105,333	1,074
	3	sorghum (Sorghum bicolor)	63,838	32,282	506
Panama	1	Rice, paddy	97,140	195,399	2,012
	2	Maize	53,160	48,246	908
	3	Plantains and others	17,861	73,988	4,142
Dominican Republic	1	Rice, paddy	178,727	369,645	2,068
	2	Plantains and others	48,977	199,341	4,070
	3	Beans, dry	41,745	51,459	1,232

Note: Gross Production Value (constant 2014-2016 thousand I\$) has been applied for Guatemala

Source: FAOSTAT

2.3.2 Horticultural Crops (Vegetables and Fruit Trees)

Table 2.3.4 shows the production value and production value per unit area for the top three horticultural crops in the six target countries. The top three horticultural crops in terms of harvested area are fruit trees (oranges, avocados, mangoes, etc.) and bananas, which require relatively large area for cultivation in all countries.

The production value per unit area is relatively high compared to food crops, especially bananas and avocados with a high production value of over US\$10,000/ha. The production value of cantaloupe melon, which is cultivated in the open fields, is also high at around US\$9,000/ha, making it one of the major agricultural products in Guatemala and Honduras (see Table 2.3.2).

Table 2.3.4 Production Value of the Top Three Horticultural Crops Harvested Area in the Six Target Countries (2019)

Country		Type of Crop	Area Harvested	Production Value	Production Value per area
			Ha.	current 000 US\$	US\$/ha
Mexico	1	Oranges	329,561	491,125	1,490
	2	Mangoes, mangosteens, guavas	215,982	567,812	2,629
	3	Avocados	215,942	2,568,642	11,895
Guatemala	1	Bananas	90,316	1,544,642	17,103
	2	Melons, other (inc. cantaloupes)	26,928	240,942	8,948
	3	Vegetables, leguminous nes	24,083	11,274	468
Honduras	1	Bananas	12,274	139,435	11,360
	2	Oranges	8,995	22,671	2,520
	3	Melons, other (inc. cantaloupes)	5,708	52,224	9,149
El Salvador	1	Apples	6,361	-	-
	2	Olives	5,445	-	-
	3	Mangoes, mangosteens, guavas	3,422	18,296	5,347
Panama	1	Bananas	8,504	117,021	13,761
	2	Oranges	4,974	7,474	1,503
	3	Vegetables, fresh nes	3,485	2,168	622
Dominican Republic	1	Avocados	42,571	359,163	8,437

Country		Type of Crop	Area Harvested	Production Value	Production Value per area
			Ha.	current 000 US\$	US\$/ha
	2	Bananas	28,861	127,904	4,432
	3	Lemons and limes	27,726	33,586	1,211

Note: Gross Production Value (constant 2014-2016 thousand I\$) has been applied for Guatemala

Source: FAOSTAT

2.3.3 Industrial Crops

Table 2.3.5 shows the production value and production value per unit area for the top three industrial crops in the six target countries. In all countries, sugarcane, coffee, and, in Guatemala, Honduras, and Panama, palm oil are the top crops, most of which are produced on estates with relatively large production systems. In El Salvador, sisal, which is used as a raw material for sisal hemp, is the third most productive crop in terms of area harvested and is a unique agricultural product in the country.

The production value per unit area is higher than that of food crops and lower than that of horticultural crops, and is in the medium range, ranging from US\$1,000 to US\$3,000/ha for both crops.

Table 2.3.5 Production Value of the Top Three Industrial Crops Harvested Area in the Six Target Countries (2019)

Country		Type of Crop	Area Harvested	Production Value	Production Value per area
			Ha.	current 000 US\$	US\$/ha
Mexico	1	Sugar cane	795,984	2,400,608	3,016
	2	Coffee, green	629,300	-	-
	3	Seed cotton	207,246	563,468	2,719
Guatemala	1	Coffee, green	327,600	452,205	1,380
	2	Sugar cane	252,885	1,223,060	4,836
	3	Oil palm fruit	188,000	276,745	1,472
Honduras	1	Coffee, green	420,628	1,113,845	2,648
	2	Oil palm fruit	200,000	264,310	1,322
	3	Sugar cane	64,087	78,145	1,219
El Salvador	1	Coffee, green	140,000	185,144	1,322
	2	Sugar cane	79,569	225,718	2,837
	3	Agave fibres nes	3,916	1,836	469
Panama	1	Sugar cane	37,548	76,843	2,047
	2	Coffee, green	15,283	26,173	1,713
	3	Oil palm fruit	9,611	-	-
Dominican Republic	1	Cocoa, beans	150,943	168,584	1,117
	2	Sugar cane	123,643	-	-
	3	Coffee, green	80,118	35,061	438

Note: Gross Production Value (constant 2014-2016 thousand I\$) has been applied for Guatemala

Source: FAOSTAT

2.3.4 Livestock Production

Table 2.3.6 shows the top three production values for major livestock products in the six target countries. Mexico and Guatemala are the top producers of beef cattle, in particular Mexican beef cattle being the highest value agricultural product category overall. In Honduras and Panama, dairy cattle are the top agricultural product in terms of value, and both countries rank third in agricultural production. Poultry is the top agricultural product in El Salvador and the Dominican Republic, and for El Salvador, poultry is the top agricultural product.

Table 2.3.6 Production Value of Major Livestock Products in the Six Target Countries (2019)

Country		Type of livestock	Production Value
			current 000 US\$
Mexico	1	Meat, cattle	7,247,444
	2	Meat, chicken	5,927,984
	3	Milk, whole fresh cow	4,131,997
Guatemala	1	Meat, cattle	968,887
	2	Meat, chicken	416,521
	3	Eggs, hen, in shell	342,068
Honduras	1	Milk, whole fresh cow	225,104
	2	Eggs, hen, in shell	102,120

El Salvador	3	Meat, pig	20,753
	1	Meat, chicken	422,568
	2	Milk, whole fresh cow	212,010
Panama	3	Eggs, hen, in shell	133,156
	1	Milk, whole fresh cow	100,188
	2	Eggs, hen, in shell	95,581
Dominican Republic	3	-	-
	1	Meat, chicken	386,006
	2	Milk, whole fresh cow	368,017
	3	Eggs, hen, in shell	147,937

Note: Gross Production Value (constant 2014-2016 thousand I\$) has been applied for Guatemala

Source: FAOSTAT

2.3.5 Fisheries

The six target countries face the ocean and are relatively rich in water resources. As a result, fisheries (fishing and aquaculture) are also practiced to a certain extent. This section provides an overview of the fisheries and aquaculture industries in the six target countries and also describes the current status of the fish processing industry, which contributes to value addition in FVCs.

1) Fishing Industry

Table 2.3.7 shows the top three catches by major fish species (marine and inland fisheries) in the six target countries. Mexico is the leader in terms of catch, mainly herring, sardine, and anchoveta. On the other hand, catches from marine and inland fisheries are limited in Guatemala, Honduras, and the Dominican Republic.

Table 2.3.7 Catch by Major Fish Species in the Six Target Countries (2019)

Country		Species	Major Fishing Area	Capture Production
				Tonnes - live weight
Mexico	1	Pacific thread herring	Pacific, Eastern Central	255,793
	2	Pacific sardine	Pacific, Eastern Central	139,327
	3	Pacific anchoveta	Pacific, Eastern Central	111,035
Guatemala	1	Skipjack tuna	Atlantic, Eastern Central	7,253
	2	Yellowfin tuna (Thunnus albacares)	Atlantic, Eastern Central	2,337
	3	Freshwater fishes	America, North - Inland waters	2,250
Honduras	1	Caribbean spiny lobster	Atlantic, Western Central	6,100
	2	Marine fishes	Pacific, Eastern Central	2,500
	3	Penaeus shrimps	Atlantic, Western Central	979
El Salvador	1	Skipjack tuna	Atlantic, Eastern Central	14,021
	2	Skipjack tuna	Pacific, Eastern Central	9,200
	3	Marine fishes nei	Pacific, Eastern Central	6,830
Panama	1	Pacific anchoveta	Pacific, Eastern Central	115,747
	2	Skipjack tuna	Pacific, Southeast	20,668
	3	Pacific thread herring	Pacific, Eastern Central	18,808
Dominican Republic	1	Groupers	Atlantic, Western Central	2,130
	2	Marine fishes	Atlantic, Western Central	2,098
	3	Snappers, jobfishes	Atlantic, Western Central	2,094

Source FishStatJ v4.02.07 (Aug. 2022), FAO

2) Aquaculture Industry

Table 2.3.8 shows the harvest volume and production value of the top three aquaculture harvests by major fish species in the six target countries. In all countries, shrimp occupies the top position in terms of both harvest and production value. Farmed bluefin tuna, which is also exported to Japan, ranks third in Mexico in terms of harvest and production value. On the other hand, aquaculture is limited in the Dominican Republic.

Table 2.3.8 Aquaculture Harvest and Production Value by Major Fish Species in the Six Target Countries (2019)

Country		Species	Environment	Production	Production Value
				Tonnes - live weight	000 US\$
Mexico	1	Whiteleg shrimp	Brackishwater	167,746	827,252
	2	Tilapias.	Freshwater	56,945	112,332

Guatemala	3	Pacific bluefin tuna	Marine	6,457	51,284
	1	Whiteleg shrimp	Brackishwater	19,500	107,250
	2	Tilapias.	Freshwater	11,395	43,301
Honduras	3	Rainbow trout	Freshwater	100	600
	1	Nile tilapia	Freshwater	36,000	100,944
	2	Whiteleg shrimp	Brackishwater	32,100	176,550
El Salvador	3	-	-	-	-
	1	Nile tilapia	Freshwater	7,500	18,825
	2	Whiteleg shrimp	Brackishwater	1,150	5,152
Panama	3	Cupped oysters	Marine	15	23
	1	Whiteleg shrimp	Brackishwater	5,153	24,682
	2	Cobia	Marine	991	10,904
Dominican Republic	3	Florida pompano	Marine	613	6,132
	1	Tilapias.	Freshwater	600	1,111
	2	Striped catfish	Freshwater	550	1,501
	3	Nile tilapia	Freshwater	450	833

Source: FishStatJ v4.02.07 (Aug. 2022), FAO

3) Seafood Processing

Table 2.3.9 shows the top 10 most produced processed seafood products in the six target countries. With the exception of Mexico, the production of processed seafood products is limited to only a few items. Although frozen and vacuum processing to preserve freshness is used in Mexico for a variety of items, it can be said that most of the target countries still leave room for intervention in seafood processing.

In the case of agricultural, livestock, and marine products, value-adding through processing is one of the measures to strengthen FVCs. In particular, horticultural crops, livestock products, and marine products are difficult to preserve for long periods of time, and processing to maintain their shelf life will ensure a market that is not dependent on distance, thereby increasing their value.

Table 2.3.9 Top 10 Seafood Products by Production Volume in the Six Countries Covered (2019)

	Mexico	Guatemala	Honduras	El Salvador	Panama	Dominican Republic
1	Shrimps and prawns, frozen	Shrimps and prawns, frozen	Shrimps and prawns, frozen	Tunas, frozen	Anchoveta meal	-
2	Tunas prepared or preserved, not minced, in airtight containers	Fish, dried and salted	Spiny lobsters (Panulirus spp.), whole, fresh or chilled	Tunas prepared or preserved, not minced	Anchoveta oil	-
3	Marine fish, frozen	-	-	Fishmeals	Marine fish, frozen	-
4	Pilchards (Sardinops spp.), prep. or pres., not minced	-	-	Tuna loins, prepared or preserved	Shrimps and prawns, frozen	-
5	Octopus, frozen	-	-	Shrimps and prawns, frozen	Fish fillets, fresh or chilled	-
6	Fishmeals	-	-	Marine fish, frozen	-	-
7	Yellowfin tuna, frozen	-	-	-	-	-
8	Anchoveta meal	-	-	-	-	-
9	Tunas, frozen	-	-	-	-	-
10	Pony fishes, frozen	-	-	-	-	-

Source: FishStatJ v4.02.07 (Aug. 2022), FAO

2.4 Trade

We have taken a bird's-eye view of each country's imports and exports of agricultural and livestock products, and marine products and their processed products, and picked up items that deserve attention. The following is a brief description of those items with large export value that bring wealth to the country and those items with large import value for which import substitution can be expected.

1) Mexico

Mexico's main agricultural exports are avocados, tomatoes, and chilies. In addition, Mexico has an advantage in the cultivation of fruits, given its climatic conditions. In terms of processed products, Mexico is a major exporter of beer and spirits. Breweries, including the world's largest exporter of beer, Heineken of the Netherlands, and Anheuser-Busch InBev of Belgium and Brazil, are located in northern Mexico. In addition, exports of tequila, a specialty distilled spirit, have been strong.

The value of Mexico's agricultural imports is larger than the value of its exports. Therefore, making import substitution as well as export expansion important. In particular, domestic production of maize cannot meet demand, and much is imported mainly from the U.S. The Mexican government is focusing on maize and bean production.

Table 2.4.1 Mexico's Major Crop Imports and Exports (2020, USD 1,000)

Mexico				
Rank (Original Produce)	export		import	
	list of articles	Amount	list of articles	Amount
1	Avocados	2,746,170	Maize	3,086,058
2	Tomatoes	2,606,104	Soybeans	1,508,940
3	Chillies and peppers, green	1,452,567	Wheat	901,745
4	Cucumbers and gherkins	632,652	Rice, paddy	708,829
5	Strawberries	588,713	Rapeseed	418,943
Rank (Processed products)	export		import	
	list of articles	Amount	list of articles	Amount
1	Beer of barley	4,252,177	Food prep nes	1,174,893
2	Beverages, distilled alcoholic	2,407,598	Cake, soybeans	687,201
3	pastry	1,451,998	Crude materials	462,130
4	Food prep nes	911,619	Fructose and syrup, other	284,096
5	Fruit, prepared nes	787,436	Oil, palm	272,322

Source: FAOSTAT

(Note) Rice and paddy are the sum of milled and brown rice.

With regard to livestock products, a large amount of beef is exported. In particular, exports to East Asia, including Japan, are increasing, and in order to further expand exports, the Mexican government is promoting the development of the livestock industry by providing financial loan programs to support the livestock industry. The value of exports of processed products is small compared to other countries, and the country imports a large amount of cheese, skim milk, and other products.

Table 2.4.2 Mexico's Major Livestock Products Imports and Exports (2020, USD 1,000)

Mexico				
Rank (Livestock Products)	export		import	
	list of articles	Amount	list of articles	Amount
1	Meat, cattle (beef & veal, boneless included)	1,532,100	Meat, pork&pig	1,306,238
2	Meat, pork&pig	879,981	Meat, chicken	731,325
3	Cattle	476,784	Meat, cattle (beef & veal, boneless included)	626,749
4	Offals, edible, cattle	97,922	Meat, turkey	248,084
5	Horses.	746	Offals, edible, cattle	164,800
Rank (Processed products)	export		import	
	list of articles	Amount	list of articles	Amount
1	Milk, whole dried	45,023	Cheese, whole cow milk	452,293
2	Milk, whole condensed	20,701	Milk, skimmed dried	421,145
3	Cheese, whole cow milk	19,280	Meat, pig sausages	166,138
4	Meat, pig, preparations	18,271	Butter, cow milk	122,647
5	Meat, chicken, canned	12,898	Bacon and ham	61,957

Source: FAOSTAT

(Note) Meat cattle, boneless and meats cattle, and meats pig and meats pork are added together.

Mexico exports a large amount of shrimp as a marine product. The main product is farmed shrimp, and its export volume is the second largest in the Latin American region after Ecuador, and most of it is exported to the U.S., China, and Japan.

Table 2.4.3 Mexico's Main Seafood Imports and Exports (2020, USD 1,000)

Mexico				
order	export		import	
	list of articles	Amount	list of articles	Amount
1	Shrimps and prawns	335,625	Tilapia	176,126
2	Fish nei	312,570	salmon	118,240
3	Tunas.	115,520	Shrimps and prawns	69,374
4	Rock lobster and other sea crawfish	109,980	Fish nei	61,243
5	Atlantic(Thunnus thynnus)and Pacific(Thunnus orientalis)bluefin tuna	60,238	Tunas	53,245

Source: Survey team compilation based on FAOSTAT

2) Guatemala

Guatemala's main exports are bananas, coffee, and cardamom. Cardamom, in particular, has the largest share of exports in the world. Processed products, mainly palm oil and sugar, are exported. Guatemala is the largest exporter of palm oil in Latin America, and exports a large amount of palm oil to Latin American countries such as Mexico and Brazil, as well as to European countries. Guatemala is also the largest sugarcane producer in Central America, and has facilities for export, including a dedicated sugar export terminal and sugar storage facilities.

Imports consist mainly of grains such as maize, wheat, and rice. While import substitution as well as export expansion will be important, the land area and scale of production are limited. Therefore, the perspective of the price competitiveness of domestically produced products against imports is important for strengthening FVCs in the future.

Table 2.4.4 Principal Agricultural Imports and Exports of Guatemala (2020, USD 1,000)

Guatemala				
Rank (Original Produce)	export		import	
	list of articles	Amount	list of articles	Amount
1	Nutmeg, mace and cardamoms	1,136,599	Maize	307,392
2	Bananas	842,277	Wheat	170,154
3	Coffee, green	651,964	Rice, paddy	121,829
4	Melons, other (inc. cantaloupes)	133,749	Apples	33,027
5	Plantains and others	110,592	Grapes	22,241
Rank (Processed products)	export		import	
	list of articles	Amount	list of articles	Amount
1	Oil, palm	465,705	Food prep nes	396,499
2	Sugar refined	311,778	Cake, soybeans	184,228
3	Sugar Raw Centrifugal	267,982	pastry	116,997
4	Food prep nes	237,227	Beverages, non-alcoholic	108,805
5	pastry	125,484	Oil, soybean	88,574

Source: FAOSTAT

(Note) Rice and paddy are the sum of milled and brown rice.

Guatemala's livestock industry is in a situation of excess imports, and the scale of exports is very small compared to agricultural products.

Table 2.4.5 Principal Livestock Imports and Exports in Guatemala (2020, USD 1,000)

Guatemala				
Rank (Livestock Products)	export		import	
	list of articles	Amount	list of articles	Amount

1	Meat, cattle (beef & veal, boneless included)	5,933	Meat, chicken	100,734
2	Chickens.	2,230	Meat, cattle (beef & veal, boneless included)	70,062
3	Meat, chicken	1,517	Meat, pork&pig	33,956
4	Hides, cattle, wet salted	884	Chickens.	19,182
5	Horses.	630	Milk, products of natural constituents nes	13,407
Rank (Processed products)	export		import	
	list of articles	Amount	list of articles	Amount
1	Meat, pig sausages	29,973	Cheese, whole cow milk	73,076
2	Meat, chicken, canned	21,782	Milk, whole dried	57,775
3	Meat, beef, preparations	9,528	Meat, pig sausages	22,565
4	Meat, pig, preparations	4,230	Meat, pig, preparations	21,509
5	Eggs, liquid	592	Meat, chicken, canned	7,377

Source: FAOSTAT (Note) Meat cattle, boneless and meat cattle, and meat pig and meat pork are combined.

Guatemala's fisheries industry exports a large amount of shrimp and tuna, but the scale of exports is small compared to agricultural products.

Table 2.4.6 Principal Seafood Imports and Exports in Guatemala (2020, USD 1,000)

Guatemala				
order	export		import	
	list of articles	Amount	list of articles	Amount
1	Shrimps and prawns	69,855	Shrimps and prawns	32,103
2	Tunas.	40,157	Yellowfin tuna (Thunnus albacares)	31,648
3	Dolphinfishes	2,737	Fish nei	18,800
4	Yellowfin tuna (Thunnus albacares)	2,587	Pilchards	9,719
5	Fish nei	1,577	Marine fish	3,657

Source: Survey team compilation based on FAOSTAT

3) Honduras

Like Guatemala, it is a major exporter of bananas and coffee. In addition, Guatemala is famous as an exporter of muskmelons and pineapples. Guatemala ranks second in the world in terms of muskmelon exports (China ranks first) and seventh in terms of pineapple exports. In terms of processed products, palm oil and cigars are widely exported. Like Guatemala, Honduras is one of the leading palm oil exporters in Latin America, and oil palm production supports the income of many small farmers.

Imports consist mainly of grains such as maize, wheat, and rice. While import substitution as well as export expansion will be important, we need to consider that if domestically produced products are price competitive with imports even there are limited land area and limited scale of production. It is an important perspective for strengthening FVCs in the future.

Table 2.4.7 Principal Agricultural Imports and Exports of Honduras (2020, USD 1,000)

Honduras				
Rank (Original Produce)	export		import	
	list of articles	Amount	list of articles	Amount
1	Coffee, green	980,247	Maize	148,961
2	Bananas	252,793	Rice, paddy	118,290
3	Melons, other (inc. cantaloupes)	149,403	Wheat	74,229
4	Vegetables, fresh nes	51,144	Avocados	34,324
5	Pineapples	43,929	Tobacco, unmanufactured	26,332
Rank (Processed products)	export		import	
	list of articles	Amount	list of articles	Amount
1	Oil, palm	302,615	Food prep nes	261,237
2	Cigars, cheroots	106,128	Cake, soybeans	122,172
3	pastry	57,252	pastry	91,404

4	Fruit, prepared nes	41,907	Beer of barley	87,486
5	Sugar Raw Centrifugal	31,298	Beverages, non-alcoholic	80,011

Source: FAOSTAT (Note) Rice, paddy is the sum of milled and brown rice.

The value of Honduran livestock exports is smaller than that of agricultural products, and imports significantly exceed exports.

Table 2.4.8 Major Livestock Imports and Exports in Honduras (2020, USD 1,000)

Honduras				
Rank (Livestock Products)	export		import	
	list of articles	Amount	list of articles	Amount
1	Meat, cattle (beef & veal, boneless included)	18,373	Meat, pork&pig	79,029
2	Meat, chicken	1,523	Meat, chicken	22,912
3	Hides nes	1,454	Offals, liver chicken	19,759
4	Eggs, hen, in shell	1,295	Chickens.	7,146
5	Offals, liver chicken	1,015	Meat, cattle (beef & veal, boneless included)	7,056
Rank (Processed products)	export		import	
	list of articles	Amount	list of articles	Amount
1	Cheese, whole cow milk	2,712	Cheese, whole cow milk	21,228
2	Meat, pig, preparations	2,495	Milk, whole dried	15,700
3	Milk, whole condensed	1,977	Milk, skimmed dried	13,808
4	Butter, cow milk	1,130	Meat, chicken, canned	12,760
5	Milk, skimmed cow	1,028	Meat, pig sausages	11,138

Source: FAOSTAT

(Note) Meat cattle, boneless and meats cattle, and meats pig and meats pork are added together.

A distinctive feature of the Honduran fisheries industry is the export of shrimp. Shrimp farming is thriving, and the value of exports is outstandingly high compared to other commodities, making Honduras one of the leading exporters of cultured shrimp in the Central American region.

Table 2.4.9 Major Seafood Imports and Exports in Honduras (2020, USD 1,000)

Honduras				
order	export		import	
	list of articles	Amount	list of articles	Amount
1	Shrimps and prawns	212,466	Fish nei	15,719
2	Tilapia	53,443	Sardines	7,112
3	Rock lobster and other sea crawfish	48,099	Shrimps and prawns	2,302
4	Sea-cucumber	6,222	Tilapia	2,142
5	Molluscs	2,855	Tunas.	2,031

Source: Survey team compilation based on FAOSTAT

4) El Salvador

Its main export commodity is limited to coffee. Compared to other countries, the country exports fewer vegetables and fruits and is more dependent on imports. Although not ranked in Table 2.4.10, avocados are the 7th most imported commodity, tomatoes are the 8th, and grapes are the 10th. More processed products are exported than raw agricultural products, with sugar, confectionery, and beverages being the most common exports. El Salvador is one of the leading exporters of confectionery and beverages in the Central American region due to its relatively well-developed infrastructure and the availability of land for processing plants and transportation facilities.

Table 2.4.10 Major Agricultural Imports and Exports of El Salvador (2020, USD 1,000)

El Salvador				
Rank (Original Produce)	export		import	
	list of articles	Amount	list of articles	Amount
1	Coffee, green	108,007	Maize	147,636

2	Chillies and peppers, green	2,558	Rice, paddy	75,267
3	Beans, dry	2,201	Wheat	71,341
4	Maize	1,773	Beans, dry	58,532
5	Vegetables, fresh nes	1,691	Apples	21,166
Rank (Processed products)	export		import	
	list of articles	Amount	list of articles	Amount
1	Sugar Raw Centrifugal	187,663	Food prep nes	241,557
2	pastry	91,019	Oil, palm	88,600
3	Beverages, non-alcoholic	85,581	Cake, soybeans	80,495
4	Food prep nes	85,361	pastry	68,282
5	Cereals, breakfast	46,057	Beverages, non-alcoholic	65,823

Source: FAOSTAT

(Note) Rice and paddy are the sum of milled and brown rice.

In livestock products, exports of processed products are higher. In addition, while cheese is the most exported processed product, it is also the most imported.

Table 2.4.11 Major Livestock Products Import and Export Commodities of El Salvador (2020, USD 1,000)

El Salvador				
Rank (Livestock Products)	export		import	
	list of articles	Amount	list of articles	Amount
1	Chickens.	7,460	Meat, cattle (beef & veal, boneless included)	163,696
2	Meat, chicken	4,081	Meat, pork&pig	20,950
3	Eggs, hen, in shell	224	Meat, chicken	16,096
4	Milk, products of natural constituents nes	102	Chickens.	8,120
5	Hides, cattle, wet salted	38	Meat, turkey	2,982
Rank (Processed products)	export		import	
	list of articles	Amount	list of articles	Amount
1	Cheese, whole cow milk	31,806	Cheese, whole cow milk	115,926
2	Meat, chicken, canned	3,334	Milk, whole dried	37,339
3	Meat, pig sausages	1,490	Meat, pig sausages	31,600
4	Milk, whole dried	1,337	Meat, chicken, canned	22,489
5	Bacon and ham	699	Meat, pig, preparations	9,032

Source: FAOSTAT

(Note) Meat cattle, boneless and meats cattle, and meats pig and meats pork are added together.

El Salvador exports a large amount of tuna species.

Table 2.4.12 El Salvador's Main Seafood Imports and Exports (2020, USD 1,000)

El Salvador				
order	export		import	
	list of articles	Amount	list of articles	Amount
1	Tunas.	74,952	Fish nei	13,710
2	Fish nei	6,064	Pilchards	9,329
3	bigeye tuna (edible fish, Thunnus obesus)	5,527	Yellowfin tuna (Thunnus albacares)	5,044
4	Marine fish	2,231	Shrimps and prawns	4,046
5	Herring	1,383	Skipjack.	3,734

Source: Survey team compilation based on FAOSTAT

5) Panama

Major exports are bananas, coffee, watermelons, and pineapples. Compared to the other five countries, watermelon is the most distinctive product, but its share of the world market is not that large. In terms of processed products, the export of distilled spirits (rum) is high, but its imports are much higher than its exports.

Imports consist mainly of grains such as maize, wheat, and rice. While import substitution as well as export expansion will be important, further investigation is needed to determine whether domestically produced products are price competitive with imported products, given the limited land area and limited scale of production. In addition, while the country exports a large amount of bananas, it also imports a large amount of bananas.

Table 2.4.13 Major Agricultural Imports and Exports of Panama (2020, thousands of dollars)

Panama				
Rank (Original Produce)	export		import	
	list of articles	Amount	list of articles	Amount
1	Bananas	151,716	Rice, paddy	112,053
2	Coffee, green	22,001	Maize	106,567
3	Watermelons	10,257	Wheat	45,611
4	Pineapples	7,547	Bananas	25,725
5	Cocoa, beans	2,090	Soybeans	13,341
Rank (Processed products)	export		import	
	list of articles	Amount	list of articles	Amount
1	Beverages, distilled alcoholic	40,732	Beverages, distilled alcoholic	512,167
2	Sugar Raw Centrifugal	21,139	Food prep nes	215,984
3	Food prep nes	15,994	Cigarettes	116,491
4	Oil, palm	10,651	Cake, soybeans	71,929
5	Food wastes	8,798	pastry	70,792

Source: FAOSTAT

(Note) Rice and paddy are the sum of milled and brown rice.

The scale of imports and exports of livestock products is smaller than that of agricultural products, with imports exceeding exports.

Table 2.4.14 Major Livestock Products Imports and Exports of Panama (2020, USD 1,000)

Panama				
Rank (Livestock Products)	export		import	
	list of articles	Amount	list of articles	Amount
1	Meat, cattle (beef & veal, boneless included)	17,029	Meat, pork&pig	30,514
2	Eggs, hen, in shell	4,462	Meat, chicken	15,782
3	Offals, edible, cattle	2,566	Meat, turkey	9,795
4	Cattle	206	Chickens.	7,691
5	Hides, cattle, wet salted	173	Milk, products of natural constituents nes	5,294
Rank (Processed products)	export		import	
	list of articles	Amount	list of articles	Amount
1	Milk, skimmed dried	3,201	Cheese, whole cow milk	69,404
2	Milk, whole dried	2,914	Meat, pig, preparations	35,391
3	Milk, whole condensed	1,094	Milk, whole dried	30,050
4	Cheese, whole cow milk	393	Bacon and ham	14,451
5	Meat, pig sausages	295	Butter, cow milk	11,179

Source: FAOSTAT

(Note) Meat cattle, boneless and meats cattle, and meats pig and meats pork are added together.

In marine products, relatively large amounts of salmon and shrimp are exported, with exports exceeding imports.

Table 2.4.15 Panama's Main Seafood Imports and Exports (2020, USD 1,000)

Panama				
order	export		import	
	list of articles	Amount	list of articles	Amount
1	Fish nei	56,768	Tunas.	44,564
2	salmon	17,356	Sardines	16,604
3	Shrimps and prawns	17,303	Fish nei	6,335
4	Yellowfin tuna (Thunnus albacares)	12,646	salmon	5,282
5	Snappers	6,676	Shrimps and prawns	3,582

Source: Survey team compilation based on FAOSTAT

6) Dominican Republic

Major exports are bananas, cocoa, tobacco, and avocados. Cocoa, tobacco, and avocado exports are distinctive compared to the other five countries. Cocoa exports rank 7th in terms of world share.

While it exports a large amount of cigarettes, it also imports a large amount of cigarettes. The value of cigars exported as a processed product is the largest among agricultural products and is one of the main industries. The tobacco processing industry accounts for 74 bn Dominican pesos of the Dominican Republic's GDP, or 12% of the total manufacturing sector (621 bn Dominican pesos). Japanese companies are also involved in tobacco processing, with an overseas subsidiary of Japan Tobacco Inc. (JT) entering the country in 2016.

Table 2.4.16 Dominican Republic's Major Agricultural Crop Exports and Imports (2020, USD 1,000)

Dominican Republic				
Rank (Original Produce)	export		import	
	list of articles	Amount	list of articles	Amount
1	Cocoa, beans	181,164	Tobacco, unmanufactured	359,252
2	Bananas	165,441	Maize	260,424
3	Tobacco, unmanufactured	88,074	Wheat	133,149
4	Plantains and others	80,626	Beans, dry	72,772
5	Avocados	67,612	Coffee, green	22,725
Rank (Processed products)	export		import	
	list of articles	Amount	list of articles	Amount
1	Cigars, cheroots	787,653	Food prep nes	216,844
2	Sugar Raw Centrifugal	112,631	Oil, soybean	144,490
3	Food prep nes	107,078	Infant food	96,228
4	Beverages, distilled alcoholic	89,508	Cake, soybeans	92,551
5	Tobacco products nes	54,429	Beverages, distilled alcoholic	87,521

Source: FAOSTAT

(Note) Rice and paddy are the sum of milled and brown rice.

The scale of imports and exports of livestock products is smaller than that of agricultural products, and imports far exceed exports.

Table 2.4.17 Dominican Republic's Major Livestock Products Import and Export Commodities (2020, USD 1,000)

Dominican Republic				
Rank (Livestock Products)	export		import	
	list of articles	Amount	list of articles	Amount
1	Meat, cattle (beef & veal, boneless included)	2,414	Meat, pork&pig	85,847
2	Chickens.	2,395	Meat, chicken	37,338
3	Meat, chicken	1,535	Meat, cattle, boneless (beef & veal)	28,661
4	Offals, edible, cattle	868	Offals, liver chicken	24,251
5	Hides, cattle, wet salted	641	Milk, products of natural constituents nes	7,583
	export		import	

Rank (Processed products)	list of articles	Amount	list of articles	Amount
1	Meat, pig sausages	4,933	Cheese, whole cow milk	92,523
2	Cheese, whole cow milk	2,336	Milk, whole dried	69,308
3	Milk, skimmed cow	404	Milk, skimmed dried	55,012
4	Butter, cow milk	365	Meat, chicken, canned	10,668
5	Meat, pig, preparations	325	Meat, pig sausages	8,798

Source: FAOSTAT

(Note) Meat cattle, boneless and meats cattle, and meats pig and meats pork are added together.

As with livestock products, the scale of imports and exports of marine products is smaller than that of agricultural products, and imports far exceed exports.

Table 2.4.18 Dominican Republic's Major Seafood Imports and Exports (2020, USD 1,000)

Dominican Republic				
order	export		import	
	list of articles	Amount	list of articles	Amount
1	Herring	4,679	Cod.	57,424
2	Cod.	2,304	Sardines	51,252
3	Eels	1,710	Herring	30,611
4	salmon	457	Tunas.	26,512
5	Lobsters	371	Fish nei	11,108

Source: Survey team compilation based on FAOSTAT

2.5 Development Challenges in the Agribusiness Sector

This section describes development challenges related to the agricultural sector in the six target countries. In particular, this section will review the situation with regard to the three priority issues that JICA has identified for its efforts in Central America and the Caribbean region: poverty, malnutrition, and grain self-sufficiency from the perspective of "human security"; natural disasters and soil degradation from the perspective of "addressing global-scale issues"; and distribution (in general) from the perspective of "developing the infrastructure for sustainable economic growth. In addition, from the perspective of "gender mainstreaming," gender issues will also be discussed in this section.

2.5.1 Poverty

Figure 2.5.1 shows the rural poverty rate and the urban-rural ratio of poverty in the six target countries. In general, poverty rates are higher in rural areas than in urban areas: in Honduras, the rate was as high as 29% of the rural population as of 2018. The Dominican Republic, on the other hand, has a very low rate of 0.4%.

In Panama, the rural poverty rate is low at less than 5%, but the poverty rate in rural areas is approximately 13 times higher than in urban areas when looking at the urban-rural poverty ratio. This indicates that the disparity between rural and urban areas is becoming more apparent as urbanization progresses, and efforts to correct this disparity through the promotion of agriculture in rural areas are required.

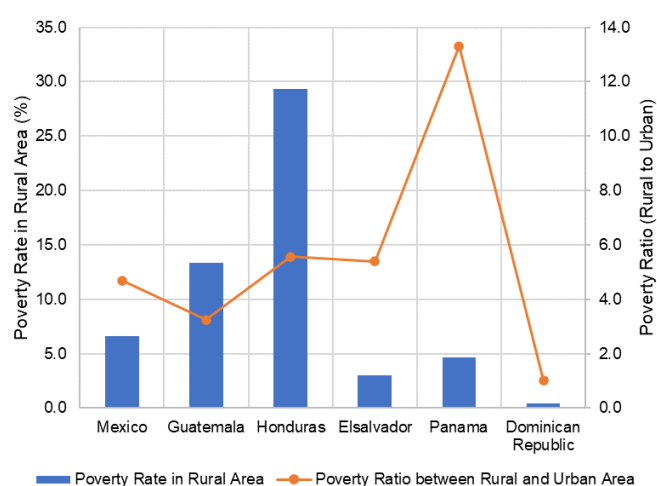


Figure 2.5.1 Rural Poverty Rates and Urban-Rural Ratios in the Six Countries Studied

Source: World Bank, LAC Equity Lab

2.5.2 Nutritional Deficiencies

Changes in nutritional indicators in the six target countries are shown in Table 2.5.1. Although the percentage of undernourished population has decreased over time in all countries, it is higher in Guatemala and Honduras than the Central American and Caribbean average of 7.7% in the 2018-2020 period, leaving room for further nutrition improvement (measures against undernutrition). The percentage of stunting, which indicates child malnutrition, is also decreasing in each country, but is very high in Guatemala at 42.8% (compared to 11.3% on average in Central America and the Caribbean).

On the other hand, the obesity rate among the adult population has been increasing over time in all countries. In Mexico, the Dominican Republic, and El Salvador, in particular, the rate is higher than the Central American and Caribbean average of 24.2%. In each country, undernutrition and overnutrition are mixed, indicating a "double burden of malnutrition" at a nutritional transition point.

The percentage of anemic women has increased over time in Honduras and El Salvador, while it has decreased in the other countries. Despite the declining trend, more than 20% of women in Panama and the Dominican Republic are anemic (the average for Central America and the Caribbean is 17.2%), and efforts to improve maternal and child nutrition are particularly needed.

Table 2.5.1 Changes in Nutrition Indicators in the Six Target Countries

Item	Year	Mexico	Guatemala	Honduras	El Salvador	Panama	Dominican Republic
Undernourishment (% in total population)	2004~2006	4.4	18.9	22.3	9.1	21.6	19.2
	2018~2020	7.2	16.8	13.5	8.5	7.5	8.3
Stunting (% in under 5-year age)	2012	12.7	47.5	22.7	16.0	20.0	8.0
	2020	12.1	42.8	19.9	11.2	14.7	5.9
Overweight (% in under 5-year age)	2012	6.7	5.4	5.0	6.0	10.1	7.8
	2020	6.3	5.1	5.7	6.6	10.8	7.6
Obesity (% in adult population, 18 over)	2012	26.8	18.9	19.0	22.2	20.6	24.5
	2016	28.9	21.2	21.4	24.6	22.7	27.6
Anemia (% in women, 15~49))	2012	15.9	11.0	16.6	9.9	22.1	28.0
	2019	15.3	7.4	18.0	10.6	21.2	26.4
Low birthweight (% in birth)	2012	8.0	11.2	11.0	10.4	10.2	11.4
	2015	7.9	11.0	10.9	10.3	10.1	11.3

Source: The state of food security and nutrition in the world, FAO 2021

2.5.3 Grain Self-Sufficiency

Figure 2.5.2 shows the grain self-sufficiency rate and the area of cultivated land per capita in the six target countries. Mexico, a large agricultural country with a vast land area, has achieved a self-sufficiency rate of more than 60% as of 2019, and has a large area of cropland per capita.

On the other hand, Honduras and Panama have a self-sufficiency rate of less than 40% and are required to improve their self-sufficiency rates from the perspective of global food shortages and soaring food prices that are expected in the future, as well as their own food security.

Although Guatemala and the Dominican Republic have achieved a self-sufficiency rate of more than 40%, the cultivated area per capita is very limited at less than 0.1 ha. If further development of farmland cannot be expected in these countries, it will be necessary to increase yields per unit area by

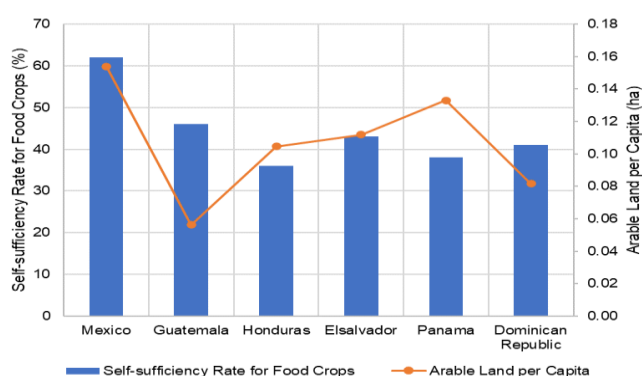


Figure 2.5.2 Grain Self-Sufficiency Ratio and Arable Land per Capita in the Six Countries Surveyed (2019)

Source: Ministry of Agriculture, Forestry and Fisheries, FAOSTAT

introducing high-yielding varieties through breeding and other means and improving fertilizer management.

2.5.4 Natural Disasters (Droughts, Floods, Storms)

The Central American and Caribbean region, the target of this study, is characterized by frequent natural disasters. The hurricane season usually lasts from June to November, and depending on the force and path of the hurricane, wind storms, storm surges, floods, landslides, and other disasters can cause human casualties and property damage. In November 2020, the region was hit by two hurricanes, Eta and Iota, in two weeks, causing extensive damage in Honduras, Guatemala, and other countries that are the subject of this study due to flooding and landslides.

German environmental NGO GermanWatch ranks the climate risk (storms, floods, extreme temperatures, extreme heat and cold waves) of all 183 countries, and according to the results for the period 1994-2013, Honduras is the country most affected by extreme weather events (#1), followed by the Dominican Republic (#8), Guatemala (9th), El Salvador (12th), and Panama (90th), making the region globally vulnerable to climate risk (<https://www.germanwatch.org>).

Figure 2.5.3 shows the change over time in the number of people per 100,000 affected by drought in the six countries surveyed. Drought has particularly affected the countries since 2000, with relatively large drought damages visible in Guatemala, El Salvador, and Honduras.

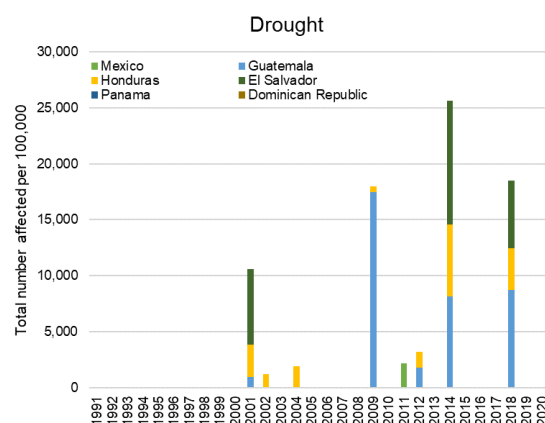


Figure 2.5.3 Number of People per 100,000 Affected by Drought in the Six Countries Surveyed (1991-2020)

Source: Our World in Data, Oxford University
 Note: Data Not Available for Panama

Figures 2.5.4 and 2.5.5 show the changes over time in the number of people per 100,000 affected by floods and storms in the six countries surveyed. As with droughts, the number of people per 100,000 affected has increased in recent years, indicating a trend toward more severe disasters. In particular, Hurricane Matthew in 2016 caused extensive damage in the Dominican Republic, and Hurricanes Eta and Iota in 2020, described above, caused extensive damage in Honduras and Guatemala.

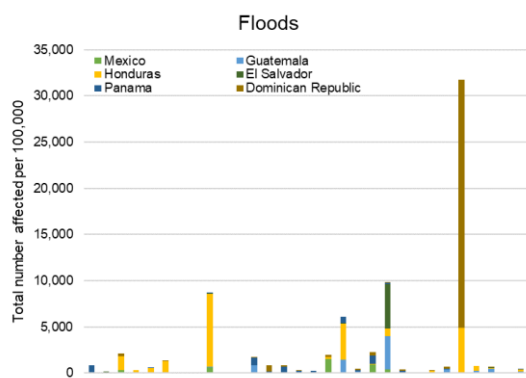


Figure 2.5.4 Number of People per 100,000 Affected by Flooding in the Six Countries Surveyed (1991-2020)

Source: Our World in Data, Oxford University
 Note: Data Not Available for Panama

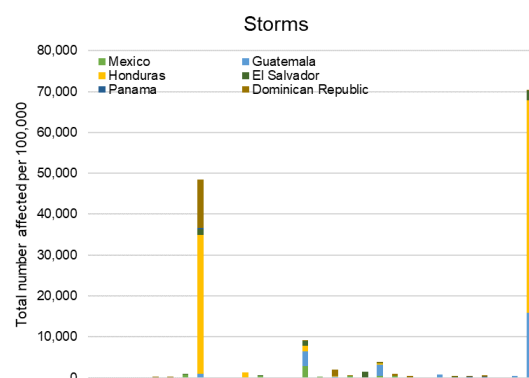


Figure 2.5.5 Number of People per 100,000 Affected by Storms in the Six Countries Surveyed (1991-2020)

Source: Our World in Data, Oxford University
 Note: Data Not Available for Panama

2.5.5 Soil Degradation

The six countries in this study are located in Central America and the Caribbean, where many areas are mountainous (sloping terrain) and the soil is easily eroded by rainfall. In addition, forests are being converted to agricultural land as a result of population growth, and soil erosion is expanding. Table 2.5.2 shows the extent of soil degradation (1981-2003) in the six target countries. Soil degradation in Guatemala occurs in more than half of the country's land area, and in the Dominican Republic in more than 30% of the country's land area. In addition, the percentage of the population affected by soil degradation exceeds 40% in the Dominican Republic.

Table 2.5.2 Degree of Soil Degradation in the Six Target Countries (1981-2003)

Country	Degrading area (km) ²	Percentage of Territory (%)	Total NPP Loss (Tonne C/ 23yr)	Percentage of Total Population (%)
Mexico	487,804	24.73	23,871,309	34.30
Guatemala	55,884	51.32	2,866,596	30.46
Honduras	30,145	26.89	1,450,818	23.38
El Salvador	5,585	26.54	234,649	16.76
Panama	8,735	11.17	513,509	7.78
Dominican Republic	18,507	37.98	560,541	43.43

NPP: net primary productivity - the rate at which vegetation fixes CO₂ from the atmosphere less losses through respiration as an indicator of land degradation or improvement

Source: Global Assessment of Land Degradation and Improvement 1. Identification by remote sensing, FAO (2008)

FAO's World Soil Resources Report (2015) lists soil erosion, changes in organic carbon, salt accumulation, nutrient imbalance, and consolidation (overgrazing and frequent cultivation machinery operation) as threats to soil in the LAC region, and reports that these items are trending toward deterioration (Table 2.5.3).

Table 2.5.3 Soil Threats in the LAC Region (Items with Worsening Trends and Their Summary)

(data) item	summary
soil erosion	They are widely distributed throughout the region. Landslides are accelerated by land use at high elevations
Organic carbon change	Organic carbon depletion is accelerated by deforestation, grassland tillage, and monoculture
Salt Accumulation and Sodium Conversion	It is caused by inadequate irrigation technology and water quality. Land use change also promotes salt accumulation.
Nutrient imbalance	In most countries, excessive extraction of nutrients from the soil results in a negative nutrient balance. In some, over-fertilization leads to nutrient imbalances as well
consolidation	Caused by overgrazing and frequent operation of cultivating machinery in agricultural fields

Note: Threats to soils are listed in order of importance.

Source: Status of the World's Soil Resources, FAO (2015)

2.5.6 Distribution

1) Mexico

The food retailing (traditional market) market in Mexico is worth approximately US\$44 billion in 2021; although many individual stores were forced to close in 2020 due to the Corona Disaster, it is expected to increase again after 2021 and grow at a CARG of 6% after 2021 (Euromonitor estimates).

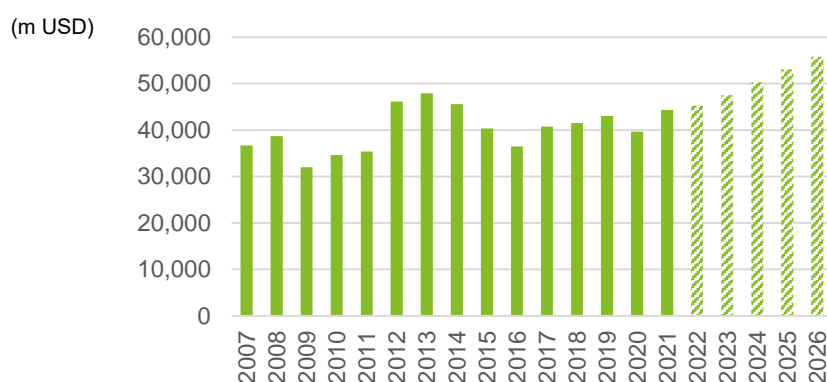


Figure 2.5.6 Market Size Trends for Food Retail Traditional Market in Mexico

Source: Euromonitor (Note) Estimated values after 2022

In Mexico, small, independently owned stores tend to be preferred over large convenience stores, and while they continue to be in constant demand, they are expected to lag behind the rapid expansion of convenience stores. Therefore, regional associations and state governments are providing support to help traditional retailers become competitive against modern retailers such as supermarkets and convenience stores. For example, the Mexican government has launched a tool called Mándamelo with the Mexican Retailers Association (ANTAD) and the National Federation of Chambers of Commerce, which provides small grocery stores with delivery services and simplified access to both digital and cash payments. In addition, with the growing focus on e-commerce throughout Mexico, traditional retailers will also need to take advantage of e-commerce platforms for future growth.

The four major listed modern retailers in Mexico are Walmart de México, Soriana, Grupo Chedraui, and La Comer. The combined sales of these four companies alone total 882 billion pesos (US\$44.1 billion), about the same as the Traditional Market. Considering the presence of unlisted companies, the Modern Market appears to be the main player in Mexico. The largest player is Walmart de México, with a 66% share as of 2021; Walmart de México has a presence in Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua in addition to Mexico, as well as 32 distribution centers in the country and abroad, and the company also operates 32 distribution centers in Mexico and abroad and 13 e-commerce sites.

Walmart de México's largest brand by sales share is Wineries and discount stores, accounting for 44.6% of Walmart de México's sales. Soriana, in second place, has three brands: Soriana Hyper, a hypermarket; Soriano Mercado, offering basic commodities at low prices; and Soriana Super, a high-quality brand. Grupo Chedraui, the third-ranked company, is a major grocery and department store chain founded in Mexico and operates in Mexico as well as in the southern United States, including California and Arizona.

Table 2.5.4 Sales and Share of Listed Food Retailers in Mexico (2021)

order	Company Name	Net sales (bn Pesos)	share
1	Walmart de Mexico (Walmex)	609	69%.
2	Soriana	155	18%
3	Grupo Chedraui	90	10% (%)
4	La Comer	28	3
	total amount	882	100%.

Source: Prepared by the survey team from Speeda.

(Note) Includes domestic sales in Mexico of four companies listed on the Mexican Stock Exchange.

2) Guatemala

The overall food retail market in Guatemala is worth approximately US\$8.2 billion in 2021. Modern

retailers and traditional retailers each account for 50% of the market, and while traditional retailers accounted for approximately 70% in 2007, the percentage has been declining over the years and is estimated to drop to approximately 40% by 2026.

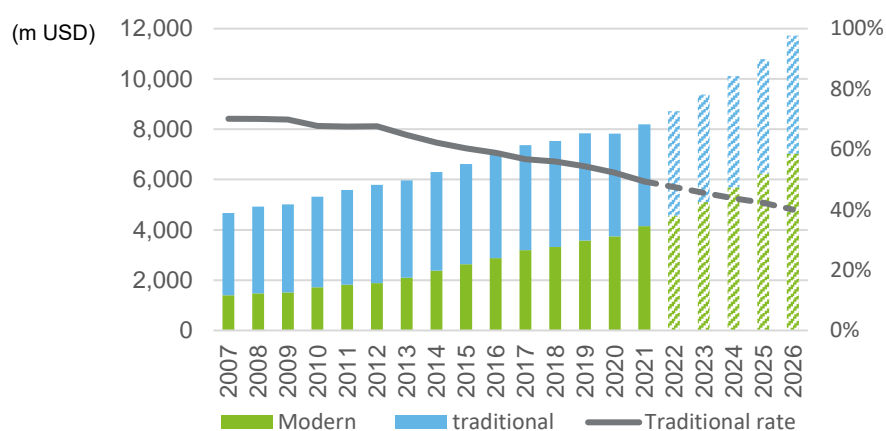


Figure 2.5.7 Trends in the Size of Modern and Traditional Food Retail Markets in Guatemala

Source: Euromonitor (Note) Estimated values after 2022

In terms of sales share by brand in Guatemala's modern market, La Torre has the largest share of 20.6% in 2021, followed by Despensa Familiar (19.7%) and Walmart Supercenter (14.3%). Unisuper SA owns La Torre, the company with the largest market share, with 99 supermarkets and 36 convenience stores in the country, as well as online shopping services. Supercenter, Paiz, and Maxi Despensa are owned by and Wal-Mart Centroamérica SA (global brand is Walmart Inc.), with Wal-Mart Centroamérica SA having a market share of about 50%.

Table 2.5.5 Top 10 Retail Brands and Holdings in Guatemala, 2021

Rank	Brand Name	Brand Owner	Sales (m USD)	Share (%)
1	La Torre	Unisuper SA	854.0	20.6
2	Despensa Familiar	Wal-Mart Centroamérica SA	817.3	19.7
3	Walmart Supercenter	Wal-Mart Centroamérica SA	594.7	14.3
4	Paiz	Wal-Mart Centroamérica SA	397.3	9.6
5	Super 24	Cervecería Centroamericana SA	300.1	7.2
6	Maxi Despensa	Wal-Mart Centroamérica SA	240.3	5.8
7	Super del Barrio	Grupo de Tiendas Asociadas SA	132.3	3.2
8	La Barata	La Barata SA	55.6	1.3
9	Mi Super Fresh	Grupo de Tiendas Asociadas SA	50.4	1.2
10	Shell Select	Shell Guatemala, SA	23.9	0.6

Source: Euromonitor

Convenience stores are expanding in Guatemala and are expected to drive the expansion of the food retail market. Limited mobility in the Corona Disaster has increased the importance of traditional retailers within walking distance, which has led retail brands to invest in traditional retailers. In addition, Industrial Bank (BI) and the Chamber of Food and Beverage of Guatemala (CGAB) are increasingly supporting traditional retailers by providing financial education and management guidance to selected retail operators to help them improve their businesses during 2021.

3) Honduras

Traditional retailers hold an important position in the Honduran grocery market. Although the share by player has been decreasing every year since 2019, small individual stores and other grocery stores will account for about 30% and 32% of the market in 2021, respectively, higher than the share of hypermarkets and supermarkets. E-commerce is not yet widespread.

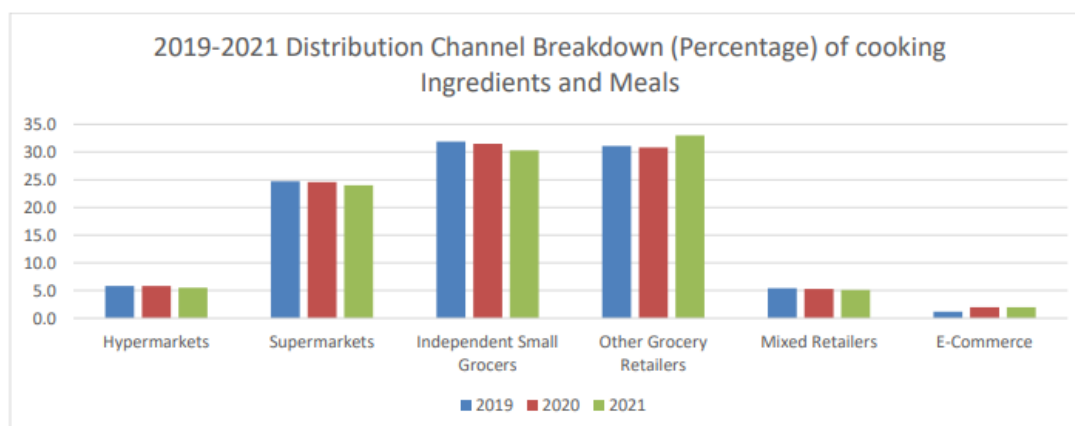


Figure 2.5.8 Share of Food Retailing in Honduras by Sector

Source: USDA "Grocery Retail, Honduras" 2022

Major modern retailers in Honduras include Walmart, Supermercados La Colonia, and Distribuidora La Antorcha. The overall retail leader is Walmart, with a 10.8% share, which operates 111 stores in the country and has brands such as Despensa Familiar, Walmart Supercenter, Maxi Despensa, and Paíz. Super Mercados La Colonia is the leader in grocery retailing, with a 7% market share. The company's supermarket brands are also the most recognized in the country.

Table 2.5.6 Share of Top 10 Food Retailers in Honduras, 2021

Company Name	2021 (%)
Wal-Mart Centroamerica	10.8
Supermercados La Colonia de Honduras	7
Distribuidora La Antorcha	2.4
Kiwla Farmaceutica	1.3
Corporacion La Cumbre	1.1
Distribuciones Universales	0.7
Precesmart Honduras	0.6
Comisariato Los Andes	0.4
Larac y Cia	0.3
Others	75.4

Source: USDA "Grocery Retail, Honduras" 2022 (original data) Euromonitor

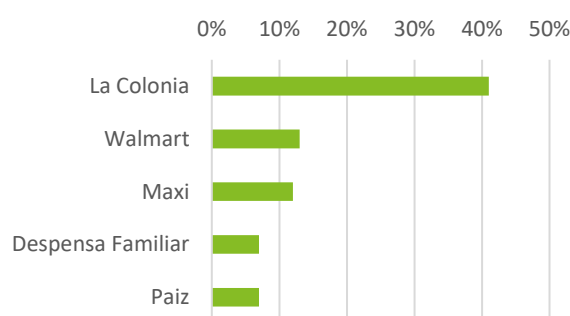


Figure 2.5.9 Top of Mind Retail Brands in Honduras (2021)

Source: Estrategia & Negocios "Walmart, lider del retail en Top of Mind Centroamérica en 2021", 2021

4) El Salvador

In El Salvador, supermarkets account for about 40% of grocery retail sales, or US\$1.7 billion. The main modern retailers are listed in the table below.

Table 2.5.7 Top Food Retailers in El Salvador, 2020

Brand Owner	Brand Name	Current Stores	Estimated annual sales
Grupo Calleja, S.A. de	Super Selectos	102	>\$150 million
Walmart Mexico y Centroamerica	Walmart Supercenter	6	>\$150 million
	Despensa de Don Juan	17	\$100-150 million
	Despensa Familiar 1/	63	\$100-150 million
	Maxi Despensa	15	>\$150 million
Price Smart	Price Smart	2	>\$151 million

Source: USDA (original data) Estimate of sales calculated by FAS, San Salvador.

The leading brand, Super Selectos, is owned by the El Salvadoran company Grupo Calleja, S.A. de, which currently operates 102 stores in the country. Walmart Mexico y Centroamerica has 101 stores, second only to Grupo Calleja, S.A. de, in terms of the total number of stores including its brands. PriceSmart El Salvador, in third place, operates large warehouse supermarkets, primarily targeting high-volume consumers such as large families and restaurant owners.

5) Panama

According to USDA², the main Panamanian food retail players are supermarkets, hypermarkets, and independent stores. Supermarkets and hypermarkets alone account for 83% of the market share, and retailing in Panama can be considered almost a modern market. Supermarket chains open stores mainly in populated areas and also offer online shopping and delivery services. Independent stores and convenience stores are mostly located in rural areas, and the USDA estimates that there are approximately 11,000 stores in the country. Major supermarkets in Panama include Riba Smith, Rey, Super 99, and Pricesmart.

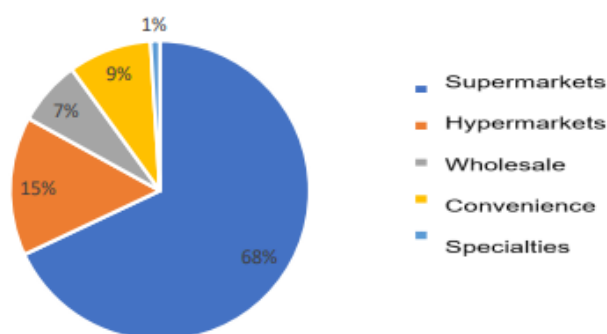


Figure 2.5.10 Channel Share of Household Goods Sales in Panama

Source: USDA, "Retail Foods, Panama", 2021

(Note: Private stores are classified as Convenience.)

An e-commerce ecosystem has also emerged in Panama, with each retailer offering subscriptions, memberships, and mobile app services on various platforms to stay competitive.

6) Dominican Republic

The overall food retail market in the Dominican Republic is worth about US\$8.5 billion in 2021, with modern retailers accounting for about half of the market and traditional retailers for the remaining half.

² USDA, "Retail Foods, Panama", 2021

In 2007, traditional retailers accounted for about 70% of the market, but this percentage is gradually declining, and after 2020, modern retailers will have the majority of the market.

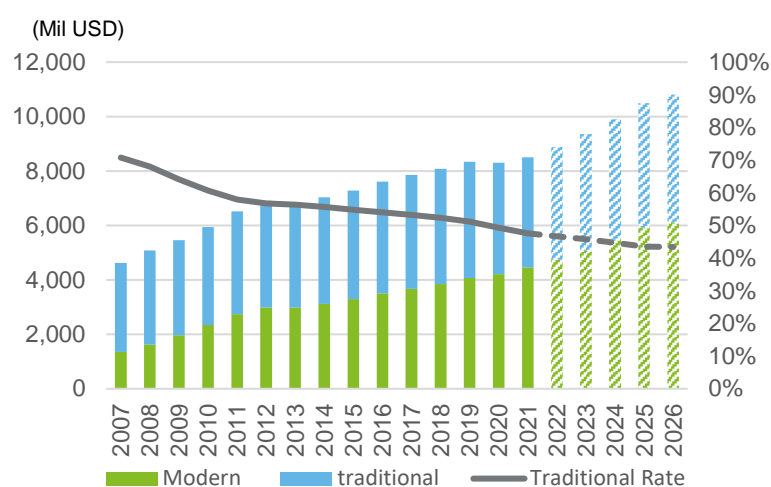


Figure 2.5.11 Market Size Trends for Modern Market, Traditional Market for Food Retailing in the Dominican Republic

Source: Euromonitor

(Note) Estimated values after 2022

In terms of brand-specific sales share of the modern market in the Dominican Republic, Multicentro La Sirena has the largest share of 21.8% in 2021, followed by Jumbo (14.7%) and Hipermercado Plaza Lama (9.2%). Sirena operates 34 stores, mainly in Santo Domingo, and also offers a pickup and delivery service called Sireba Go. The major chains are expanding their store network. The major chains are expanding their store network, and the modern market is expected to continue to grow.

Table 2.5.8 Top 10 Food Retail Brands and Holdings in Dominican Republic, 2021

Rank	Brand Name	Brand Owner	Sales (m USD)	Share (%)
1	Multicentro La Sirena	Ramos Business Group (Grupo Ramos)	971.2	21.8
2	Jumbo	Centro Cuesta Nacional	657.3	14.7
3	Hipermercado Plaza Lama	Grupo Lama CxA	411.5	9.2
4	Supermercados Nacional	Centro Cuesta Nacional	170.5	3.8
5	Hipermercado Ole	Hipermercado Olé SA	165.1	3.7
6	Almacenes Iberia	Almacenes Iberia CxA	144.8	3.2
7	Supermercado Bravo	Bemosa Cxa	118.8	2.7
8	La Cadena	Mercatodo SA	79.8	1.8
9	Aprezio.	Ramos Business Group (Grupo Ramos)	70.7	1.6
10	Super Lama	Grupo Lama CxA	57.2	1.3

Source: Euromonitor

The Traditional Market in the Dominican Republic is primarily comprised of privately owned colmados. While the food retail market in the Dominican Republic is expected to continue to grow, the percentage of Traditional Market is expected to gradually decline, due in part to the expansion of e-commerce.

2.5.7 Gender

(1) Characteristics of Latin America and the Caribbean Countries

In Latin America and the Caribbean, the traditionally male-dominated culture known as machismo

persists, and women have difficulties to be engaged in businesses outside their homes. A bottleneck in participation in the agricultural sector is the low rate of land ownership by women (see the following table). Guatemala has a low percentage of female landowners, less than 10%. Other countries, except for Panama, also have low percentages of female land ownership, in the 10% range. As a result, women have fewer opportunities to participate in agricultural technical training and to obtain loans secured by land compared to men.

Table 2.5.9 Percentage of Female Landowners in the Six Countries

Country	Percentage of females (%)
Mexico	15.7
Guatemala	7.8
Honduras	14.4
El Salvador	11.5
Panama	29.3
Dominican Republic	10.2

Source: FAO, Statistics, Gender and Land Rights Database, https://www.fao.org/gender-landrights-database/data-map/statistics/en/?sta_id=1162 (Downloaded August 2022)

As shown in the table below, women's participation in business management is generally higher in Latin America and the Caribbean countries than the world average. In terms of involvement in corporate governance, Honduras shows a high rate while Mexico does a low rate. However, the percentage of female CEOs in each country is around 20%, which is not very different among the six countries. The percentage of regular female employees is about 30 to 40%, except for Panama. In general, women are likely to be employed in the non-production sector, implying that women may play a major role in administration and support within the company.

Table 2.5.10 Participation of Women in Business Management

Country/ Region	Percentage of companies that women participate in business management and ownership (%)	Percentage of companies where women participate primarily in corporate management and ownership (%)	Percentage of companies where the CEO is a woman (%)	Percentage of full-time female employees (%)	Percentage of full-time female employees in production (%)	Percentage of full-time female employees in non-productive sectors (%)
Mexico	25.7	n.a.	14.6	37.8	20.9	32.4
Guatemala	31.5	18.4	18.5	36.6	17.5	24.7
Honduras	54.7	26.5	28	33.3	16.4	34
El Salvador	38.4	24.2	28	34.7	28.4	37.8
Panama	24.7	n.a.	23.5	41.9	34.4	44.2
Dominican Republic	32.2	13.4	21.2	33.6	31.8	57.9
Latin America and the Caribbean	49.9	19.9	20.1	33.8	22	44.5
the whole world	33.4	14.6	18.2	32.3	27.2	38.4

Source: <https://www.enterprisesurveys.org/en/data/exploretopics/gender> (downloaded August 2022)

Under these circumstances, international organizations such as SICA, BCIE, IDB, and USAID have implemented various support programs to promote gender equality in the region, especially for women's participation in economic activities. These are described below.

(2) Gender Mainstreaming Support Program in Central America and the Caribbean Countries

(1) SICA

In 2013, the SICA Regional Policy for Gender Equality and Equity (PRIEG) was established as the first cross-sectoral policy promoting gender mainstreaming in SICA. The overall goal of the policy is to “institutionalize the measures for SICA member countries to achieve equitable and just societies by 2025, ensuring the full development and advancement of women in all sectors in the region and member countries”. The donors provide support to this PRIEG program.

(2) BCIE (Central American Development Bank)

In 2014, SICA and BCIE, with funding from BCIE, developed the Regional Program for Promoting Women’s Economic Independence (2015-2020). It was intended to promote the implementation of PRIEG’s “Policy Area 1: Women’s Economic Independence”. The Program consists of the following five items.

- (a) Strengthening the legal system in the economic sector to achieve gender equality
- (b) Promotion of gradual universalization of social security, incorporating the concept of joint responsibility for care work
- (c) Strengthening the entrepreneurial and operational capacity of women in urban and rural areas**
- (d) Promotion of decent work that incorporates the principles of gender equality
- (e) Promotion of women’s participation and leadership in the economic sector

The activity of (c) mentioned above is implemented by BCIE funds. A two-step loan program providing microcredit is implemented targeting small and female-headed medium-sized microenterprises (SMEs) in Guatemala, El Salvador, Nicaragua, and Costa Rica through national or private banks in each country. Also, business training for female entrepreneurs is organized, while gender consideration training for the Micro and Small Enterprise Support Center staff is organized. Those attempts will encourage female entrepreneurs to access more financial services and other economic opportunities.

It is noted that the lending criteria vary depending on the country, and the BCIE has not been able to mandate that national financial institutions adopt gender-oriented criteria, such as lending to female-headed households or indigenous women under the Two-Step Loan Program. On the other hand, information on who is eligible for loans under the financial products is collected by the amount of loans and socio-demographic characteristics (rural, urban, etc.), including gender. The collected information is kept as statistics data at BCIE.

(iii) Central American Micro, Small and Medium Enterprise Support Center

The Central American Micro, Small, and Medium Enterprises Support Center was established in 2001 under the SICA framework considering the importance of micro, small, and medium enterprise sector in the local economy. It aims at development of Micro, Small and Medium Enterprise (MSMEs) through capacity building of private and governmental institutions. In particular, the Center provides business advisory services for female entrepreneurs and gender courses targeting the Center staff, so that female entrepreneurs can access economic opportunities. The Center has institutionalized gender mainstreaming by establishing a Gender Unit in 2017.

The Center has also developed a Regional Strategy for the Promotion of Entrepreneurship in Central America and the Dominican Republic, which considers women’s participation in economic activities as an essential element for sustainable economic development and states that such participation should be guaranteed. The member countries and international organizations implement the strategy. For example, the Government of the USA implements the “Regional program for capacity building and qualification

of human resources of the support center in Central America,” concretely introducing business advisory services specifically for women entrepreneurs.

(c) IDB

One of the regional programs implemented by the IDB is the Ciudad Mujer. This is a comprehensive service support center to assist women, who have been victims of violence, including police reporting, judicial medical services, mental health care, legal support services, and pregnancy examinations. The program began in 2011 with assistance to El Salvador, and has now expanded to Honduras, the Dominican Republic, and Mexico.

4) FAO

Since 2012, FAO has supported the Community of Latin American and Caribbean States (CARICOM) in implementation of the “Plan for the Eradication of Hunger and Food and Nutrition Security 2013 – 2025”. In 2016, FAO supported the development of the “Plan SAN-CELAC Gender Strategy” to integrate the concept of gender equality as a part of the Plan mentioned above.

The regional program “Women's Access to Land: Equality and the Right to Food Security”, was launched in 2016, aiming to improve women's access to land and property in Latin America and the Caribbean countries by 1) Information collection, research and studies (knowledge creation); 2) Promotion of rural women's land ownership through various mechanisms; 3) Promotion of the revise of national land ownership laws and strengthening policies; and 4) Improvement of access to land for rural women and 5) Sharing of good practices.

(3) Status of gender issues and measures by country

As mentioned above, the gender issues in the six target countries are relatively similar, and gender mainstreaming programs have been developed and implemented throughout the Central American region. On the other hand, each country has its own government gender mainstreaming efforts and approaches by international donors and NPOs, as each country has different farming conditions and levels of economic development. The following sections describe gender issues and efforts in each country.

(a) Mexico

Mexico is a member of the OECD and is considered a developed country. However, the GINI coefficient is 45.4% (WB, 2020), which shows the biggest gap between rich and poor among OECD member countries. Various disparity factors, including regional differences, disparities among classes, gender gap, and ethnicity, are identified. More than 70% of farmers are small producers with less than 5 ha of farmland and low productivity. Access to farming capital is also limited, and capital and cultivation technology are not sufficient.

The majority of workers in the agricultural sector in Mexico are men, and the percentage of women employed is very low. In the fourth quarter of 2020, the national agricultural sector employed approximately 6.68 million people, of which 5.88 million were men and only 800,000 were women. For example, in Sinaloa State, which is famous for vegetable cultivation for export, post-processing activities, such as fruit selection and packing, were regarded as women’s work. However, due to intensive modern agricultural development using capital and technology, the proportion of male labor increased from 80% to 90% from 1990 to 2010, and the role of women in agriculture is declining.³

IFAD considers that it is difficult for small-scale farmers in Mexico to access finance, therefore, it has

³ Institute of Developing Economies, 2017, Transformation of Agricultural Management in Developing Countries, Research Report, Chapter 6: Agriculture in Mexico and the Changing Environment Surrounding It.

given high priority to support for adaptation to climate change, especially for small-scale farmers, and economic opportunities for poor rural households headed by indigenous peoples, rural youth, and women.

(b) Guatemala

Guatemala's gender inequality index ranks at 119th out of 189 countries (2020), while its gender gap index ranks at 113th out of 115 countries (2020). According to the United Nations Development Program, women in Guatemala earn 56 cents while men earn one dollar. In addition, women's labor force participation rate is 37.4%, the lowest among Latin American and Caribbean countries, which drops further to 28.1% in rural areas (ILO, 2017). However, women's participation in the agricultural sector has increased in recent years as many young men have become migrant workers.⁴

The Government of Guatemala has regarded such an issue as one of the main national challenges, and in 2000, the “Intergovernmental Agreement 200-2000” created the Presidential Agency for Women as a public policy advisory and coordinating body for the comprehensive development of women in Guatemala. The “K'atun 2032” also states that the country will work with indigenous peoples and children to address gender inequality in order to eliminate historically constructed inequalities.

In addition, the Ministry of Agriculture and Pastoral Food (MAGA) has developed a gender equality policy (Política Institucional para la Igualdad de Género, 2016) to promote gender equality. However, discrimination and violence against women are still prevalent, and women do not have decision-making power. In addition, although MAGA has a Gender Unit, due to the budget shortage, it is difficult to operate the unit without financial support from international organizations. The number of staff assigned to the unit is limited, ranging from two to six, which is not enough to handle a wide range of tasks. Furthermore, the unit members are working other jobs at the same time and are not able to devote themselves as the Gender Unit member.

Involvement in the agricultural sector for women is not very high in Guatemala. It is probably because that women shoulder heavy burdens taking care of their children in addition to farming activities. Still, women contribute to tasks requiring careful work, such as hand-picking coffee. Moreover, in these days, there are some cases that women become coffee baristas or co-founders of companies.

In response to women's difficulties in accessing loans, IDB has provided various assistance to female entrepreneurs and agricultural production activities in Guatemala. For example, IDB has supported digital technology targeting rural women and indigenous peoples through a loan to the Génesis Empresarial Fund. There is also a program to provide loans to women entrepreneurs and women-driven companies through a loan to Banco De Continental. In addition, there is a “Catalyzer Fund”, which provides venture capital financing to companies where decision makers are women and female entrepreneurs, without the need for collateral.

In addition, IDB provides technical assistance on sustainable agriculture in cardamom cultivation, namely, support for business operation and processing technologies. Also, in addition to promotion of women's access to finance, IDB encourages full repayment of funds through technical assistance and loans. Moreover, the “Green Guarantee” program provides guarantees to lenders (about the same number of male and female beneficiaries), who are growing cardamom, coffee, cacao, and other crops in pilot plots.

In Guatemala, there are various non-profit organizations, such as Micoope Cooperative (a non-profit

⁴ WB, 2020, Project Appraisal Document on a Proposed Loan in the Amount of US\$150 million to the Republic of Guatemala for a Responding to COVID-19: Modern WB 2020, Project Appraisal Document on a Proposed Loan in the Amount of US\$150 million to the Republic of Guatemala for a Responding to COVID-19: Modern and Resilient Agri-Food Value Chains Project

organization dealing with insurance, loans, and deposits), Fenacoac (a national federation of savings and credit unions under Micoope), and the Génesis Empresarial Foundation (a non-profit organization), which provide small to medium-sized According to IDB Lab's Guatemala office, there have been very few non-payments or delinquencies, and more than 95% of borrowers have repaid their loans on time.

(c) Honduras

In Honduras, the National Women's Agency was established in 1999 as an institution to protect women's rights and promote gender equality policies, and its policy is the Gender Equality Second Plan 2010-2022. In addition, a Gender Unit has been established in the Department of Science and Technology of the Ministry of Agriculture and Pasture (DICTA). However, it is reported that the shortage of political and financial support makes it difficult for DICTA to fulfill the roles.⁵

In the agricultural sector of Honduras, organizations such as Cooperativa and Asociación have been established. A Cooperativa is governed by a general assembly and a board of directors, and the activities of a Cooperativa are managed and supervised under the responsibility of the board of auditors to ensure the governance of the organization. Asociación, on the other hand, is created for the common benefits, not for individual or private profit. It is easier to establish an Asociación under mild conditions than Cooperativa, and there are many Asociaciones. Farmers, who have irrigation systems, produce coffee, cacao, and cashews, often set up Asociaciones that handle all activities, from production to distribution, and sometimes to export. These organized farmer groups can get loans from private or agricultural banks. In addition, there are cashew production Asociaciones, whose members are exclusively women (JICA, 2013).

(d) El Salvador

The Government of El Salvador, through the Secretariat of Social Inclusion (SIS), with support from the IDB and JETRO, has implemented the “Ciudad Mujer”, a governmental project to support women since 2011, which is currently under the Ministry of Rural Development. It provides administrative one-stop services for women and serves as a center for social inclusion and expansion of women's economic activity and employment opportunities. As of 2017, 26 rural women's groups have been established in El Salvador. This initiative is a successful example of women's support and has been introduced in other Latin American countries.

There is also PRODEMORO (Programa de Desarrollo y Modernización Rural para la Región Oriental, Eastern Region Rural Modernization and Development Program), which builds net houses and irrigation facilities for farmer organizations and provides cultivation techniques. Through the Ciudad Mujer and PRODEMORO, women's groups have been established to cultivate vegetables.

However, it is said that women's participation in the agricultural sector is not very active in El Salvador. It is because that women are busy taking care of their families and do not have land ownership. On the other hand, there is a cooperative called “La Canasta Campesina”, which is headed by a woman, with 70% of members being women. It produces organic vegetables, herbs, fruits, and eggs and sells them directly to consumers. However, such cases in the agricultural sector are rarely observed.

With regard to entrepreneurship, women have limited access to finance due to their lack of assets as collateral and insufficient understanding of the conditions to gain loans. Furthermore, the traditional belief that women cannot manage a business has affected women's entrepreneurship and participation in businesses. In response to such a situation, financial education is important for women to take advantage of opportunities and to improve their skills for access to finance. In addition, a combination of technical and financing, including fintech, can be helpful for rural women.

⁵ JICA, Agricultural Sector Information Collection and Verification Study, Honduras, 2013

(e) Panama

The Panamanian government is committed to implementing public policies to provide equal opportunities for women, and the “Action Plan for Equal Opportunities for Women 2014-2024” has been developed. However, coordination among organizations and budgeting for implementing the plan have yet to progress. In addition, financing for entrepreneurial cooperatives, microcredit programs, and rural development has faced difficulties. Under the situation, inequality in employment opportunities, labor force, and working environment for women is a major problem in Panama, with women earning only 61% of men's working income.⁶

While lending is widespread in Panama, however, further financial inclusion is necessary. For example, the percentage of rural residents with bank accounts is 20% lower than in urban areas. In addition, the percentages of women and men who own bank accounts and have access to bank loans are only 17% and 21%, respectively. In response to that, the IDB-INVEST has approved a non-sovereign loan to improve access to financial services for small and medium enterprises (SMEs) and women entrepreneurs.⁷

(f) Dominican Republic

In recent years, the agricultural sector in the Dominican Republic has grown considerably due to the strong demand for organic and fair trade in fruits, vegetables, cocoa and bananas, as well as fresh produce from the growing tourism industry. Small-scale agricultural producers, on the other hand, are engaged in the traditional production of coffee, rice, and beans, and their growth has been slow. In addition, the percentage of rural women engaged in labor is 38.1%, lower than the 49.5% of urban women (IFAD, 2017).

96% of the domestic businesses in the Dominican Republic are small and micro enterprises (Ministry of Commerce and Industry, 2013). When it comes to small-scale self-employment, most of the bearers are women. However, they cannot obtain loans from banks due to shortage of collaterals, and they are forced to borrow from friends and relatives or use informal moneylenders with high interest rates to raise funds for their businesses. Under these circumstances, microcredit is attracting attention, and more than 20 organizations, including the government-affiliated Banca Solidaria, ADOPEM, and the Dominican Development Foundation, are implementing microcredit projects.⁸

2.5.8 Impact of the COVID-19 Disaster

The COVID-19 disaster that began in late 2019 has taken a tremendous economic toll on the LAC region: the 2021 report by ECLAC⁹ shows a regional GDP contraction of over 7% in 2020, the largest decline in economic activity in the region in 120 years. This decline is larger than in other regions (e.g., global average 3.3%, U.S. 3.5%, Euro 6.6%). In addition to the economic damage, the human toll is also severe, with data through mid-May 2021 reporting 18.9% of COVID-19 cases and 29% of deaths in the LAC region, which represents 8.4% of the global population (Johns Hopkins University, 2021).

Although the situation has been improving recently due to vaccination, various infection control measures, and the establishment of a medical system, COVID-19 has had a very large negative impact on the region. Table 2.5.11 summarizes the impact of the COVID-19 disaster on the agriculture-related sectors in the LAC region.

With regard to poverty and food security, the quarantine and lockdowns associated with the COVID-19

⁶ Panama Country Strategy Note, IFAD

⁷ IDB Group Country Strategy with Panama 2021-2024, 2021

⁸ Kunimoto, Iyo, 2015, "Latin America: Society and Women in the 21st Century."

⁹ The Outlook for Agriculture and Rural Development in the Americas: A Perspective on Latin America and the Caribbean 2021-2022, ECLAC

disaster have exacerbated the food insecurity and malnutrition situation for a significant proportion of the population. With regard to demand, production, and trade in food products, the degree of decline has been smaller than for other products due to their essential nature, but logistical restrictions have had a significant impact on perishable products (vegetables, fruits, fish and seafood), among others. Agricultural commodity prices have risen and are expected to continue to do so as the global economy recovers.

Table 2.5.11 Impact of the COVID-19 Disaster on Agro-related Sectors in the LAC Region

(data) item	Impact Overview
Poverty and Food Security	<ul style="list-style-type: none"> Poverty and extreme poverty reached their highest rates in 2020 in the past 12 and 20 years, respectively. The region's unemployment rate was 10.7% at the end of 2020, 2.6 percentage points higher than the value registered in 2019. 44 million people are moderately or severely food insecure, of which 21 million are severely food insecure. Employment declined substantially in sectors with a high proportion of young and unskilled workers and in activities most vulnerable to automation. Accelerating the transformative forces of digitalization and automation, the lost jobs are unlikely to be recovered.
Demand, Production and Trade	<ul style="list-style-type: none"> Agricultural output in 2020 was positive in many cases, with a lower degree of decline than the overall GDP value. (e.g. Mexico - 1.9%, Guatemala - 2.9%, Honduras - 6.3%, Panama - 4.3%, Dominican Republic - 2.8%) This is due not only to the fact that food is a necessity, but also because of its low elasticity, demand in the major destinations - the US, EU, and China - did not change significantly during the COVID-19 disaster. On the other hand, among them, vulnerable food products such as live animals, fruits, vegetables, and seafood were affected by logistical restrictions on international trade, as was the case for other product exports.
Agricultural commodity prices	<ul style="list-style-type: none"> The FAO Food Price Index averaged 127.1 points in May 2021. This represents an increase of 5.8 points (4.8%) over the previous month of April and an increase of 36.1 points (39.7%) over the same month last year. Food prices are expected to continue to rise as the global economy recovers.

Source: The Outlook for Agriculture and Rural Development in the Americas: A Perspective on Latin America and the Caribbean 2021-2022, ECLAC

2.6 Policies and Measures for Agriculture-Related Sectors

This section summarizes the policies and measures for the agriculture-related sectors in the six target countries.

1) Mexico

In the country's National Development Plan (2019-2024), agricultural and rural policy falls under "Economic policy: food self-sufficiency and rural relief". Since the self-sufficiency rate has declined under the neoliberal policies of the National Development Plan, the Plan calls for the support of small-scale farmers and the strengthening of production capacity to improve self-sufficiency and lists the following five specific priority measures.

1. **Producción para el Bienestar (Production for Living)**
A direct payment system based on farmland area, with the policy objectives of supporting small farmers and combating rural poverty.
2. **Support for coffee and sugarcane producers**
The program provides a fixed amount of 5,000 pesos to coffee growers with 1 hectare or less and 7,300 pesos to sugarcane growers with 4 hectares or less. Coffee and sugarcane are traditional Mexican products, and are mostly produced in the southern regions of the country, such as Chiapas and Veracruz, where many indigenous people live. In effect, the assistance will be limited to the targeted areas.
3. **Basic Agricultural Product Price Guarantee**
A program that purchases basic agricultural products produced by small farmers at a

guaranteed price. 2 million farmers are eligible for the program. The five target crops are corn (for food), beans, wheat, rice, and milk.

The target farmers are limited to small-scale farmers, and the applicable states are also limited, so that the measures are specific to regions with a large indigenous population.

4. Livestock Farmer Loans

Loan program for small-scale beef cattle producers (farmers with less than 10 head of cattle), providing 4 billion pesos to support livestock farmers

5. Fertilizer distribution

Program to distribute fertilizer to farmers in Guerrero and Veracruz, where there is a large indigenous population.

In addition, the Ministry of Agriculture, Livestock, Fisheries, Rural Development and Food (SAGARPA), which oversees the agricultural sector, has set further market diversification as a major goal in its National Agricultural Plan (2017-2030) and has identified 38 crops as strategic crops in the plan and plans to increase production.

Basic Strategic Crops

Corn (white, yellow), coffee, sugarcane, beans, forage oats, cacao, oilseed crops (canola, sunflower, safflower, soybeans), chickpeas, sorghum, rice, apples

Market Potential Crops

Lignans (tequila and mescalero), avocado, cotton, vegetable fuels (castor bean, jatropha, sweet sorghum), barley, bell pepper, pepper, citrus fruits (lemon, orange, grapefruit), berries (cranberry, raspberry, blackberry), tomatoes, pecan nuts, oil palm, coconut, papaya, pineapple, grapes, vanilla

2) Guatemala

In the country's National Development Plan "K'atun Nuestra Guatemala 2032", the agricultural and rural development sector is positioned in "Natural Resources for the Present and the Future" among the five priority areas of development, and Priority 4 "Introduction of Agricultural Technologies for Food Security" and Priority 6 "Agricultural and pastoral production for food security". In addition, the National Policy for National Integrated Rural Development (PNDRI), which is the basis of the current agricultural and rural development policy, was formulated in 2009 and defines the priority targets of the rural development policy as (1) indigenous people and landless people, (2) indigenous women and women farmers, (3) wage labor farmers, (4) artisans, (5) small producers, and (6) small entrepreneurs, among others.

Furthermore, the National Competitiveness Policy 2018-2032 (Política Nacional de Competitividad) aims to maintain an average annual growth rate of 6% of gross national product until 2032, to strengthen competitiveness, increase national productivity, and achieve inclusive, rapid, and sustainable economic growth. To achieve this, 11 priority sectors have been established: forestry, furniture, paper and rubber, fruits and vegetables, process food, beverages, clothing and footwear, metals, tourism and insurance services, transportation and logistics, information technology and call centers, and construction.

The main program in the sector of agriculture and rural development is the "Family Farming Program for Strengthening Rural Economy 2016-2020 (PAFFEC)," which is implemented for households that depend on family farming for their livelihood. PAFFEC classifies the survey areas into (1) market-oriented agriculture, (2) agriculture that achieves self-sufficiency and sells surplus production, and (3) agriculture that does not achieve self-sufficiency and provides the necessary support to strengthen each

of these categories. The government also encourages the promotion of family farming using local resources such as forestry, livestock, and fish farming.

3) Honduras

Agricultural sector policies in the country include the National Policy for the Agrifood Sector and Rural Environment 2004-2021 (Política de Estado para el Sector Agroalimentario y el Medio Rural de Honduras 2004-2021) by the Ministry of Agriculture and Pasture (SAG). The policy is based on the "National Policy for the Agricultural Food Sector and Rural Environment 2004-2021 (Política de Estado para el Sector Agroalimentario y el Medio Rural de Honduras 2004-2021). The National Policy was developed through proposals and consultations with the private sector in the agricultural sector under the Agricultural Round Table, which is composed of representatives from various sectors of agricultural production (fruit, vegetables, grains, pastoralism, oil palm, cacao, pig farming, beekeeping, sugarcane, etc.).

The policy document outlines two main strategic directions based on the current situation and challenges in the country's agriculture-related sector.

- 1 Transformation of the Agri-Food Sector
 - 1.1 Competitiveness and Quality Improvement
 - 1.2 Production promotion and integration of agri-food chains
- 2 Poverty alleviation and rural livelihood improvement
 - 2.1 Multi-sectoral activities
 - 2.2 Promotion of agriculture by smallholders
 - 2.3 Gender equity

Under this strategic direction, the following eight priority measures are specified.

- Market Development and Commercialization
- Food Hygiene and Safety
- Technological innovation in the agri-food sector
- Agricultural Education and Training and Agribusiness
- Rural Agricultural Finance and Risk Management
- Rural Infrastructure Development and Irrigation
- Sustainability of natural resources
- Access to land, legal security and social equity

4) El Salvador

In its government plan "Pais Seguro" (Safe Country), the country has established "16 areas of government activity (security of the population, market regulation and supervision, order and respect for human rights, integrity and transparency, responsible government, local development and regional balance, competitiveness, economic liberalization and integration, El Salvadorans living abroad, micro and small business development, agro-pastoral sector development, health care, education, housing, social and family strengthening, and environment)" and "10 presidential projects" related to these areas. (development of the agro-pastoral sector, health and health care, education, housing, social and family strengthening, and the environment)" and has established "10 Presidential Projects" pertaining to these issues.

In addition, since 2011, the "Family Farming Plan" has been promoted as an agricultural policy to stimulate the economy of the Ministry of Agriculture and Pasture, reduce poverty in rural areas, and increase agricultural production. The plan is divided into four programs as shown below.

- Measure 1: Food and Nutrition Security Program (PAN)
Strengthening farmers' production capacity and promoting the transition from subsistence farmers to saleable farmers
- Measure 2: Family Agriculture Program (PAP) for building production chains
In order to strengthen the value chain, capacity building and technical assistance through the Farmers Field School, productivity improvement, management capacity building, and private investment promotion, the following methods should be applied: 1) capacity building and technical assistance through the Farmers Field School, 2) strengthening linkages mainly through the Center of Agglomeration and Service (CAS), 3) strengthening market access through linkages with commerce and industry, 4) financial assistance through the Agricultural (4) Financial support through a special trust for the agricultural sector (FIDEAGRO), (5) Improved access to low-cost fertilizers, etc., and (6) Enhanced access to market information.
- Measure 3: Agricultural Innovation Program (PIA)
- Measure 4: Program for Agriculture, Commerce and Industry Collaboration (PEIC)

5) Panama

The National Cooperation Plan "Panama Cooperera 2030" (Panama Cooperera 2030), launched by the Panamanian government in 2017, identifies sustainable economic growth and reducing inequality as priority areas for the country's government to address in the future. The plan identifies six strategic axes: well-being and human development, strengthening democracy and the rule of law, sustainable economic development, citizen security, development-friendly foreign policy, and respect and protection of the environment. The third pillar, sustainable economic development (equitable growth), includes the promotion of food security and rural production. Agriculture is also identified as a priority sector for intervention from 2015 to 2019, along with logistics, tourism, and mining.

In the agricultural sector, the first phase of the Agricultural Solidarity Plan was announced in 2020, which includes two programs: the Agro Solidario for national producers and the Agro Vida for subsistence producers. The family agriculture program, Agro Vida, has a mandate to provide farm equipment, grain seeds, and supplies to ensure food security for families affected by the pandemic.

6) Dominican Republic

The country has enacted the National Development Strategy 2030 (END2030: Estrategia Nacional de Desarrollo 2030), which will be maintained as a policy regardless of whether there is a change of government. The strategy also has four strategic axes (democratic social organization, equality of opportunities and rights, competitive economy, and environmental considerations) and takes a long-term perspective. Specific goals and actions related to the agricultural sector are listed below.

Strategic Axis: Equal Opportunity and Rights

2.4.2 Promoting inclusive territorial development and reducing urban-rural disparities

- Support family farming as a means of reducing rural poverty and contributing to the food and nutrition security of rural populations
- Provide comprehensive services to improve the management of rural microenterprises
- Facilitate access to agricultural production capital (land ownership, credit, etc.) for rural women

Strategic Axis: Competitive Economy

3.5.3 Improve the productivity, competitiveness, environmental and financial sustainability of agricultural production chains to contribute to food security, take advantage of export potential, and generate employment and income for rural populations

- Reform institutions in the agricultural and forestry sectors to promote productive transformation and competitive access to local and external markets
- Crop zoning according to agricultural production resource characteristics and environmental and risk conditions
- Promote and enhance sustainable management practices of natural resources, degraded lands and lands undergoing desertification through training and extension programs and promotion of species that enable adaptation to climate change, respect biodiversity, and meet risk management standards.
- Promote research, innovation, and technological development, including biotechnology, to improve the production, processing, and marketing processes of agricultural and forestry products and to disseminate their results widely in the face of an efficient agricultural extension system
- Enhance and facilitate access to market information and intelligence systems for agricultural and forestry products through the use of ICT and appropriate dissemination to producers and agricultural organizations.
- Develop and strengthen national and global coalition structures and public-private partnerships that contribute to the creation of social capital and the utilization of resulting synergies, based on participatory planning of all stakeholders in the agricultural sector, including small producers
- Develop financial services that facilitate the capitalization, technization, and risk management of agricultural and forestry production units, and develop regulations and mechanisms that address the needs of the sector and provide individual and collective access to small and medium producers
- Develop integrated, modern and efficient agri-food health and safety systems
- Maintaining the health and competitiveness of all actors in the production chain
- Promote efficient delivery modes of infrastructure, services, and inputs that improve the quality and productivity of agri-food and forestry production and distribution processes
- Facilitate the creation of a business promotion system that can reorganize the national and international marketing chain of agroforestry products to create fairer and more stable conditions for agroforestry producers
- Develop systems to support the export of agricultural and forestry products in key export markets and provide information and training on their requirements
- Encourage expansion of crops and species with profitability and market potential, including carbon markets
- Establish a functional system of property registration and ownership that guarantees the legal security of property in rural areas
- Providing land tenure opportunities for youth and women to promote access to credit and the investments needed for sustainable production, and facilitating the land tenure granting process for land reform beneficiaries
- Promote increased productivity and supply on farmland that makes the greatest contribution to national food security and proper nutrition through the dissemination of best growing practices
- Encourage creation of local agri-industries to add value to primary production

Strategic Axis: Environmental Considerations

4.1.4 Manage water resources efficiently and sustainably to ensure water security

- Strengthening the participation and joint responsibility of irrigation system users in the conservation, improvement, and environmentally and financially sustainable use of irrigation systems
- Promote resources, means, and support for the modernization and preservation of irrigation infrastructure to improve water use efficiency and its impact on water use agricultural productivity

4.3.1 Reduce vulnerability, advance adaptation to the impacts of climate change, and contribute to mitigation of its causes

- Encouraging the development and transfer of technologies that contribute to adapting forest and agricultural species to the impacts of climate change

2.7 Agricultural Support System

2.7.1 Organizational Structure of the Agribusiness Sector

In each country, there are a number of support organizations in the agriculture-related sector, such as associations/councils for major export commodities such as coffee, in addition to ministries related to agriculture. Below is a list of major support organizations, related laws, and support programs in each country.

Table 2.7.1 Major Relevant Organizations, Support Programs, etc. in Agriculture-Related Sectors

Country	Classification	Japanese (language)	abbreviation	Spanish (language)
Mexico	Agriculture in general	Department of Agricultural Development (reorganized in July 2001. Former DGA)	DGFA	Dirección General de Fomento a la Agricultura
	Ministry of Agriculture and Agro-Farming	Ministry of Agriculture, Pasture and Rural Development, Fisheries and Food (Reorganized in December 2000. Formerly SAGAR)	SAGARPA	Secretaría de Agricultura, Ganadería y Desarrollo Rural, Pesca y Alimentación
	Agriculture in general	Mexico Agricultural Insurance	AGROASEME X	Aseguradora Mexicana Agropecuaria
Guatemala	Ministry of Agriculture and Agro-Farming	Ministry of Agriculture and Rural Affairs	MAGA	Ministerio de Economía Agricultura, Ganadería y Alimentación
	export	Guatemala Exporters Association	AGEXPORT	Asociación Guatemalteca de Exportadores
	Ministry of Agriculture and Agro-Farming	Agricultural Science and Technology Agency	ICTA	Instituto de Ciencia y Tecnología Agrícolas
	post-secondary education institution, incl. university, college, etc.	University of San Carlos de Guatemala	USAC	Universidad de San Carlos
	Agriculture in general	New agricultural extension service system in collaboration with local governments	SNER	Sistema Nacional de Extencion Rural
	export	Guatemala Coffee Export Association	Anacafe	Association Nacional Del Cafe
Honduras	Agriculture in general	Rural Development Bank	BANRURAL	Banco de Desarrollo Rural

Country	Classification	Japanese (language)	abbreviation	Spanish (language)
	Other	Ministry of Social Development and Inclusion	SEDIS	Secretaria de Desarrollo e Inclusión Social
	Agriculture in general	Agricultural Development Bank	BANADESA	Banco Nacional de Desarrollo Agrícola
	Agriculture in general	Agricultural Development Training Center	CEDA	Centro de Entrenamiento de Desarrollo Agrícola
	Agriculture in general	General Directorate of Agricultural Development of Honduras	DESAGRO	General Department of Agricultural Development
	Ministry of Agriculture and Agro-Farming	Ministry of Rural Development, Honduras	DESARRUAL	Rural Development Department
	Agriculture in general	Department of Science and Technology, Ministry of Agriculture and Pasture, Honduras	DICTA	Department of Science and Technology
	Agriculture in general	Directorate General of Fisheries and Aquaculture, Ministry of Agriculture and Pasture, Honduras	DIGEPESCA	Dirección General de PESCA y Acuicultura
	export	Agricultural Exporters Federation	fast-fourier-transform	Federación de Agroexportadores de Honduras
	Agriculture in general	Honduras Agricultural Investment Fund	FUNDER	Fundación de Desarrollo Empresarial Rural
	Agriculture in general	Agricultural Sector Modernization and Development Act	LMDSA	Law of Modernization and Development of the Agricultural
	Agriculture in general	National Program for Agriculture and Food Development	N/A	Programa Nacional de Desarrollo Agrolimentario
	Ministry of Agriculture and Agro-Farming	Ministry of Agriculture and Pastoral Affairs of Honduras	SAG	Secretaria de Agricultura y Ganadería
	Agriculture in general	National Agricultural Health Service of Honduras	SENASA	Servicio Nacional de Sanidad Agrocuaria
	Agriculture in general	Agricultural Market Information Office, Ministry of Agriculture and Pastoral Affairs, Honduras	SIMPAH	Sistema de Información de Mercados de Productos Agrícolas
	Agriculture in general	Planning and Evaluation Office, Ministry of Agriculture and Pastoral Affairs, Honduras	UPEG	Unidad de Planeamiento y Evaluación de Gestión
Agriculture in general	Honduras Coffee Research Institute	IHCAFE	Instituto Hondureño del Café	
El Salvador	Agriculture in general	National Agricultural and Forestry Technology Center	CENTA	Centro Nacional de Tecnología Agropecuaria y Forestal
	Agriculture in general	Plant Health Bureau, Ministry of Agriculture and Pasture	DGSV	División General de Sanidad Vegetal
	Ministry of Agriculture and Agro-Farming	Ministry of Agriculture and Rural Affairs	MAG	Ministerio de Agricultura y Ganadería
	Agriculture in general	Family Farming Plans	PAF	Plan de Agricultura Familiar
	Agriculture in general	Family Farming Program for the Production Chain (Family Farming Program 2)	PAP	Programa de Agricultura Familiar para el Encadenamiento Productivo (Programa 2 del PAF)
	Agriculture in general	Beekeeping and Coffee Growers Association of the Eastern Region of El Salvador	APICAFE	Consorcio de Apicultores y Cafetaleros de la Región Oriental de El Salvador

Country	Classification	Japanese (language)	abbreviation	Spanish (language)
	Agriculture in general	Norimaki Industrial Bank	BFA	Banco de Fomento Agropecuario
	Agriculture in general	Federation of Dairy Farmers and Dairy Products Processors	Asociación Salvadoreña de Ganaderos e Industriales de la Leche	Asociación Salvadoreña de Ganaderos e Industriales de la Leche
	Agriculture in general	National Agricultural and Forestry Technology Center	CENTA	Centro Nacional de Tecnología Agropecuaria y Forestal
	Agriculture in general	El Salvador Coffee Council	CSC	Consejo Salvadoreño del Café
	Agriculture in general	Agricultural Credit Guarantee Program	PROGARA	Programa de Garantía Agropecuaria
Panama	Agriculture in general	Panamanian Food Marketing and Distribution Association	ACOVIPA	Asociación de Comerciantes Distribuidores de Víveres y Similares de Panamá
	Other	Small and Medium Enterprise Agency	AMPYME	Autoridad de Micro, Pequeña y Mediana Empresa
	Agriculture in general	Panama Agro-Pastoral Research Organization	IDIAP	Instituto de Investigación Agropecuaria de Panamá
	Agriculture in general	Organization for Promotion of Agricultural Marketing	IMA	Instituto de Mercadeo Agropecuario
	Agriculture in general	Panama Cooperative Organization (Organisation)	IPACOOOP	Instituto Panameño Autónomo Cooperativo
	Ministry of Agriculture and Agro-Farming	Ministry of Agriculture and Pastoral Development	MIDA	Ministerio de Desarrollo Agropecuario
Dominican Republic	Ministry of Agriculture and Agro-Farming	Ministry of Agriculture	Ministry of Agriculture, Forestry and Fisheries (formerly Ministry of Economy, Trade and Industry)	Ministerio de Agricultura
	economy	Ministry of Economic Planning and Development	Ministerio de Economía, Planificación y Desarrollo	Ministerio de Economía, Planificación y Desarrollo

Source: Compiled by survey team from various sources and Internet information.

2.7.2 Other Support Systems

An example of an agricultural insurance support program in Central America and the Caribbean is Mexico's agricultural insurance program (2019-2022, 86,085 cumulative policyholders) (Source: GIZ, *Innovations and emerging trends in agricultural insurance for smallholder farmers - an update*, 2021, p. 49). In Mexico, there is also a microinsurance scheme under the CADENA (disaster assistance program) and an agricultural insurance scheme under the Natural Disaster Program, with Mexico leading the way in the region (Source: Interview with Shilpa Pankaj, Head of Agriculture, APAC (Singapore), Guy Carpenter, June 28, 2022).

In addition, although not a country covered in this survey, there are El Niño index insurance schemes in Chile and Peru in South America. This was piloted in 2011 by the insurance company La Positiva Seguros y Reaseguros SA via a microfinance institution (MFI) (the reinsurance company is PartnerRe) and has worked relatively well (Source: *ibid.*).

On the other hand, the first international institutional initiative to support disaster recovery is “Cat Bond” (catastrophe bond), issued for the first time by the World Bank in 2014. The bond, outlined below,

provides a new way for governments in 16 Caribbean countries to address natural disasters and climate change by allowing institutional investors to bear the risk of disasters.

Table 2.7.2 Overview of the World Bank "Cat Bond"

(data) item	Contents
Issuer	World Bank (International Bank for Reconstruction and Development, IBRD)
Rating	Aaa (Moody's) / AAA (S&P)
Total amount of issue	US\$30 million
Redemption period	3 years
Composition Company	Guy Carpenter Securities and Munich Re
Sales company	Guy Carpenter Securities
Advisor	Swiss Re
Reinsurance company	Caribbean Catastrophe Risk Insurance Facility (CCRIF): An organization established in 2007 by the World Bank with contributions from the Government of Japan to provide prompt insurance payments to 16 Caribbean governments to assist member countries in coping with disasters in the event of major earthquakes and hurricanes. Since then, it has been managed through contributions from the governments of Canada, the United Kingdom, France, Ireland, and Bermuda, the European Union (EU), the World Bank, and the Caribbean Development Bank, as well as premiums from beneficiary countries. In recent years, membership has expanded to include Central American countries with support from the governments of Canada, the United States, and Mexico.
Structure	Interest payments and principal repayments on the cat bonds are covered by an insurance swap agreement between the World Bank and CCRIF. In the event of a natural disaster exceeding a predetermined magnitude, the principal amount of the cat bond is paid to CCRIF in proportion to the magnitude of the disaster, which reduces the principal amount to be redeemed by the same amount.

Source: World Bank press release (June 30, 2014)

<https://www.worldbank.org/en/news/press-release/2014/06/30/world-bank-issues-its-first-ever-catastrophe-bond-linked-to-natural-hazard-risks-in-sixteen-caribbean-countries>

2.8 Japan's Efforts in the Agriculture-Related Sector

1) Information gathering and verification survey on development cooperation in Central America and the Caribbean Region With/Post COVID-19 societies (to be completed by March 2022)

The study covered Guatemala, Belize, El Salvador, Panama, and the Dominican Republic, and collected information on FVC challenges that emerged prior to and as a result of COVID-19. The results confirmed that challenges included inadequate equipment and infrastructure, farming techniques, coordination among FVC actors, value addition, access to market information, adaptation to climate change, and access to finance and insurance. These were previously recognized as challenges, but became more apparent during COVID-19.

In response, the report identified the strengthening of food sanitation and storage capacity, linkages among FVC actors, climate change countermeasures, and agricultural support systems as key issues, and proposed measures and support along these lines. Among the projects that should be undertaken with Japan's cooperation are the development of post-harvest processing and distribution infrastructure, improvement of farming techniques, development of irrigation infrastructure, introduction of weather and disaster monitoring systems, and loans for producer organizations.

2) Information gathering and confirmation survey for the utilization of Japanese technology in strengthening the North American and South-Central region wide and food value chain (to be completed in February 2020)

FVC surveys were conducted in Paraguay, Peru, Ecuador, Costa Rica, and Guatemala in order to confirm issues for strengthening FVC in the Latin American region and Japanese technologies that can contribute to solving such issues. As a result, it became clear that the main FVC exports are to the middle class in North America and Europe, and that although quarantine and sanitary standards in European and US

markets are not as high as in Japan, a sophisticated response is required to secure volume, consumer preferences, organic certification, and harvesting and shipping according to seasonal events. Meanwhile, many engaged in value-added fruit and vegetable exports, such as citrus fruits from Peru, broccoli from Ecuador, and pineapples from Costa Rica, are focusing on Asian markets, but are facing challenges in preservation techniques and cost reduction during transportation.

In addition, Japanese companies could provide support for agricultural waste disposal, installation and data analysis of agricultural weather observation equipment, and improvement of food processing technology and technology transfer. Involvement of large-scale companies may cause negative problems, such as increased agricultural waste, environmental degradation and conflicts with local residents over pesticide spraying, and lower prices for agricultural products. The representatives of local FVCs are generally highly aware of these issues and are committed to environmental and social considerations and compliance with international standards through the introduction of new technologies, and there is room for Japanese companies to participate in waste management.

2.9 Other Donor Initiatives in the Agribusiness Sector

The six target countries have received assistance mainly from the Inter-American Development Bank (IDB), the Central American Bank for Economic Integration (BCIE), and IFAD, including loans and technical assistance for agriculture and SME support. The following table shows the main types of assistance provided. The table suggests that coffee is the main target crop of FVC, and that the upstream "producers" of FVC are the main target, and that the support focuses on digitalization, quality improvement, climate change adaptation, and support for smallholder farmers and enterprises.

Table 2.9.1 Support of Other Donors in the Agricultural Sector in the Six Target Countries

Country	Donor	Support in the Agricultural Sector	Main target
Central America	IDB/EU	Support for the establishment and implementation of a China-US digital trade platform (technical cooperation)	VC General
Mexico	IDB	Expanding coffee cultivation in response to climate change (technical cooperation), agricultural innovation (technical cooperation), direct farmer support programs (loans)	producer
Guatemala	IDB	Support for climate-friendly agricultural technologies for smallholder entrepreneurs and farmers (loans), and improving the competitiveness and financing of coffee cultivation (technical cooperation)	producer
	BCIE	Support for agricultural insurance feasibility study (technical assistance)	Producers, insurance companies
Honduras	IDB	Coffee Chain Digitalization for Resilience of Specialty Coffee Producers (technical cooperation); Value Chain and Rural Business in the Fonseca Bay Region (loan)	producer
	KfW	Micro, Small and Medium Enterprises Financial Sector Support (Technical Assistance) *Agricultural sector support accounts for 44% of total loans	smaller companies
El Salvador	IDB	Technology introduction and innovation for small farmers (investment incentives); support for development of information systems for coffee forests (technical cooperation)	producer
	BCIE	Support for Family Farming and Rural Entrepreneurship for Food Security and Nutrition (Loan)	Producers, entrepreneurs
	USAID and others	VC building project for cacao (Alianza Cacao). VC building project through the conservation of the Criollo species of cacao. The objective is to revive cacao production and exports and reduce excessive migration. Synergistic effects are expected through support to strengthen financial services to cacao VC stakeholders.	Cacao VC officials
	EU, SIECA, Dutch	The Export Investment Promotion Agency and donors are working together to strengthen the export competitiveness of small and medium-sized enterprises	smaller companies

Country	Donor	Support in the Agricultural Sector	Main target
	government	(SMEs) from Central American countries in the European market, focusing on "soft" areas such as providing information on the EU market, export business guidance, and organizational strengthening, with possible needs for related agricultural infrastructure development and agricultural financial services support for exporters and others.	
Panama	IDB	Sustainable and Inclusive Agricultural Innovation Project (loan); post-COVID economic recovery assistance for indigenous coffee producers (technical assistance)	producer
Dominican Republic	IDB	Agriculture, Food Safety and Innovation Project (loan), Production Support for Coffee Farmers (technical cooperation), Agricultural Innovation Grant Support Program (loan)	producer

The main types of support provided by other donors in agriculture-related sectors are described below, by country.

1) Mexico

In Mexico, the "Reducing the Impacts of Climate Change on Vulnerable Populations in the Balsas Basin" is being implemented by IFAD starting in 2021. The project cost is \$55 million, of which IFAD's Climate Finance is contributing \$22.4 million. The project targets vulnerable groups in rural areas (poor, youth and women, and indigenous peoples) and will contribute to the impacts of climate change through environmental protection and the strengthening of production systems in the Balsas watershed.

2) Guatemala

The IDB is currently providing a variety of assistance in the agricultural sector in Guatemala, including agroforestry, technical assistance to small farmers, and funding to SMEs for the introduction of smart agricultural technologies in response to climate change. However, the size of the funds is relatively small, ranging from \$300,000 to \$2 million, reflecting the fact that these supports are for small and medium-sized enterprises and farmers. Although already completed, IFAD also provided assistance to the coffee sector, including strengthening the coffee sector through collaboration between the private and public sectors (technical cooperation) and technical cooperation on diversification of agricultural production targeting small-scale farmers. No support is currently being provided by IFAD.

3) Honduras

Technical assistance for banana VC is being provided by the IDB to reduce the impact of hurricanes and the COVID-19 disaster on banana production costs and to revitalize the banana sector and, in turn, the economy. However, the loan amount is relatively small at US\$750,000. Also planned is assistance to improve climate change adaptation in forestry and agroforestry targeting micro, small, and medium enterprises (MSMEs), although this is still in the preparatory stage of implementation.

In addition, a socioeconomic inclusion project for small farmers in northeastern Honduras is currently being implemented by IFAD. This will improve the organizational capacity, productivity, and processing and marketing capabilities of small farmers, thereby improving the livelihoods of the targeted farmers. The total project cost is \$46.48 million, of which \$16.33 million is funded by IFAD.

4) El Salvador

One of IFAD's ongoing projects in El Salvador is the development of a national program for rural economic reform. This seeks to build the capacity of small farmers to adapt to climate change, and is financing research, extension, and education/training for the development of climate change-adaptive value chains. The total project cost is \$18.69 million, of which \$17.13 million is financed by IFAD.

Support by the IDB includes the Climate Change Adaptation Improvement Program in Coffee

Production (loan project). This program aims to improve the livelihood of coffee farmers by introducing smart agriculture in coffee cultivation and strengthening marketing. The project cost is US\$45 million. In addition, technical assistance for small farmers' innovation is underway, targeting producer associations. This is being done through two schemes: technical cooperation and investment incentives.

From 2014-2019, USAID provided technical assistance and strengthened the organization of relevant institutions in coffee VC for about 6,000 small-scale coffee farmers to enhance their competitiveness in the international market. The total investment amounted to \$29.4 million, of which USAID contributed \$10 million.

5) Panama

In Panama, the Sustainable and Inclusive Agricultural Innovation Project is being implemented by the IDB. It aims to increase agricultural income, strengthen resilience against pests and hurricanes, and maintain the sustainability of the agricultural environment, and consists of three components: 1) improvement of sustainable production technologies, 2) inclusive market innovation, and 3) digital information management and analysis. The project cost is \$46 million, of which the IDB is financing \$41 million. In addition, technical assistance is being provided to indigenous coffee-producing communities to help them recover economically from the COVID-19 disaster.

6) Dominican Republic

In the Dominican Republic, the Agriculture and Nutrition Improvement Project (loan) is being implemented by the IDB and consists of three components: 1) nutrition and sanitation services for agricultural products, 2) improvement and dissemination of quarantine techniques for plants and animals, and 3) compilation of agricultural statistical data. The project's operating cost is \$50 million, all financed by the IDB. In addition, technical assistance to farmers producing coffee on the border with Haiti is also underway.

Chapter 3 OVERVIEW AND ISSUES OF THE AGRICULTURAL FINANCE SECTOR

3.1 Overview of the Financial Sector in Six Countries Surveyed

The following table shows the outstanding credit balances to the private sector in the six countries surveyed. Among six countries, Mexico has the most significant credit balance (USD 312,188 million), which is followed by Panama. The credit balances to the private sector in four countries, namely Dominican Republic, El Salvador, Guatemala, and Honduras, are small, reflecting the size of their economies.

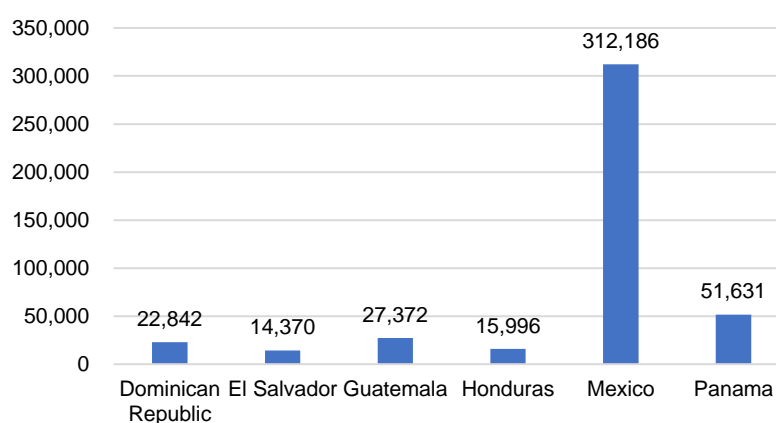


Figure 3.1.1 Outstanding Credit to the Private Sector in the Six Countries Surveyed (2020, million USD)

Source: World Development Indicators Database

<https://databank.worldbank.org/source/world-development-indicators> (last viewed June 30, 2022)

The World Bank uses “domestic private credit to the real sector by deposit money banks as a percentage of local currency GDP” to measure the financial depth of a country.¹ The financial depth of the six countries surveyed since 2011 is depicted in the figure below.

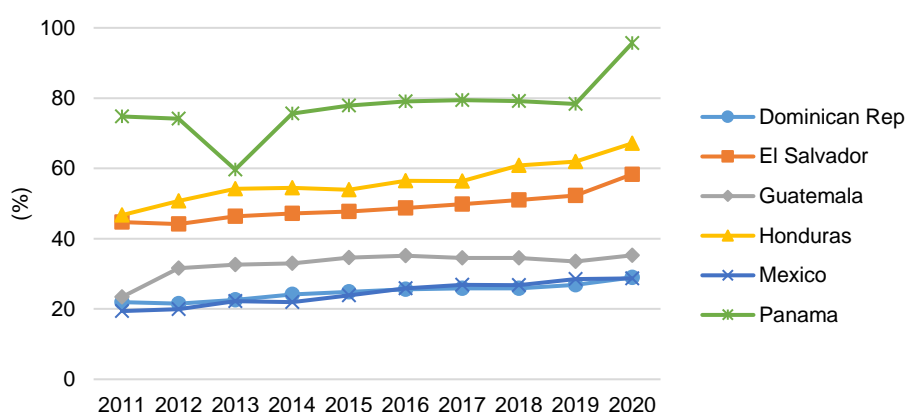


Figure 3.1.2 Financial Dept (Domestic Credit to Private Sector by Banks as % of GDP) of the Countries Surveyed

Source: World Development Indicators Database

<https://databank.worldbank.org/source/world-development-indicators> (last viewed June 30, 2022)

Figure 3.1.2 shows that the financial depth of Panama is much higher than other countries (95.7% in 2020), reflecting its higher GDP per capita (above \$10,000). The financial depth of Honduras and El

¹ <https://www.worldbank.org/en/publication/gfdr/gfdr-2016/background/financial-depth>

Salvador, which was 67.1% and 58.3% in 2020, is relatively high next to Panama. On the other hand, those of Mexico and the Dominican Republic, which were 28.7% and 29.0% in 2020 respectively, are lower than others. Almost all countries have increased their financial depth over the last ten years. Among them, Honduras has shown the largest increase, lifting it from 46.7% in 2011 to 40% in 2020.

The following figure shows the changes in lending interest rates, deposit rates, and interest margins of the banking sector in the six countries surveyed. Interest rates declined or remained stable in 2020 and 2021, partly due to the abundance of liquidity in financial markets due to monetary easing in response to the spread of COVID-19. However, because the USA and European countries, on which the six countries economically depend, started showing clear signs of economic slowdown due to soaring raw material prices and clogged supply chains in 2022, and the market players started avoiding risks, interest rates were expected to increase after this. Such a global trend might affect the financial markets in the six countries.

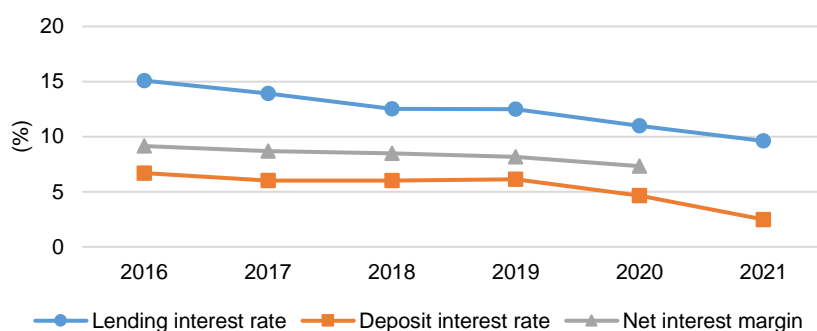


Figure 3.1.3 Interest Rates in the Dominican Republic

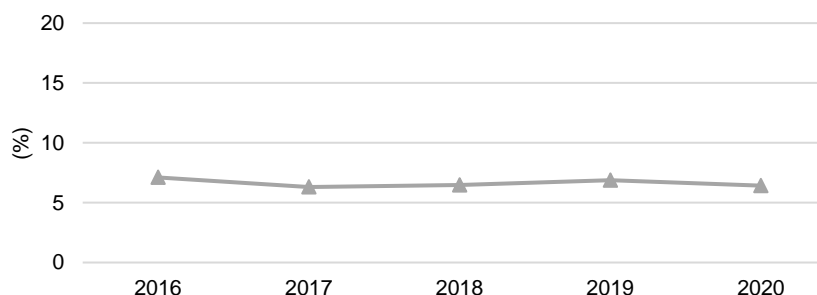


Figure 3.1.4 Interest Rates in El Salvador

(Net Interest Margin only)

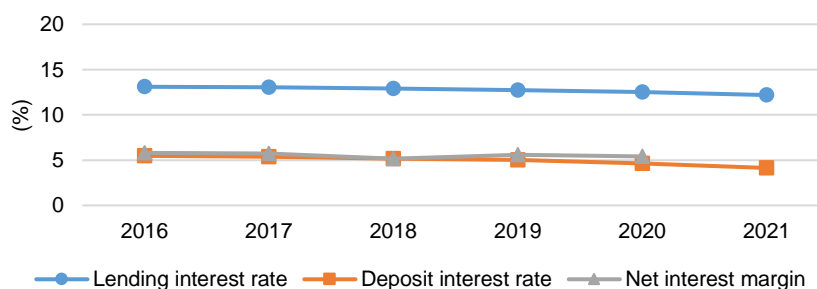


Figure 3.1.5 Interest Rates in Guatemala

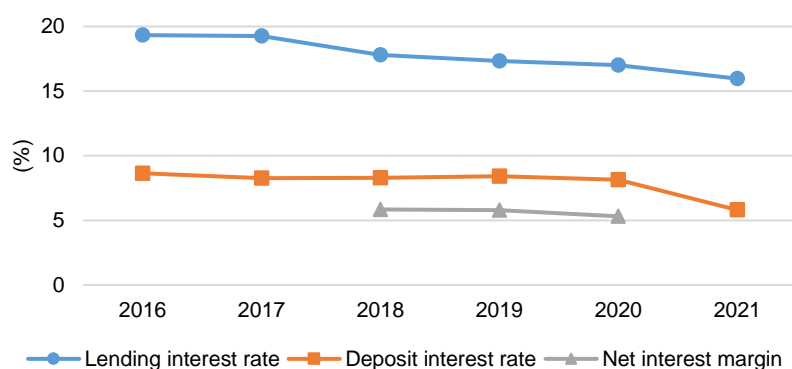


Figure 3.1.6 Interest Rate in Honduras

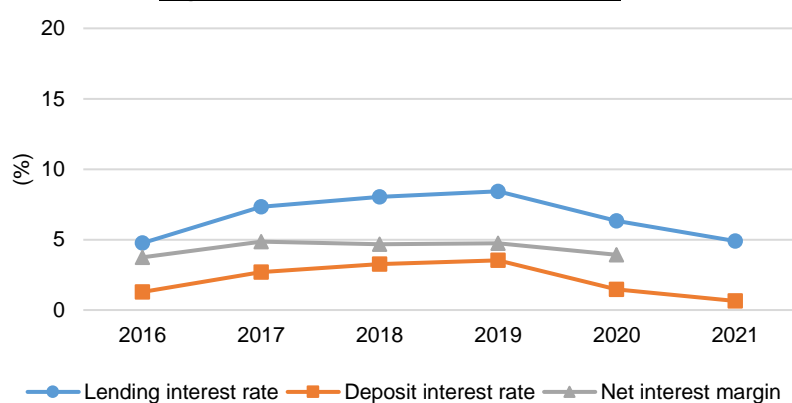


Figure 3.1.7 Interest Rates in Mexico

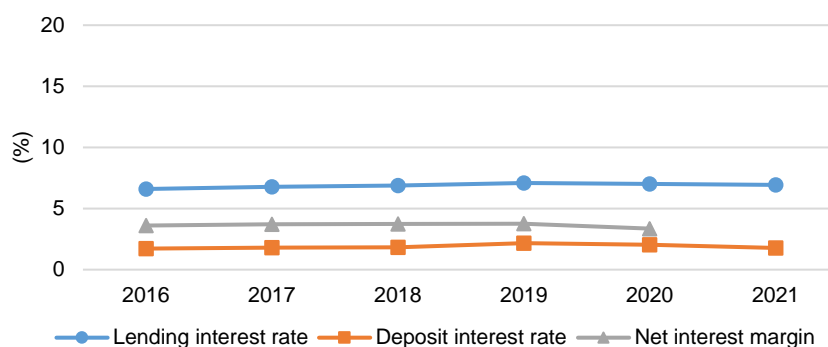


Figure 3.1.8 Interest Rates in Panama

Source: Global Financial Development Database November 2021, World Development Indicators Database
<https://databank.worldbank.org/source/world-development-indicators> (last viewed June 30, 2022)

The following figure shows the changes in the NPL (non-performing loan) ratios of domestic banks of six countries, by which the soundness of the financial sector can be measured. Since the definitions of NPLs may differ from country to country, it is preferable to look at the trends of NPL ratios of six countries rather than comparing the levels of NPLs. Before the spread of COVID-19, the NPL ratios were stable or declining in most countries except Guatemala and the Dominican Republic, where there was no data; the ratios rose significantly in 2020 or 2021. This appears to be due to the deterioration in business conditions due to the spread of COVID-19.

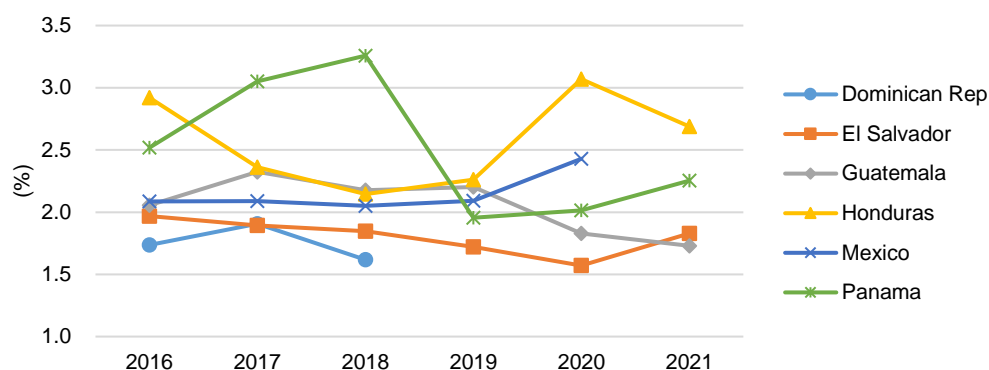


Figure 3.1.9 NPL Ratios of Six Countries Surveyed (Bank Non-Performing Loans to Total Gross Loans)

Source: World Development Indicators Database

<https://databank.worldbank.org/source/world-development-indicators> (last viewed June 30, 2022)

3.2 Recent Initiatives in Agricultural Finance

3.2.1 Financial DX

1) Global Trends

The definition of the term "financial DX" in general is not always clear, but if we consider it as digital transformation (DX) in the area of finance, we need to first check this definition of DX. DX is a concept proposed by Professor Erik Stolterman of Umeå University in Sweden in 2004, and is defined as "the penetration of ICT that changes people's lives for the better in all aspects" (Source: Erik Stolterman, Anna Croon Fors, "Information technology and the good life", *Information Systems Research Relevant Theory and Informed Practice*, 2004).

In Japan, DX is defined as "the use of the third platform (cloud, mobility, big data/analytics, and social technologies) to create value and establish competitive advantage by transforming both the online and real customer experience through new products, services, and new business models, while companies respond to dramatic changes in their external ecosystem (customers and markets) and drive change in their internal ecosystem (organizations, cultures, and employees) (Declaration on the Creation of the World's Most Advanced Digital Nation and Basic Plan for the Promotion of Public-Private Data Utilization, approved by the Cabinet on July 17, 2020)." It is increasingly distinguished from "digitization," which is the conversion of material information into digital form, such as by automating existing paper processes, and "digitalization," which is the transformation of an organization's entire business model to create a better way to serve its clients and partners.

Financial DX is also recognized as transforming financial services through "fintech," and the term "fintech" as used here is defined by the BIS in "the Irving Fisher Committee on Central Bank Statistics (IFC) Report: Central Banks and Fintech Data Issues (February 2020)" as "technological innovation used to support or provide financial services" (Source: the said report, p.1).

The term "Fintechs" or "Fintech companies" is defined as follows and is distinguished from the generic term "fintech. Fintechs or Fintech companies are defined as "Incorporated institutions that use technology-enabled innovation to provide financial services" (e.g., neobanks, fintech credit institutions/platforms, fintech insurance companies, fintech asset management, fintech payment service providers, etc.). (Source: *ibid*, p.1-3)

In general, the key disruptive technologies that will drive change in financial services are (1) AI and Big Data (machine learning, predictive analytics), (2) cryptography (smart contracts, biometrics), (3) distributed computing (distributed ledger technology (DLT), blockchain), and (4) mobile access and the Internet (application programming interfaces (APIs), e-wallets, payment platforms).

Such innovative technologies have led to the emergence of fintech-based online financial services around the world in recent years. For example, there are "challenger banks" (e.g., Monzo in the UK, Atom in the US, N26 in Germany) that have acquired banking licenses and provide financial services on mobile apps. There are also online lenders including P2P lenders (e.g. LendingClub in the US), invoice finance providers (e.g. Kickpay in the US), balance sheet lenders (e.g. PayPal Working Capital in the US), which solicit donations, purchases and investments other than in the form of loans. There is also a growing number of crowdfunding providers. In addition, there is a cloud-based accounting service called Xero and a cloud-based cash management support service for small businesses called CaFE, and the use of such cloud-based accounting + cash management platforms is emerging as a key to financing for small and micro businesses (MSMEs).

During the Covid-19 pandemic, the governments in the world took emergency measures for MSMEs. For example, in the UK, the "The Coronavirus Business Interruption Loan Scheme" was established as part of business support from March 23, 2020. Meanwhile, Trade Ledger (digital lending platform), Wisefunding (digital SME credit scoring platform), Nimbla (trade finance insurance) and NorthRow (digitization of customer relationship processes) have jointly established a new platform of rapid lending services for the banks and alternative lenders (lending businesses that use fintech to replace traditional financial intermediaries).

2) Overview of Latin America and the Caribbean

Traditionally, countries in Latin America and the Caribbean with high Fintech penetration are Mexico (72%) and Brazil (64%) (Source: EY, *Global FinTech Adoption Index 2019*), and it is presumed that the penetration level is low in the countries in this survey except Mexico. Deloitte, "A tale of 44 cities: connecting global FinTech Interim Hub Review 2017," also finds that the FinTech Index Performance Score is unknown for those countries other than Mexico, which are not included in the report.

The digital banking market in Latin America and the Caribbean has a high average annual growth rate of 27% from 2012 to 2021, but is still considered an untapped market, with the top 10 new financial service providers, known as digital banks (a collective term that includes neobanks and challenger banks), estimated to account for 90% of the market (Source: BPC & Fincog, *Digital Banking in Latin America, 2021*, p.12).

The leading digital bank active in the region is Brazil's nubank (established in 2013), which has 34 million customers and 63.5% of the emerging financial services customer base in Latin America and the Caribbean. However, although the company has overseas operations with offices in Mexico, Argentina, and Colombia, it does not yet cover the entire region. (Source: *ibid*, p.13-14, 19)

The top 10 digital banks in the six countries in this survey are also (founded in 2016, 500,000 customers), BROXEL (founded in 2010, 6 million customers), and CUENCA (founded in 2018, 500,000 customers) in Mexico. And these digital banks have yet to expand into the five countries in this survey outside of Mexico. (Source: *ibid*, 2021, p. 19-26)

Meanwhile, in April 2020, the IDB and Finnovista published "Fintech in Latin America and the Caribbean - A Consolidated Ecosystem for Recovery," a report on the latest developments in the fintech industry in Latin America and the Caribbean, which also reveals the regional maldistribution of fintech in the region.

According to the report, there are 2,482 fintech companies active in Latin America and the Caribbean overall, a sharp increase from the previous survey points of 703 companies in 2017, 1,166 companies in 2018, and 1,830 companies in 2020. This number of companies represents 22.6% of the total global number of 11,000 companies (source: Findexable, *The Global Fintech Index 2021*, 2021). By country, the number of companies is concentrated in Brazil (771 companies, 31%) and Mexico (512 companies, 21%), with the two countries accounting for 52% of the total. As for the countries covered in this study, the Dominican Republic (55 firms, 2%), Guatemala (31 firms, 1%), Honduras (25 firms, 1%), Panama (16 firms, 1%), and El Salvador (14 firms, 1%).

The 2,482 fintech companies active in the region, broken down by sector, are: payments and remittances (25%), lending (19%), business technology solutions for financial institutions (15%), corporate financial management (11%), personal financial management (7%), insurance (7%), asset management, trading and capital markets (6%), crowdfunding (5%), and digital banking (5%) (Source: IDB and Finnovista, *Fintech in Latin America and the Caribbean - A Consolidated Ecosystem for Recovery*, 2022, p. 20).

First, if we look at the "lending" sector, it is also called "digital credit solutions" or "alternative finance" and there are 502 companies in the region (as of 2021; 115 in 2017). These include consumer finance (56%), business lending (20%), factoring (11%), P2P consumer lending (7%), and P2P business lending (6%). By country, Brazil accounted for 64% of the US\$5.3 billion (2020) in alternative financing, followed by Chile (US\$0.8 billion) and Mexico (US\$0.5 billion). It should be noted that according to the same report (p. 32), 85% (US\$4.5 billion) of the funds provided by these new forms of lending platforms and crowdfunding are for business, mainly for MSMEs.

In the area of Business Technology Solutions for Financial Institutions, the breakdown is: digital banking platforms and services (46%), business infrastructure (17%), smart contracts (12%), data analytics (9%), other solutions (7%), and customer identity verification KYC (6%), Chatbot automated conversation programs (3%).

The "Corporate Financial Management" segment includes: financial management and business intelligence (42%), digital accounting (19%), electronic invoicing (18%), debt collection solutions (17%), and other (4%).

Many of the region's fintech companies are young, having been in business for less than two years (37% of the total number of companies), have between 1 and 10 employees (47% of the total number of companies), and operate in only one country (70% of the total number of companies). In countries other than Brazil and Mexico (1,283 firms or 52% of the total number of firms in the two countries), where there is a concentration of fintechs, fintechs originating from these two countries have not made inroads into the region, and the penetration of fintechs has not progressed.

On the other hand, the concept of a new business model called "open banking" or "open finance," in which financial data is shared among parties using API technology, is already widely recognized, with Brazil and Mexico leading the way.

In Mexico, a prominent country in the fintech sector among the six countries in this survey, the government is responding to the rapid development of fintech and enacted a "Fintech Law" in 2017 as a first step in this direction. However, some impediments to further fintech development have been identified, including underdeveloped infrastructure (financial infrastructure, digital communications), low financial literacy, and weak digital technology and financial skills. (Source: IMF, *IMF Working Paper Fintech and Financial Inclusion in Latin America and the Caribbean*, WP/21/21, 2021, p. 75-76). The table below summarizes the details of the infrastructure environment surrounding fintech in Mexico. It should be noted that Fintech Mexico, an industry association, currently has 195 members, of which 115 are fintech companies.

Table 3.2.1 Infrastructure Environment Surrounding Fintech in Mexico

Identification System	<ul style="list-style-type: none"> • Digital financial services such as online banking and electronic payments are offered. Banamex, the country's largest bank, allows customers to register for BancaNet online banking by providing their Banamex customer number and entering either a branch code or a securely generated PIN as a registration key. Once registered, the customer can securely log in and perform electronic transactions using their customer number and online password. • In August 2017, the CNBV (Comisión Nacional Bancaria y Valores) announced new regulations requiring all banks to install fingerprint scanners for customers within 12 months in order to strengthen identification and authentication systems. Regulated financial institutions will be required to scan fingerprints when opening accounts and applying for loans and credit cards, and this data will be matched with data held by the National Forensic Institute. • Instituto Nacional Electoral (INE) maintains an electronic database of all registered citizens, including photo identification, date of birth, and address. • Banks are allowed to implement voice and facial recognition technology to improve online banking security. • Banks are legally required to comply with the Know Your Customer (KYC) process to verify the identity of the account holder at the time of registration. • On the regulatory front, Mexico has adopted a tiered KYC process and simplified the required documentation based on the customer's risk level, allowing individuals outside the formal financial system to access deposit accounts in a secure and affordable manner. Low-risk accounts with capped transaction volume can be opened without identification and without an in-person application process.
Technical infrastructure	<ul style="list-style-type: none"> • Due to Mexico's large land area, the disparity between rural and urban areas in terms of technological infrastructure is significant and has restrained the expansion of digital financial services in some areas. Approximately 99.2% of the population has access to electricity, but to a limited extent. Reliance on electricity services is lower in mountainous and southern areas than in urban areas. • Mexico has the third largest mobile market in Latin America, yet has the lowest mobile penetration in the region. 4G connections are growing rapidly and account for 50% of mobile connections, while most of the remaining connections are still 3G. Universal mobile coverage (>100%) will be achieved by 2020 by reducing terminal and access costs. • Mexico's relatively small bank branch infrastructure allows for the introduction of innovative financial services. At the end of 2016, about 81% of municipalities had no local bank branches, 91% had no ATMs, and 78% had no facilities with POS terminals. The 2014 banking reform has helped the banking sector. The number of POS terminals has doubled since competition was encouraged, but coverage is still low in some municipalities.
Electronic funds transfer, payment, and interoperability	<ul style="list-style-type: none"> • The government has enacted legislation to enable mobile and online banking services to facilitate the adoption of electronic transactions by financial institutions and businesses. The government has mandated the introduction of centralized electronic payments (government-to-government) to government ministries and agencies since 2010, and is in the process of phasing this into government-to-government (G2P) payments. This is part of the "Mexico Digital Strategy" that the government launched in 2013. Electronic banking for G2P services through the government's one-stop e-services portal to promote the use of e-payments and digital financial services in the non-government sector. • The legal environment for supportive measures encourages innovation in new digital financial services. Regulations encourage interoperability of systems, with all major Mexican banks interconnected and consumers able to conduct open-loop transactions through online banking. Most banking applications are also interoperable. Competition in the banking industry is intense, users are more discerning in their choice of banks, and banks are more willing to use interoperable services. This competition also puts pressure on the cost of digital financial services. Online transactions are usually free or included in standard bank account fees; card payment fees have also declined for consumers and merchants as a result of increased competition since the 2014 banking reforms. Most banks charge fees for international money transfer transactions, such as money transfers from the U.S. to Mexican bank accounts, but these costs are charged to the U.S. sender, not the Mexican recipient.
Regulations related to digital financial services	<ul style="list-style-type: none"> • In June 2016, the National Strategy for Financial Inclusion was released. It consists of the following pillars: improving financial infrastructure in underserved areas, expanding access to financial services for marginalized populations, advancing financial education, using technology to improve financial inclusion, and creating data and measurements to assess financial inclusion. The initiative complements the Mexican government's 2013 Digital Mexico Strategy, which aims to develop a digital economy, including an ecosystem of mobile financial services.

	<ul style="list-style-type: none"> The financial inclusion strategy is underpinned by a series of regulatory reforms that have been implemented in the past to provide an ecosystem that enables digital financial services. In January 2014, a major reform of the banking sector was made into law. This reform includes the Comisión Nacional para la Protección y Defensa de los Usuarios de Servicios Financieros (Condusef, Financial Services Consumer Protection Agency), which was empowered to require greater transparency from financial service providers. CNBV was also empowered to regulate and impose sanctions on operators that do not comply with the law. 2014 amended law allows non-bank financial institutions to issue cards and make card payments. The Law on Financial Technology was approved in December 2017 and came into force in March 2018, marking a major step forward in terms of regulation. For the first time, this defined digital financial services such as e-money and cryptocurrencies, and established procedures and rules for fintech operations.
Law enforcement and organizational capacity	<ul style="list-style-type: none"> The CNBV is the main regulator of the banking sector and is supported by CONDUSEF, Comisión Nacional del Sistema de Ahorro para el Retiro (CONSAR, the pension regulator) and Comisión Nacional de Seguros y Fianzas (CNSF, the insurance regulator). Instituto Federal de Telecomunicaciones (IFT) is a telecommunications regulator that works closely with the government and the CNBV to develop cross-cutting policies for the digital sector and financial inclusion strategies. As provided for in the 2014 banking reform, all financial services are subject to the Anti-Money Laundering (AML) and Combating the Financing of Terrorism (CTF) laws. The government has made sustained efforts to improve the capacity of law enforcement agencies to combat the risk of abuse of the banking system. In Mexico's Financial Intelligence Unit (FIU), agents are regularly trained in new technologies and investigative techniques to track and contest financial crimes. In addition, the FIU and other law enforcement teams regularly share information with foreign agencies, particularly the United States, and work closely with the U.S. OFAC.
Innovation in Digital Financial Services	<ul style="list-style-type: none"> Innovation in the digital financial services sector is maintained by a good balance between the government and the business sector. The government has enabled the ecosystem through legislation covering the financial services and telecommunications sectors. This has enabled financial institutions and telecommunications providers to jointly launch new digital financial services. Banks were among the first to introduce online banking for checking account holders and support it through mobile banking apps, but the apps function as an extension of online banking rather than a separate product. Mobile providers also help banks offer a variety of services, targeting both regular bank customers who use smartphones and those who do not have a regular bank account and need text message-based services. Regarding the potential of the Mexican mobile money market, Samsung Pay launched its service in Mexico in February 2018; in March 2018, e-commerce giant Amazon (USA) introduced its first debit card in Mexico, named Amazon Rechargeable. With the approval of the Fintech Law in March 2018, tighter regulations surrounding digital products have prompted new products and new partnerships between financial and telecommunications companies, ushering in a new wave of innovation in digital financial services. Mexico is one of the largest fintech markets in the region. The Fintech Law also allows non-bank financial institutions (NBFIs) to use e-money transactions, which will help to spread the use of e-money.

Source: afi & FILAC (Financial Inclusion Initiative for Latin America and the Caribbean), *The Digital Financial Services Ecosystem in Latin America and the Caribbean*, The Economist Intelligence Unit, 2019.

The following table summarizes the overview of fintech-related regulations, etc. for the other five countries covered in this survey, which are far behind Mexico in fintech concentration.²

² Based on the following information.

- IMF, IMF Working Paper Fintech and Financial Inclusion in Latin America and the Caribbean, WP/21/21, 2021, p.54-56, p.58-64
- Fintech Switzerland, In Guatemala, Incumbents Tap Fintech Specialists to Ramp up Tech Capabilities, 2 December 2021. <https://fintechnews.ch/latin-america-fintech/in-guatemala-incumbents-tap-fintech-specialists-to-ramp-up-tech-capabilities/50436/>
- Ana Cristina Arosemena, Fintech in Panama, 17 March 2022, Central Law Blog <https://central-law.com/en/panama-fintech/>
- The Business Year, Fintech in Panama 2020, 4 March 2020, <https://www.thebusinessyear.com/article/fintech-takes-over-in-panama-city>
- Accounting Team El Salvador, Overview and Opportunities for Fintech Companies in El Salvador, BIZLATINHUB, 26 November 2019, <https://www.bizlatinhub.com/overview-and-opportunities-for-fintech-companies-in-el-salvador/>

**Table 3.2.2 Overview of Fintech-related Regulations in the Countries covered in this Survey
(excluding Mexico)**

Dominican Republic	
Major Related Laws and Regulations for Financial Inclusion	<ul style="list-style-type: none"> • Law of Secured Transactions • Law of Reciprocal Guarantees • Modification of the Microcredit Regulations • Modification to the Payment Systems Regulations • Cyber Security and Information Regulation • Restriction of Bank Fees for Inactive and Cash Withdrawals • Factoring Law • Leasing Law
Fintech Strategy and Regulation	<ul style="list-style-type: none"> • The development of a fintech strategy was initiated in 2018 and revised by the Central Bank in 2020 with technical assistance from the IDB and incorporated into the broader framework of the financial inclusion strategy. • Goals: financial system stability, payment and settlement system efficiency and security, innovation in financial business models and financial products, financial inclusion and inclusive growth • The Payment Systems Regulations (2019) established a framework to regulate fintech companies that make digital payments.
Fintech Overview	<ul style="list-style-type: none"> • In 2019, the Association of FinTech Companies of the Dominican Republic (ADOFINTECH) was created to encourage and promote all types of activities related to technology and computer systems applied to the provision of financial services and insurance. Currently, the Association has 126 members, of which 56 are fintech companies. Its business areas include digital payments, insurance, finance, treasury management, fintech promotion agencies, technology providers to financial institutions, and FX trading. • Financial institutions began offering new products and operationalizing features that incorporate technological input and novel applications (e.g., mobile apps for online banking, enhanced ATM capabilities, and rapid settlement through the use of RTGS (real-time gross settlement system)). • As of 2022, 55 companies have been identified as fintech operators in the Dominican Republic, of which approximately 60% are members of ADOFINTECH. • The main obstacles to the development of fintech companies identified by ADOFINTECH are: (1) the relatively small size of the domestic market, (2) the high regulatory cost burden for fintech companies, and (3) the lack of agreement on how contracts should be enforced in accordance with general consumer protection regulations.
Guatemala	
Major Related Laws and Regulations for Financial Inclusion	<ul style="list-style-type: none"> • Formulation of the National Strategy for Financial Inclusion (ENIF) (2019, Ministry of Economy)
Fintech Strategy and Regulation	<ul style="list-style-type: none"> • Operation of the SIB Innovation HUB by the Central Bank (Bancos de Guatemala)
Fintech Overview	<ul style="list-style-type: none"> • The percentage of the population of electronic payment users is 6.28%, while personal finance is still at a slight level of 0.9%. • The Guatemalan Fintech Association was founded in October 2019. It has 28 member companies. • According to Fintech Switzerland, there are 47 domestic fintechs. Of these, electronic payments (39.6%), digital lending (19.1%), and personal wealth management and corporate financial management (8.5%) account for the largest share.
Honduras	
Major Related Laws and Regulations for Financial Inclusion	<ul style="list-style-type: none"> • Complementary Norms for Strengthening Transparency, Financial Culture and Treatment of the Financial User by the Financial and Insurance System • Regulations on the Authorization and Operation of Correspondent Agents • Regulation for the Authorization and Operation of Non-Bank Institutions that Provide Payment Services Using Electronic Money" (INDEL) (as amended by the Financial Innovation Commission) • Law on Payment Systems and Securities Settlements
Fintech Strategy and Regulation	<ul style="list-style-type: none"> • The Central Bank (BCH) and the National Commission for Banking and Insurance (CNBS) have each established committees to study the Fintech sector. To create a collaborative environment between the public and private sectors, the Financial Innovation Commission

Honduras	
	<p>(MIF) was created in October 2019. The MIF is supported by the Inter-American Development Bank (IDB) and aims to contribute to financial innovation through the adoption and use of financial technology for financial inclusion.</p> <ul style="list-style-type: none"> • Currently, the MIF has two working groups, one focusing on payments and remittances, the other on cross-cutting technologies (digital onboarding, open banking, use of APIs, etc.) and alternative finance. • CNBS is one of the working groups related to digital financial services. BCH participates in the CEMLA Fintech Forum and working groups within the regional integration framework promoted by the Central American Integration System (SICA) and the Central American Monetary Council and working groups. • BCH is currently working on reforming its payment system. Regulatory reforms are expected to bring in new players. An interdisciplinary committee has been established with the objective of studying new business models, paying attention to AML/CFT (anti-money laundering and combating the financing of terrorism) and cybersecurity risks inherent in these activities. Amendments to the law on payment systems and securities settlement have been discussed in the context of fintech development, but have not yet been ratified. • Fintech activities are regulated by the following: (1) the Office of Management and Public Innovation, created by Executive Decree PCM-076-2020, reports to the Office of the President and, among its various functions, manages policies and standards related to IT and cybersecurity; (2) The Honduran Digital Government is a department under the Secretary of State, with the objective of creating a digital culture supported by IT.
Fintech Overview	<ul style="list-style-type: none"> • Fintech companies concentrate on the payment and remittance sector. Some exist to manage corporate and personal finances and provide support to financial institutions. In addition, start-ups have emerged in the areas of crowdlending, microinsurance, and personal financial management. Some foreign start-ups, such as KIVA, for example, have already partnered with domestic financial institutions.

Panama	
Major Related Laws and Regulations for Financial Inclusion	<ul style="list-style-type: none"> • National Financial Education Strategy (NFES) • Official Resolution SBP-DR-0069-2013 dated June 5, 2013: Financial Education Program by the Panamanian Banking Supervisory Authority (initiated in 2013)
Fintech Strategy and Regulation	<ul style="list-style-type: none"> • Banking Law (1998): has been amended on various occasions, but is still in the process of comprehensive revision, which is key to the development of the Fintech ecosystem in Panama. • The Supervisory Bureau of Banking (SBP) creates legal instruments and a regulatory framework for financial services that complement international services, including e-wallets, digital currency providers, payment management systems, and remittance apps. • The United Nations Development Program (UNDP) is committed to fintech development in Panama and has been conducting Alternative Finance Lab events since 2016, exploring new financial technologies and mechanisms that would increase access to investment opportunities for Panamanian entrepreneurs and small business owners.
Fintech Overview	<ul style="list-style-type: none"> • Recently, platforms have been developed for money transfers, e-wallets, digital payments, etc., despite the lack of regulation. One example is FacePhi, a selfie-based authentication system recently introduced by Banco General de Panama. The bank has integrated FacePhi technology into its Android and iOS mobile banking apps, using its biometric facial recognition software as an advantage to identify customers who log on to Banco General de Panama's app. • ViaCarte, a payment solutions and mobile money technology company, recently announced a partnership with PayMachine to expand credit services available to unbanked customers in Panama. The two companies aim to strengthen the mobile payments ecosystem in Panama by offering affordable credit services to unbanked customers. • Through a network of financial institutions, telecommunications carriers and retailers, ViaCarte and Paymachine provide on-demand credit and risk analysis tools that allow consumers to apply for low-cost micro loans through cell phone applications. • Global fintech company Mobi724 recently launched a seamless card-linked discount offering system in Panama, allowing consumers to redeem rewards and coupons directly at the point of sale via credit card. The development of e-commerce was promoted in COVID 19, and new technologies were developed accordingly. These are expected to continue and establish themselves in the financial sector in the medium term.

Panama	
	<ul style="list-style-type: none"> The fastest-growing areas are cryptocurrencies and blockchain. These include P2P payments (e.g., Aeon), charities and donations (e.g., Cointributions), and crypto wallet solutions (e.g., Blockmove).

El Salvador	
Major Related Laws and Regulations for Financial Inclusion	<ul style="list-style-type: none"> Executive Order No. 28: Establishment of the National Council for Financial Inclusion and Education (CNIEF) National Strategic Guidelines for Financial Education
Fintech Strategy and Regulation	<ul style="list-style-type: none"> The government is working with fintech companies to develop a legal framework to incorporate the fintech industry, but currently there is little regulation. The Central Bank (BCR) aims to assess the performance of fintech companies currently active and to come up with a regulatory framework that will promote business while maintaining financial order and fairness by absorbing risks in the financial industry.
Fintech Overview	<ul style="list-style-type: none"> Market entry has just begun. The fintech company YoVendoRecarga was born out of people's need to efficiently increase their SIM card balances; GlobalPay is a web platform for receiving payments and recharges for citizens abroad; and Tigo is a mobile phone company that offers a variety of services to help people pay their bills. These fintechs have business cooperation with four domestic telecom operators (Tigo, Claro, Telefonica, and Digicel).

Source: Compiled by the JICA Survey Team from various sources.

3) Progress of Financial DX and Lending Practices in Latin America and the Caribbean

The IMF argues that "Latin America and the Caribbean continues to lag behind other regions in terms of financial inclusion. Unlike what has been observed in other parts of the world, there is no clear evidence that the development of fintech has supported the expansion of financial inclusion in Latin America and the Caribbean" (Source: IMF Report, p. 2, 2021). The report then examines possible drivers of financial inclusion, such as gross national income per capita (GNI per capita), Gini coefficient, school enrollment, and cell phone network coverage, which do not differ significantly compared to other regions of the world. However, a higher trend is observed in the Latin America and Caribbean region with respect to the "Gini index" and "ratio of overhead costs to total assets of banks."

Considering that, with the exception of Mexico, the use of financial DX and FinTech has not yet become widespread in the six countries covered in this study, and that the "ratio of overhead costs to total assets of banks" tends to be high, it can be inferred that, in general, traditional screening methods are followed by loan officers in lending practices to farmers and agriculture-related MSMEs, and that lending costs are relatively high. In addition, even in Mexico, where the concentration of fintech is leading the way, there is no evidence yet that the concentration of such fintech is contributing to financial inclusion and increased lending to agriculture/MSME sector.

To begin with, the foundation of financial services is credit services, but if we compare traditional "loans" with "transaction lending," the latter automatically determines creditworthiness by utilizing transaction data held by a company. It is precisely in this new form of lending that recent fintech/technological innovations, particularly natural language processing (extracting and classifying quantitative and qualitative information from vast amounts of document data under certain conditions), machine learning (automatically identifying patterns in credit data and using the patterns once identified for subsequent predictions), and the latest algorithms (Cost reduction and speeding up of quality improvement of data processing and analysis technologies), etc. can be optimally utilized.

Looking ahead, it is assumed that the global trend of financial DX and fintech will come to the six countries in this study in earnest, and that the advanced fintechs emerging in Mexico, Brazil, Chile, and other countries will seek to make inroads. In such cases, local financial institutions may move into a DX phase that will fundamentally change their lending practices for agriculture and related MSMEs, and it

will be important to adapt to the actual financial environment in each country in the future.

3.2.2 Financial Education

In recent years, financial education has been attracting attention from various stakeholders in Latin America and the Caribbean, including government agencies, private companies, universities, and NGOs. Although financial and economic conditions differ from country to country, governments are taking certain measures from the perspective of financial stability and financial inclusion, viewing financial education policies as a means of promoting economic growth.

The OECD's "Financial Education in Latin America and the Caribbean: Rationale, Overview and Wat Forward" (Nidia Garcia, Andrea Grifoni, Juan Carlos Lopez Diana Mejia, 2013) discusses low financial literacy and the growing interest in financial education policy in the context of Latin America and the Caribbean.

- In general, there is widespread ignorance among the population about basic financial concepts such as inflation, interest rates, the relationship between risk and return, and the general functioning of capital markets. With regard to savings and investments, the majority of the region's population is not saving for retirement. Most of those who do save are upper-income earners. Lower-income individuals typically save through informal products. Low-income individuals borrow money from family and friends, while middle- and high-income individuals ask financial institutions. There is also a direct relationship between the number of years of formal education of the head of household and access to credit through formal financial institutions. Unpaid debt increases as the nation's income level declines. (Source: the same report, p. 25-27)
- Governments believe that financial education policies are timely and appropriate because they can address the needs of both the growing middle class and the poor, while at the same time having a positive effect on individual and household participation in financial markets, and on economic development in general. This interest is reflected in the participation of 14 Latin American and Caribbean countries in the OECD's International Network for Financial Education (INFE) 26, where they are contributing to and learning from globally identified best practices in policy development and implementation. Latin American and Caribbean countries also cooperate with the OECD on financial education issues through another channel, the regional network of central banks. (Source: the same report, p. 29)

However, due to a lack of basic research, it has not been possible to measure the level of financial literacy and diagnose the needs gap, and it is not easy for policy makers in each country to have a clear picture of the level of financial literacy and financial behavior of their citizens and to develop effective financial education programs and strategies based on evidence. It is not easy to develop effective evidence-based financial education programs and strategies.

Meanwhile, in 2008, with the support of the United States' Council for Economic Education (CEE), the Center for Latin American Monetary Studies (CEMLA) and Banco de la Republic Colombia organized the "Conference on Economic and Financial Education in Latin America and the Caribbean" with the support of the United States' Council for Economic Education (CEE). These conferences and other events have since led to various surveys, conferences, and international cooperation projects related to financial education in the region, and the situation regarding basic research on financial literacy has improved as policy makers in each country have begun to draw on best practices from around the world.

Subsequently, in 2014, CEMLA published "Financial Education and Inclusion in Latin America and the Caribbean - Programs of Central Banks and Financial Superintendencies" (Maria Jose Roa Gascia, Gloria A. Alonso Masmela, Nidia Garcia Bohorquez, Diego Andres Rodriguez Pinilla, 2014), a report that summarizes the financial education programs by central banks and financial regulators in the region.

The following is an overview of the level of development of financial education in the six countries covered in this survey, the various approaches, and the joint government/private sector financial education programs.

Table 3.2.3 Overview of Financial Education, by Country

Mexico	
Definition of Financial Education	<ul style="list-style-type: none"> Knowledge, behaviors, and attitudes that are the basis for all sound financial decisions. The formation of these skills and competencies begins with economic and financial education and is carried out through a process that results in increased financial literacy and financial soundness. In other words, financial education is a process that begins with economic and culminates in increased financial literacy and financial soundness. (Mexico's National Policy for Financial Inclusion)
Regulatory Framework	<ul style="list-style-type: none"> Article 30 of the General Education Law: stipulates that all government curricula and syllabi provided by the state and their implementing agencies and private curricula must be followed by local governments, private organizations approved by the state or authorized to study them, which must provide financial education at the school level.
Organizations Concerned	<ul style="list-style-type: none"> Financial Education Commission (CEF): established in 2011 with the objective of developing and implementing a national strategy for financial education. Members include the Undersecretary of Finance and Credit (CEF Chairman), Undersecretary of Primary Education of the Ministry of Public Education, Undersecretary of Higher Education, Chairman of the National Commission for the Protection and Defense of Financial Service Users (Condusef), Chairman of the National Banking and Securities Commission (CNBV), Chairman of the National Insurance Bond Commission (CNSF), Chairman of the National Retirement Savings System Commission (Consar); President of the Executive Director of the Institute for the Protection of Banking and Savings (IPAB); Head of the Banking, Securities and Savings Unit, Development Bank Unit, Insurance, Pensions and Social Security Unit of the Ministry of Finance and Credit (SHCP); and Head of the General Directorate for Financial Education and Cultural Development of the Central Bank of Mexico. National Council for Financial Inclusion (CONAIF): established in 2011 to develop and implement national policies for financial inclusion. The Council coordinates with the CEF on actions and initiatives related to financial education. Financial Groups Regulation Act: established in 2014 by a joint body of the CEF and NONAIF.
Core Organizations and Their Activities	<ul style="list-style-type: none"> CEF and NONAIF jointly published the National Policy for Financial Inclusion in March 2020. This was integrated with the National Strategy for Financial Education. The goal of the financial inclusion policy is to improve the economic and financial skills of the population. Two strategies for the policy: first, to promote financial and economic education and increase financial capability among school-aged people. Second, to expand economic and financial education and awareness activities to promote knowledge, skills, and financially sound behavior. Specific actions: inclusion of economic and financial education content in the compulsory education curriculum and syllabus established by the General Education Law, inclusion of economic and financial education and digital education for the beneficiaries of social programs, etc. A goal of increasing the economic and financial capacity of the population and an index was established to measure this goal. This indicator is the "Financial Capability Index" score, and the goal is to achieve 60.5 points by 2024. The baseline was set at 58.2 points in 2018.

Guatemala	
Definition of Financial Education	<ul style="list-style-type: none"> The process of acquiring the knowledge and skills necessary to make better economic decisions and improve individual and family well-being.
Regulatory Framework	<ul style="list-style-type: none"> Article 3 Letter of the Financial Supervision Law: recommends that the Banking Supervisory Authority fully comply with the best practices for operations and financial service provision in the supervised financial system, as well as the current applicable legal provisions, in accordance with Art. Official Communication No. 4828-2019: recommends that all supervisory agencies adopt, implement, and communicate the contents of "Best Practices for Conducting Business and Providing Financial Services".
Organizations Concerned	<ul style="list-style-type: none"> Council for Financial Education: a meeting created to coordinate financial inclusion efforts. Members include the Bank of Guatemala and the Banking Supervisory Agency, as well as the Department of Consumer Care and Assistance (DIACO) of the Ministry of Economy, the

Guatemala	
	<p>Ministry of Finance, the Ministry of Education, the General Directorate of Taxation, and banks/credit unions (CAC) in Guatemala.</p> <ul style="list-style-type: none"> Financial Inclusion Committee (COMIF): Consists of the Governors of the Monetary Board of Guatemala and the Central Bank of Guatemala, the Minister of Economy, and the Director of Banking Supervision. The organization has an Executive Director, who is a senior government official of the Central Bank of Guatemala. Technical/administrative support is provided by the organizations that comprise the committee as needed.
Core Organizations and Their Activities	<ul style="list-style-type: none"> The Council for Financial Education and COMIF take the lead in coordinating and implementing related work.

Honduras	
Definition of Financial Education	<ul style="list-style-type: none"> A process to help consumers and investors develop an understanding of financial products/concepts/risks. With information, guidance, and impartial counseling, they will develop the skills to Develop the skills and confidence to recognize financial risks and opportunities, make informed decisions, know where to turn for help, and improve their financial wealth Be able to take effective actions to improve their economic wealth. (OECD, 2015)
Regulatory Framework	<ul style="list-style-type: none"> Article 59 of the Credit Card Law: "In order to strengthen the mission of the Office of Financial Users Protection to inform, educate and guide financial system users on financial operations, the State Banking and Insurance Commission may request an appropriate budget extension to carry out said mission, taking into account the powers, attributes and limitations provided by law." Comision Nacional de Bancos y Seguros de Honduras (CNBS) Resolution GE Resolution No. 1768/12-11-2012: Article 4, Section 28 of the Law, which includes regulations on strengthening the transparency of supervisory bodies, financial culture and financial customer service, provides that financial service users have the right to receive financial education from the CNBS. Regulatory guidelines of the Debt Relief Law: mandates budgetary expenditures for financial education campaigns (Article 7 of the Regulation: Obligations of Financial Institutions, No. 3). It also stipulates that all institutions in the country's financial system must promote a culture of fostering sound financial management through educational campaigns (Article 13 on Financial Education). Resolution GA510/06-15-2016: establishing a Market Discipline/Transparency/Financial Education Unit to improve the structure of the Office of Financial User Protection and to comply with Resolutions C140/2012 and C141/2012, as well as amendments to the 2013 Credit Card Law. CNBS Women's Financial Inclusion Plan: activities are being implemented according to the plan, which was developed in July 2019.
Organizations Concerned	<ul style="list-style-type: none"> National Banking and Insurance Commission (CNBS): requires financial institutions to submit an Annual Financial Education Plan each January, which reports on the budget allocated for financial education programs. Honduran Banking Association (AHIBA): responsible, together with CNBS, for implementing and coordinating financial education campaigns and promoting the payment of workers' salaries via banks.
Core Organizations and Their Activities	<ul style="list-style-type: none"> CNBS and AHIBA will play a central role in expanding training and information services for financial users while working to make economic and financial information, including statistics and comparative indicators, publicly available, and train facilitators to coordinate and manage new strategic alliances and ensure their continuity.

El Salvador	
Definition of Financial Education	<ul style="list-style-type: none"> A process to enable the public to acquire knowledge, develop skills and attitudes to properly use their personal/business finances, make appropriate decisions, and build a solid and reliable foundation for the purpose of helping to improve social and economic welfare.
Regulatory Framework	<ul style="list-style-type: none"> Executive Order No. 28: Creation of the National Council for Financial Inclusion and Education (CNIEF) to coordinate formal financial inclusion and education initiatives and activities. Implementation of the National Financial Inclusion Policy (PNIF), approved by the President. Facilitated access to financial products and continued both national financial education work and the development of the National Strategy for Financial Education (NFES). National Strategic Guidelines for Financial Education

El Salvador	
Organizations Concerned	<ul style="list-style-type: none"> • Council for Financial Inclusion and Education (CNIEF): Members are the Central Reserve Bank of El Salvador, the Financial System Supervisory Authority, the Ministry of Economy, the Ministry of Education, Science and Technology, the Development Bank of El Salvador, the Consumer Protection Agency, the National Microenterprise Commission, the Deposit Guarantee Association, the Agricultural Development Bank, the • Financial Education Issues Support Group (GATEF): responsible for monitoring technical matters related to the decisions of the Council and coordinating the different working subgroups. It coordinates five subgroups grouped into priority segments, including the education community, entrepreneurs/self-employed/small businesses, employers, immigrants, and vulnerable groups. • Financial Inclusion Issues Support Group (GATIF): responsible for monitoring technical matters related to Council decisions and coordinating the different working subgroups. • Central Reserve Bank (Department of Public Policy and Financial Innovation within the Department of Financial Regulation and Public Policy): promotes the signing of a framework agreement for inter-institutional cooperation in the field of financial education, signed by CNIEF member institutions and additionally Banco Hipotecario de El Salvador (BH).
Core Organizations and Their Activities	<ul style="list-style-type: none"> • With the Council for Financial Inclusion Education (CNIEF) at its core, the Group for Assistance in Financial Education Issues (GATEF), the Group for Assistance in Financial Inclusion Issues (GATIF), and the Central Reserve Bank (Department of Public Policy and Financial Innovation within the Department of Financial Regulation and Public Policy) coordinate with each other to comply with the guidelines of the National Strategy for Financial Education and implement financial education programs through various communication channels.

Panama	
Definition of Financial Education	<ul style="list-style-type: none"> • Financial education is the set of skills, abilities, knowledge and attitudes required to properly manage money. (Panamanian Banking Association (ASOBANCA) (La Asociación Bancaria de Panamá))
Regulatory Framework	<ul style="list-style-type: none"> • National Strategy for Financial Education (NFES): The main objectives are to ensure that the public has access to basic financial education, to lay the foundation for Panama's financial culture, and to contribute to proper resource management and rational and informed financial decision-making.
Organizations Concerned	<ul style="list-style-type: none"> • Banking Supervisory Authority; Consumer Protection and Competition Prevention Authority (ACODECO); Ministry of Social Development (MIDES); Ministry of Education (MEDUCA); Small and Medium Enterprises Authority (AMPYME); Securities Market Supervisory Authority (SMV); Panama Insurance and Reinsurance Supervisory Authority (SSRP); Ministry of Economy and Finance.
Core Organizations and Their Activities	<ul style="list-style-type: none"> • The Panama Banking Supervisory Authority, which plays a core role, with the support of the National Competitiveness Center (CNC) and the IDB's Multilateral Investment Fund (MIF), launched a financial education program in 2013 (Official Resolution SBP-DR-0069-2013, dated June 5, 2013).

Dominican Republic	
Definition of Financial Education	<ul style="list-style-type: none"> • A process by which citizens gain an understanding of financial products, concepts, and risks, and through information, guidance, and impartial counseling, develop the ability to A process that enables them to recognize financial risks and opportunities, make informed decisions, know where to turn when they need help, and take effective action to improve their financial well-being. (National Strategy for Economic and Financial Education (EEF))
Regulatory Framework	<ul style="list-style-type: none"> • Absence of an institutional framework that could serve as a guideline for coordinating economic and financial education efforts. • Regulation on the Protection of Users of Financial Products and Services: Article 41 (Entities Responsible for Financial Education) stipulates that "The Central Bank and the Banking Supervisory Authority shall promote financial education and guidance programs within their respective spheres of authority, giving priority to users of financial products and services in order to contribute to the banking process."
Organizations Concerned	<ul style="list-style-type: none"> • Central Banks, etc.
Core Organizations and Their Activities	<ul style="list-style-type: none"> • The Panel on Economic and Financial Education, including the international forum afi & Consumer Empowerment and Market Conduct (CEMC) Working Group, assists in the development of strategic plans for economic and financial education. The Panel is

Dominican Republic	
	composed of 13 public and private financial system institutions: Argentarium, Association of Commercial Banks, Association of Savings and Credit Banks and Credit Corporations (ABANCORD); Central Bank of the Dominican Republic (BCRD); Reserve Bank of the Dominican Republic (BANRESERVAS); Ministry of Economy, Planning and Development (MEPyD); Ministry of Education (MINERD); Ministry of Finance/ Center for Fiscal Policy and Management Training (CAPGEFI); Ministry of Industry and Commerce (MIC); Office of the President; Dominican Republic Banking Supervision Authority (SIB); Pension Supervision Authority (SIPEN); and Securities Supervision Authority (SIV).

Source: Prepared by the JICA Survey Team based on afi & Consumer Empowerment and Market Conduct (CEMC) Working Group. FINANCIAL EDUCATION IN LATIN AMERICA AND THE CARIBBEAN 2020, etc.
https://www.afi-global.org/wp-content/uploads/2020/12/AFI_CEMC_FI_CS_AW_digital.pdf

3.2.3 Agricultural Insurance

1) Market Overview of Agricultural Insurance in Latin America and the Caribbean

Agricultural insurance is generally classified into three categories: (1) yield insurance, (2) income insurance, and (3) index insurance. Indemnity-based agricultural insurance compensates for yield loss due to natural disasters, and is the most widespread type of insurance in the world. It is classified into two categories: Named-peril Insurance, which covers only specific perils such as fire and hail, and Multi-peril Insurance, which covers multiple perils that may cause damage over a wide area. Crop Revenue Insurance is an insurance policy that compensates for reduced revenue due to yield reduction, price reduction, or both. Index-based Agricultural Insurance pays claims based on an index. The index is chosen based on non-arbitrary data, such as precipitation and temperature. (Source: Eiji Tanaka, "The Future of Agricultural Insurance in Japan and Examples of ICT in Agricultural Insurance in Other Countries," The General Insurance Institute of Japan Report No. 114, January 2016, p. 27-28)

There are two types of index insurance: Crop Weather Index Insurance, which uses indices such as precipitation and temperature that can easily lead to losses, and Area-Yield Index Insurance, which pays claims when yields in a specific area fall short of the average historical yields. Crop weather index insurance has the advantage of transparency in underwriting and loss investigation, and easy and quick processing of paperwork, since the policy is underwritten with a promise to pay claims when the index shows a certain value regardless of whether or not a loss has occurred. (Source: *ibid*, p. 28)

Agricultural insurance penetration in Latin America and the Caribbean is only 0.03% of GDP, with a market size (2014) of US\$1.6 billion. This represents about 6% of the total global agricultural insurance market of about US\$25 billion, which is lower than the US market of US\$15 billion (60% share) and China market of US\$6 billion (24% share). The market share by country within the region is 61% for Brazil, 15% for Mexico, 15% for Argentina, and 8% for other Central American countries. (Source: Swiss Re, Agricultural insurance in Latin America: taking root, 2016, p. 12)

According to reinsurance giant Swiss Re, the protection gap (gap between economic losses and insurance payouts) for natural catastrophe losses in the Latin America and Caribbean region reached US\$15 billion in 2016 (equivalent to more than 60% of total losses), with numerous perils affecting the agricultural sector in many countries. Innovative insurance and reinsurance solutions could help bridge this gap. Currently, however, the trend in agricultural insurance in the region is toward crop insurance products.

The main local insurers in the region are Alianca do Brasil (market share 11%, 2015) in Brazil (already in a strategic alliance with Spanish insurer Mapfre) and Proteccion Agropesuararia (ProAgro) in Mexico. Note that the latter has a 52% market share in Mexico (2015) and also handles the government-subsidized index insurance CADENA. Meanwhile, foreign players include Spain's Mapfre, followed by Allianz, Swiss Re's Corporate Solutions, Zurich, Maritima, and Liberty. (Source: *ibid*, p. 7)

2) Agricultural Insurance Assistance Program

The share of agricultural risk borne by the government, reinsurers, insurance companies, cooperative mutual aid, and agricultural producers is generally said to vary depending on the magnitude of the disaster. (Source: World Bank, *Agricultural Insurance in Latin America - Developing the Market*, 2010, Figure 1)

The possible support models for agricultural insurance include (1) full government support, (2) support through public private partnerships (PPPs), and (3) market-based support. (Source: World Bank, *Agricultural Insurance in Latin America - Developing the Market*, 2010, Figure 2)

Among the six countries in this survey, only Mexico has a PPP model in the CADENA program as a typical model (Source: Swiss Re, *Agricultural insurance in Latin America: taking root*, 2016, p. 11).

There are 11 major agricultural insurance support programs in Latin America and the Caribbean (1.1 million policyholders cumulative) through 2020, as is the case where the government should be seen as bearing the full agricultural risk. Of these, Mexico has an agricultural insurance program (2019-2020, 86,085 policyholders cumulatively) in the six countries included in this study. (Source: GIZ, *Innovations and emerging trends in agricultural insurance for smallholder farmers - an update*, 2021, p. 49)

In addition, Panama and the Dominican Republic have public systems that provide mandatory agricultural insurance (yield insurance) on bank loans to farmers, with half of the premiums covered by government subsidies. In Panama, the Agricultural Insurance Institute (ISA) and in the Dominican Republic, the national insurance company AGRODOSA offer insurance products. (Source: Interview with AGRODOSA dated October 10, 2020, etc.)

It is estimated that the need for agricultural insurance still has room to develop in the Latin America and Caribbean region. For example, according to the World Bank's "Agricultural Insurance in Latin America - Developing the Market, December 2010" (p. 70), about 138 million hectares (83% of cultivated land) in the region are uninsured.

The insurance industry is currently strengthening its portfolio of crop insurance products within the region. For example, it is exploring the possibility of introducing income crop insurance products for soybeans and corn in Brazil, Mexico, and Argentina. It is also adopting an agribusiness value chain approach to offering crop insurance products. That is, it is shifting its focus from offering simple named loss and multiple loss crop insurance (MPCI) to individual farmers to offering financial transfer solutions to other players in the broader agribusiness value chain.

Players in the agribusiness value chain have various insurable interests. For example, input suppliers and financial institutions have an interest in protecting their sales revenues and collecting their trade receivables due to weather events affecting crop production. Grain elevators and fruit exporters have an interest in ensuring that they procure enough grain or fruit in their respective catchments to reach the break-even point needed to cover their fixed costs, or in the quantities needed to comply with futures contracts.

3) Potential for Widespread Use of Weather Index Insurance

Metadata (observed data) is necessary for designing weather-indexed insurance policies, and it is important to manage observed data and exclude abnormal values. For example, insurance companies in Japan use about 10 years of weather data in weather statistics by the Japan Meteorological Agency to calculate premium rates using various methods.

However, with the exception of Mexico, where the insurance industry is maturing, there are areas in the five countries covered by this study where observation data is not available due to delays in the

development of weather data, and there is a strong possibility that there are issues with the accuracy of observation data. In addition, the use of weather data requires advanced know-how from insurance companies, but the five countries surveyed do not have a diverse ecosystem, including microinsurance, and there are only locally-owned national insurance/reinsurance companies in the Dominican Republic and Panama. (Source: Swiss Re, *Agricultural insurance in Latin America: taking root*, 2016, p. 8)

The Insurer's article dated March 29, 2022 (<https://www.theinsurer.com/esg/mexican-parametric-launch-aims-to-build-resilience-of-smallholder-farmers/21857.article>), one of the key themes of COP26 in November 2021 was the recognition of the important role of insurance in building the resilience of vulnerable communities.

At the Insurance Development Forum held in March 2022, the Parametric Risk Transfer Initiative was announced with the goal of providing affordable insurance to smallholder farmers in Mexico. Reinsurance company Guy Carpenter led the initiative, along with insurers AXA, Munich Re, and Swiss Re, with Mexican state-owned insurer Agroasemex serving as the local partner and InsurTech Raincoat providing the technology platform.

Guy Carpenter CEO Alfredo Honsberg mentioned that insurance is an important tool for building resilience among vulnerable populations and said, "In the case of smallholder farmers, being at the bottom of the pyramid means that their coping mechanism are rather slim, and in the case of a climate event where entire communities are affected, the ability to help each other is significantly reduced, potentially hindering the effectiveness of other public policy interventions related to better farming practices."

Note that the insurance products under this initiative will utilize the CHIRPS rainfall data set, which will be acquired using satellite technology. Each insurable crop plot will be assigned to a grid point from which CHIRPS data is obtained. Based on this rainfall data, a drought index and rainfall excess index are developed and further monitored daily by an independent third party to increase transparency in the claims process. There are three levels of claims coverage, depending on the risk covered. For excess rainfall coverage, if the cumulative rainfall over a three-day period exceeds a defined level at any grid point, a claim payment is triggered for all insurable parcels within that grid point, with the amount paid depending on the cumulative rainfall recorded. In the event of drought, a five-day moving average of rainfall is estimated for each grid point, and if the value falls below 3 mm, it is considered a dry period. If the number of dry season days exceeds a predetermined level during the compensation period, all parcels within that range are eligible for payment, the amount of which depends on the number of dry season days.

The next step, if the pilot is successful, will be for the insurance department of the Mexican Ministry of Finance to adopt the program as public policy and establish a long-term financing mechanism to support the program. The fiscal budget will start with corn, followed by beans, wheat, rice, and sorghum, determined by geographic priorities and crop type.

The novelty of the program lies in the convenience of the "last mile component" for both enrollment and post-loss payments. To enhance the service, several municipalities will be assigned staff in cooperation with the Ministry of Agriculture.

3.2.4 Private Investment in the Agribusiness Sector

1) Trends in Private Equity/Venture Capital Investment

Mergr's private equity and M&A-related database of agri-investors in the Latin America region shows the presence of eight companies (Source: <https://mergr.com/latin-south-america-agriculture-investors>). However, when we check the business activities of each company on their websites, (1) Aqua Capital

and (2) Patria Investimentos are the only two institutions with even a small amount of agribusiness investment experience in the Latin America and Caribbean region relevant to this study.

In addition, if we extract venture capitals specializing in the agribusiness sector and Agtech from Latin America and Caribbean/agriculture information sources such as Agri Investor³ and LatamList⁴, AgFunder is one of the most active investors in the sector. Incidentally, Japan's Norinchukin Bank has decided to invest in the company's AgFunder Fund IV and signed an agreement in March 2020. (Source: Norinchukin Bank press release: https://www.nochubank.or.jp/news/news_release/2022/-agfunder-fund-iv.html)

A summary of these investment institutions is provided below.

Table 3.2.4 Investment Companies Operating in Latin America and the Caribbean

Name of Company	Aqua Capital
Home Page	https://aqua.capital
Type of Company	private equity
Base Address/Contact	Av. Cidade Jarjim 803, 6 th Floor, Sao Paulo, 01453-000, Brazil
Year Established	2009
Investment Size	small-scale
Assets under Management	n.a
Portfolio	Cumulative number of investments: 40 (total revenues of the portfolio companies, including Brazil's top 40 agribusinesses, amounting to US\$3 billion). The sectors include agriculture (34%) and transportation (23%). https://aqua.capital/portfolio/
Investment Targets and Policies	Growth investment in the agricultural value chain (mid-market with annual sales of \$15-250 million) in Brazil and Latin America region. Target industries include agriculture, beverage, food, and transportation. It focuses on investment opportunities that can benefit from the following themes. <ul style="list-style-type: none"> • Growing demand for essential foods with a focus on safety and affordability • Closing the productivity gap with global best practices • Solving the climate change and sustainability challenges inherent in agricultural and food innovation • Changing consumer habits driven by health, wellness and convenience • Innovation and disruption of traditional agricultural and food models
Strategy	As a signatory member of the UN Principles for Responsible Investment (PRI: Principles for Responsible Investment), it promotes high ESG and positive impact standards and aims to contribute to the UN Sustainable Development Goals. Fully committed to food security, climate change, diversity, working conditions, and other key SDGs, especially given the magnitude of the impact of the agriculture and food systems on these important matters.
In-region results for the past three years	2 (Growth Investment, Buyout)

Name of Company	Patria Investimentos
Home Page	https://www.patria.com/private-equity
Type of Company	Merchant Bank
Base Address/Contact	Av. Cidade Jrjim 803, 10 th Floor, Sao Paulo, 01453-000, Brazil
Year Established	1988
Investment Size	large-scale
Assets under Management	US\$5.8 billion
Portfolio	Agriculture (15%), Services (15%)
Investment Targets and Policies	A Brazilian merchant bank that has been making PE investments since 1994. He is involved in investment operations with hands-on assistance, including the development of growth strategies. His investments focus on those that meet the demand for basic needs.
Strategy	n.a
In-region results for the	1 (Buyout)

³ https://www.agriinvestor.com/regions_and_countries/latin-america/

⁴ <https://latamlist.com/tag/agriculture/>

Name of Company	Patria Invertementos
past three years	

Name of Company	AgFunder
Home Page	https://agfunder.com
Type of Company	Venture capital
Base Address/Contact	845 Market St., Suite 450, San Francisco, CA 94103, US
Year Established	2013
Investment Scale	mid-scale
Assets under Management	Cumulative 6 funds under management (US\$91.3 million). Fund performance: AgFunder IV (US\$60 million, from March 2022), AgFunder Alternative Protein Fund (US\$20 million, from November 2019), Co-Investment Fund II (US\$5 million, from November 2018), etc.
Portfolio	Total number of investments: 70. By sector: agriculture (15%), services (15%).
Investment Targets and Policies	A Brazilian merchant bank that has been making PE investments since 1994. It is involved in investment operations with hands-on assistance, including the development of growth strategies. The investments focus on those that meet the demand for basic needs.
Strategy	-
In-region results for the past three years	Jüsto (electronic grocery store, Mexico), etc.

Source: Prepared by this research team based on Mergr (<https://mergr.com/latin-south-america-agriculture-investors>), each organization's website, crunchbase, etc.

According to the AgriFoodTech Investment Report 2021 published by AgFunder, global value chain investment to Agtech sector startups will reach US\$30.5 billion annually in 2020 (+34.5% YoY).

As background, the COVID-19 pandemic highlighted the importance of efficient supply chains and alternative ways to grow, process, transport, and sell food to consumers, resulting in a demand for innovation in the linkage between farmers and retailers that has fueled new VC investment. For food delivery, there was increased investment in cloud retail technology to support home dining, particularly in the eGrocery space. VC investment in alternative food products is also on the rise, as consumers are increasingly concerned about the origin of their food. The table below shows the global Agtech companys' fundraising (2020).

Table 3.2.5 Global AgTech Firms' Fundraising (2020)

Item	Results
Amount invested	US\$30.5 billion (including US\$15.8 billion upstream and US\$14.7 billion downstream)
Number of investments	3,093 cases
Specialized investor	2,789 companies
Investment per large project	US\$1.6 billion

Note: Upstream refers to agri-biotech, farm management, farm robotics and equipment, bioenergy and biofeedstock, new farming, agribusiness marketplaces, midstream, and innovative food. Downstream includes restaurant/retail, online restaurants and dining, e-grocers, restaurant marketplaces, and home cooking.

Source: AgFunder, *AgFunder AgriFoodTech Investment Report 2021*, p.5

Looking at the amount and number of VC investments (2020) by investment area, the largest VC investments were in midstream technology (food safety, traceability, logistics/transportation, and processing technology) with US\$5.3 billion (338 investments), followed by eGrocery with US\$5.1 billion (202 investments), retail and Restaurant Technology: US\$2.4 billion (294 jobs). (Source: *ibid.*, p. 16)

Looking at VC investment performance by country, the U.S. ranks first with US\$13.2 billion (815 investments), China second with US\$4.8 billion (115 investments), and India third with US\$1.8 billion (164 investments), while Colombia is the only Latin American country in the top 20 (US\$360 million, 12 investments). This suggests that although Latin America and the Caribbean is one of the world's

leading agricultural regions, it has yet to see the emergence of promising Agtechs.

Meanwhile, there are more than 50 major investors worldwide involved in so-called "social impact investing" (source: causeartist, <https://causeartist.com/changing-the-world-through-social-impact-investing/>). Among them, investors specializing in agriculture-related sectors are engaged in the following activities.

- Astanor Ventures (Belgium): Focusing on the fact that livestock and fisheries produce most of the greenhouse gas (GHG) emissions in the food industry, the company has set KPIs for "water use" and "ecosystem diversity" for investment.
- Fresh Ventures (The Netherlands): Investment activities are aimed at encouraging systematic improvement of the food system.
- Aqua-Spark (The Netherlands): investment activities are focused on small- and medium-scale aquaculture businesses to ensure that they have a social and environmental impact.

Notably, there is Alterfin (Belgium), which makes impact investments specifically in small farmers, related MSMEs and microfinance institutions around the world, including Latin America. A summary of this investor is provided in the table below.

Table 3.2.6 Overview of Impact Investors Operating in the Latin American Region

Name of Company	Alterfin
Home Page	https://www.alterfin.be/en/about
Type of Company	Social Impact Investor
Base Address/Contact	avenue des Arts 7-8, 1210 Brussels, Belgium Branches in Latin America have already been established in Honduras and Peru.
Year Established	1994
Investment Size	small-scale
Assets under Management	66 million euros
Portfolio	Cumulative number of executions: 165 (87 of which are in Latin America). Currently managing 4 funds. Investments and loans outstanding: €82 million. 35 countries worldwide. Of this amount, 27 million euros are for Latin America. 46% of the total portfolio is for farmers, 51% for microfinance institutions, and 3% for funds.
Investment Targets and Policies	Provides investments and loans to small farmers, SMEs, and microfinance institutions around the world, including in Latin America.
Strategy	6,146 NGOs, banks, etc. are our cooperative members. In addition, we have appointed agricultural and fair trade organizations as partners (77 in total). 84 microfinance institutions are our partners. 3.67 million final beneficiaries (30% farmers, 69% women).
In-region results for the past three years	-

Source: Prepared by the JICA Survey Team based on Alterfin's website (<https://www.alterfin.be/en/about>) and Annual Report 2022, etc.

2) IDB Group Investments in Private Agribusiness

Within the IDB Group, IDB-INVEST is responsible for investments and loans to the private sector, and its portfolio of development-related investments and loans (as of December 31, 2021) totaled US\$5,585.6 million, of which US\$5,308.0 million (95%) were loans, bonds, and debt securities, Equity investments amounted to US\$277.6 million (5%) (Source: IDB-INVEST, *2021 Information Statement*, p. 17).

In line with its strategic priorities and risk tolerance, IDB-INVEST focuses on the following three objectives for equity investments (Source: IDB-INVEST website <https://idbinvest.org/en/solutions/equity>). In selecting investee companies, IDB-INVEST focuses on expected returns based on

economically rational judgments, as well as on encouraging value-adding and sustainable corporate development of the investee companies.

- To provide growth capital to financial institutions that serve micro, small and medium-sized enterprises; social and accessible infrastructure; expansion-driven corporates; and regional funds focused on reaching small countries.
- To serve as an anchor investor in infrastructure projects (such as public-private partnerships (PPP), clean energy, transport or social infrastructure), providing equity to complement debt financing.
- To support early-stage projects that have the potential for rapid growth but have a hard time finding capital, such as those involving new platforms for financial technologies (fintech).

A search on the IDB-INVEST website for ongoing investment and loan projects in the agribusiness sector in the six countries included in this survey yields 11 in Mexico, 4 in Guatemala, 1 in Honduras, 2 in El Salvador, 0 in Panama, and 0 in the Dominican Republic. The loan amounts per project varied from US\$5 million to about US\$100 million. All projects were financed by loans (some projects were marked as "unknown"), and there were no equity investments in the agribusiness sector. (Source: IDB-INVEST website <https://idbinvest.org/en/projects>)

As for other donors' ongoing investment and financing projects in the agribusiness sector in Latin America and the Caribbean, 99 IFC projects were identified, but only 4 of them were equity investments. The four projects are one in Argentina, two in Colombia, and one in the wider Latin America region. The wider Latin America project is an equity investment (US\$6 million) in ProducePay-Equit, a private company operating an e-commerce platform for farmers in the region, which operates in the agribusiness and fishery sectors. IFC invested in the company in May 2021 when it raised US\$35 million in a financing Series C. (Source: IFC website: <https://disclosures.ifc.org/enterprise-search-results-home>)

Meanwhile, IDB Lab, an IDB Group company, specializes in innovative startups in Latin America and the Caribbean, providing loans and equity investments, etc., according to the needs of their growth stage (Source: IDB Lab website <https://bidlab.org/en/how-to-apply>). As of December 31, 2021, IDB Lab's assets under management (AUM) totaled US\$226.5 million (116 investments). First, the portfolio of self-funded loans and equity investments amounted to US\$178.0 million (103 investments), of which US\$40.8 million (37 investments) were loans and US\$137.2 million (66 investments) were equity investments. At the same time, it co-manages 13 funds (AUM US\$48.5 million) with other companies, including eight investment funds (balance US\$38.9 million) and five loan business funds (balance US\$9.6 million). (Source: IDB Lab, Quarterly Report Q1 2022, p.9)

The IDB Lab has the following seven conditions when accepting applications for investment (Source: IDB website), and while agribusiness is not its main target, it is clear that promising Agtechs and other businesses can be considered for investment.

- Innovative solutions (applying disruptive technologies or models)
- Impact on the social environment
- Strategic priority areas for the IDB (reducing poverty and economic inequality, promoting diversity and gender equality, and what is environmentally sustainable)
- Within LAC region
- Project Sustainability
- Organization's ability to execute project
- For grantee startups, applicants must have a minimum of 50% ownership.

In practice, the amount of investment is US\$3-5 million per investment via venture capital funds, US\$1-3 million for venture debt and other debt financing, and US\$700,000 - 2 million for equity investments

made directly. On the other hand, for early-stage loans, the loan amount is US\$1-3 million per loan at market interest rates depending on risk, denominated in local currency, and guaranteed/non-guaranteed in some cases. The Social Entrepreneurship Program (SEP) provides loans of 4-8 years with a maximum loan amount of US\$1 million per loan and a maximum grant of US\$250,000.

(Source: IDB Lab website <https://bidlab.org/en/products#financing>)

3) ESG-related Bonds

In general, "ESG bonds (SDGs bonds)" refer to bonds that use the proceeds to fund projects that have some effect on environmental improvement or social contribution. Depending on the use of the funds, they are sometimes categorized as green bonds (environmental bonds), social bonds (social contribution bonds), sustainability bonds (environmental and social contribution bonds), etc., but the boundaries between these similar concepts are not always clear. The table below summarizes similar concepts based on the United Nations' publicly available information, etc.⁵, with a focus on so-called "sustainable finance".

Table 3.2.7 Relationship between Sustainable Finance and Similar Concepts

Objective	Sustainable Development					
	Environment			Society	Economy	Governance
Field	Curbing Climate Change	Adaptation to Climate Change	Other Environments			
Type	Low Carbon Finance					
	Climate Finance					
	Green Finance					
	Sustainable Finance					

Source: Prepared by the JICA Survey Team based on UN Global Compact, Sustainable Finance (August 2022), etc.

<https://www.unglobalcompact.org/sdgs/sustainablefinance>

Green bonds and other ESG-related bonds are growing in issuance worldwide, and according to the Climate Bond Initiative (CBI), an international green bond standard-setting NGO (January 31, 2022), the total amount of green bonds and green loans raised that meet CBI standards was US\$517.4 billion globally, doubling from US\$269.5 billion the previous year. The investment sectors in which green bonds are used include agriculture-related sectors such as agriculture and food production, food distribution and management, and forest and land management.

Outstanding green bond issuance in the Latin America and Caribbean region has increased from US\$13.6 billion as of September 2019 to US\$30.2 billion as of June 2021, but the actual amount is still small. In the region's sustainable bond market (also referred to as "GSS bonds" to include all green, social, and sustainable bonds), the top three are Chile, Brazil, and Mexico, with these three countries dominating 77% of the market. In addition, "ESG bonds," which include thematic bonds that differ from traditional green bonds, have recently emerged. Furthermore, in the future, Latin America and the Caribbean is expected to need about US\$80 billion for climate change adaptation by 2030. (Source: Green Finance for Latin America & the Caribbean, 2022, <https://greenfinancelac.org/our-initiatives/green-social-and-thematic-bonds/>)

In the region, the IDB and IDB-INVEST have so far reportedly supported more than 30% of the cumulative issuance of ESG-related bonds as "anchor investors" as well as technical assistance for the issuance of such bonds. The IDB and IDB-INVEST also provide guarantee services to encourage the issuance of ESG bonds. In addition, they work with national governments, financial regulators, and stock & bond exchanges to guide ESG bond markets, and have pilot projects in Chile, Brazil, and Mexico.

⁵ <https://www.unglobalcompact.org/sdgs/sustainablefinance>

3.3 Agricultural Finance in the Countries Surveyed

The following is an overview of agricultural finance in the six countries surveyed. The information is compiled from materials and literature available via the Internet, and we will collect missing information through local mercenaries. Local information will be gathered through interviews with financial supervisory agencies in each country, as well as with state-owned and private financial institutions that provide loans to agriculture.

3.3.1 Mexico

1) Overview of the Financial Sector in Mexico

(1) Types of Financial Institutions and Supervisory Bodies in Mexico

Financial institutions in Mexico are supervised by the National Banking and Securities Commission (Comisión Nacional Bancaria y de Valores, CNBV), and 5,069 financial institutions and similar organizations are under the supervision of the CNBV. 50 of these financial institutions are commercial banks (Banca Múltiple), 13 are development banks and similar institutions, 41 are multipurpose financial companies (Sociedad Financiera de Objeto Múltiple, SOFOM), 77 are credit unions, 154 are union companies (SOCAP), and 34 are popular financial institutions (Sociedades Financieras Populares, SOFIPO) (see next table). The others are money transfer agencies and money changers.

Table 3.3.1 Financial Institutions in Mexico

Classification	Description.	Number of institutions
commercial bank	Foreign banks have a strong presence, with four of the top five banks accounting for more than 75% of total assets of all commercial banks (BBVA Bancomer, Santander, Banamex, and HSBC), and only one Mexican capital bank, Banorte. ⁶	50
Development banks, etc.	In addition to the Development Bank, there are 16 other institutions with functions similar to those of a development bank, such as Development Agencies and Public Trusts. It is established for each sector, such as housing, small business development, etc. The agriculture sector is financed by FND, a development agency, and FIRA, a public trust, which provides loan funds.	13
Multipurpose Finance Company (SOFOM)	Institutions that fall under the category of non-banks specializing in lending without deposit functions, and in addition to lending, they also provide leasing and factoring services. They are classified as SOFOM-regulated companies with capital ties to financial institutions (SOFOM ER) and non-regulated companies without capital ties to financial institutions (SOFOM ENR).	41
Credit union	A financial services company dedicated to subscribers (corporate and individual). The objective is to achieve financial access for subscribers and is specialized in certain sectors, such as agriculture. Activities are funded by subscriber contributions. It can also be involved in commercial activities, such as buying and selling products for subscribers.	77
Union companies (SOCAP)	Non-profit non-bank. Provides deposit and loan services to subscribers. Both operating funds and profits are made by subscribers. Unlike credit unions, it cannot engage in for-profit activities.	154
Popular Financial Institutions (SOFIPO)	It is an institution that provides microfinance and is supervised by the CNBV, as well as by CONDUCEF (National Commission for the Protection of Users of Financial Services), which is responsible for registration and supervision.	34

Source: CNBV website, number of financial institutions as of August 2022

Note that outstanding loans to nonfinancial sectors in Mexico totaled 8.1 trillion pesos in 2021 (see next figure).

⁶ JBIC Report, "Investment Climate in Mexico" (information as of June 2020): https://www.jbic.go.jp/ja/information/investment/images/inv_mexico17.pdf

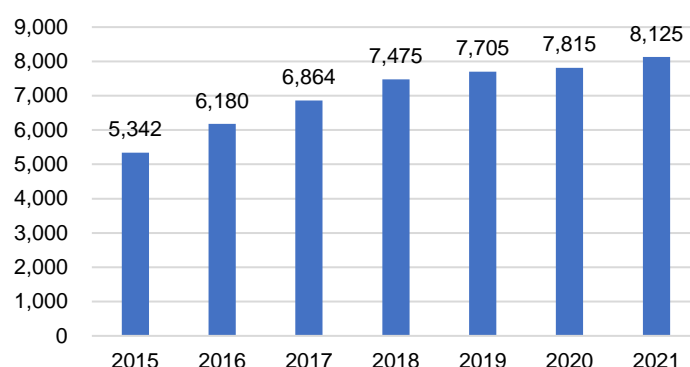


Figure 3.3.1 Domestic Credit Outstanding to Nonfinancial Sector

Source: Banco de México, compiled from Sistema de Información Económica, in billions of pesos

Of the total outstanding loans in Mexico, 60% are originated by commercial banks, 6% by development banks, which are government-affiliated financial institutions, and only 4% by small financial institutions such as multipurpose finance companies and credit unions (see next figure). In addition, "other" loans account for 30%, most of which are government funded loans for housing.

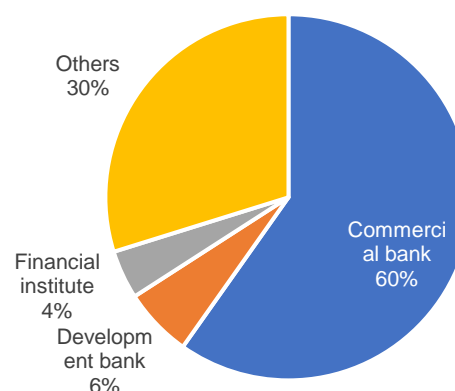


Figure 3.3.2 Breakdown of Domestic Credit Outstandings by Type of Financial Institution

Source: Compiled from Banco de México, Sistema de Información Económica

(2) State-owned Financial Institutions in Mexico

Public financial institutions in Mexico include six development banks (Banca de Desarrollo), four development organizations (Organismos de Fomento), and three public trusts (Fideicomisos Públicos de Fomento Económico). These institutions are listed below. The following table shows the loan coverage of these institutions.

Table 3.3.2 Public Financial Institutions in Mexico

	Business area
Development bank	
Nacional Financiera S.N.C. (NAFIN)	Micro, small and medium enterprises, entrepreneurs
Banco Nacional de Obras y Servicios Públicos S.N.C. (BANOBRAS)	Infrastructure and Public Services
Banco Nacional del Comercio Exterior S.N.C. (BANCOMEXT)	Trade (foreign)
Sociedad Hipotecaria Federal S.N.C. (SHF)	Housing
Banco del Ahorro Nacional y Servicios Financieros S.N.C. (BANSEFI)	Savings and Credit for the Poor
Banco Nacional del Ejército Fuerza Aérea y Armada S.N.C. (BANJERCITO)	Military Savings and Credit
Development agency	
Financiera Nacional de Desarrollo Agropecuario, Rural, Forestal y Pesquero (FND)	Rural Credit
Instituto del Fondo Nacional de la Vivienda para los Trabajadores (INFONAVIT)	Mortgage Loans for Private Sector Workers
Fondo de la Vivienda del Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado (FOVISSSTE)	Mortgage Loans for Public Sector Workers
Instituto del Fondo Nacional para el Consumo de los Trabajadores (INFONACOT)	Consumer credit (finance, loan)
Public trust	
Fondo de Operación y Financiamiento Bancario de la Vivienda (FOVI)	Social housing
Fideicomisos Instituidos en Relación con la Agricultura (FIRA)	Agricultural production

	Business area
Fideicomiso de Fomento Minero (FIFOMI)	Mining and manufacturing industry

Source: World Bank (2017) Financial Sector Assessment, Mexican government website.

Of the above, FIRA is formed from the following four public trust organizations, and 13 public financial institutions listed above are sometimes referred to as 16 institutions in total.

- Fondo de Garantía y Fomento para la Agricultura, Ganadería y Avicultura (FONDO)
- Fondo Especial para Financiamientos Agropecuarios (FEFA)
- Fondo de Garantía y Fomento para las Actividades Pesqueras (FOPESCA)
- Fondo Especial de Asistencia Técnica y Garantía para Créditos Agropecuarios (FEGA)

Among public financial institutions, FND, a development agency, and FIRA, a public trust, provide loans to the agricultural sector.

(3) Microfinance in Mexico

According to the CNBV, microfinance institutions in Mexico are SOFIPOs (Popular Financial Institutions), but in addition, banks and credit unions also provide microfinance services. The World Bank's microfinance database, MIX Market, lists 61 microfinance institutions in Mexico. Most of these institutions are SOFOMs (multi-purpose financial companies), SOFIPOs and SOCAPs (cooperative companies), as well as commercial banks.

The largest microfinance institution in Mexico registered with MIX Market is Caja Popular Mexicana. The company is a SOCAP (cooperative enterprise) with over 70 years of operating experience, providing financial services through approximately 460 locations. The next largest bank in terms of assets is Banco Forjadores, S.A., a commercial bank, with \$1.20 billion loans as of 2018. Founded in 1990, the bank focuses on microfinance and has recently expanded into Guatemala and Peru; Banco Compartamos has previously received loans from the World Bank as well as overseas investment and loan funds from JICA.

It should be noted that the average loan amount for microfinance in Mexico is less than \$1,000, which is smaller than those in neighboring countries. Microfinance in Mexico is based on group guarantees, which means that the loan amount is reduced according to the least creditworthy member of the group, and borrowers generally receive loans from multiple microfinance institutions.

2) Overview of Agricultural Financing in Mexico

(1) Overview of Agricultural Financing in Mexico

In Mexico, loans to the agricultural sector used to be provided by state-owned development banks, but commercial banks now provide the majority of loans. The outstanding balance of commercial bank loans to agriculture reached 115.9 billion pesos in 2021 (see next figure). The outstanding balance of loans by development banks to agriculture, forestry, and fisheries remains at 1.6 billion pesos. However, loans to agriculture by the Financiera Nacional de Desarrollo Agropecuario, Rural, Forestal y Pesquero (FND), a development institution described below, are not included in the total outstanding loans by development banks.

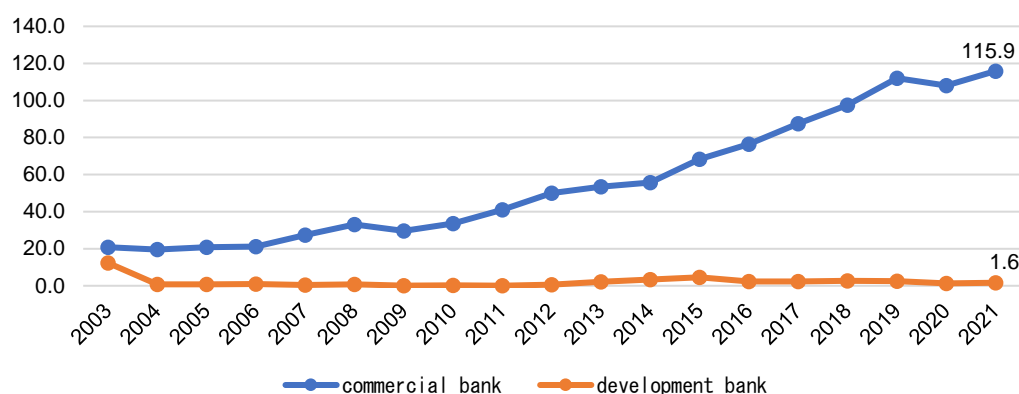


Figure 3.3.3 Outstanding Balance of Loans to Agriculture, Forestry, and Fisheries

Source: Compiled from Banco de México, Sistema de Información Económica, in billions of pesos

Note that the share of loans to the agricultural sector in total loans is low for both commercial banks and development banks, at 2.1% and 0.2%, respectively, as shown below.

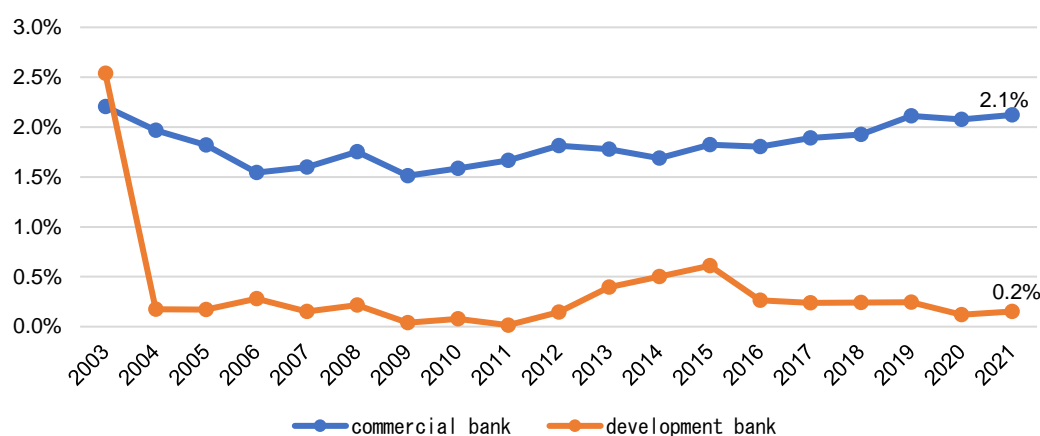


Figure 3.3.4 Loans to the Agricultural Sector as a Percentage of Outstanding Balance of Total Loans

Source: Compiled from Banco de México, Sistema de Información Económica, in billions of pesos

Public financial institutions that provide loans to the agricultural sector include the FND and the Fideicomisos Instituidos en Relación con la Agricultura (FIRA). While the FND targets smallholder farmers who can sell their surplus produce on the market or who have started to engage in corporate agricultural production activities, FIRA primarily targets larger-scale agricultural producers who have taken off in corporate agricultural production activities and, in some cases, export their products.

FND provides loans directly to businesses, including farmers, as well as indirectly through private financial institutions, and direct loans account for more than 60% of the total outstanding loans by FND. On the other hand, FIRA does not provide direct loans to farmers and other businesses, but only indirect loans through other financial institutions. It should be noted that 71% of the loans made by commercial banks to agriculture are originated by FIRA funds. ⁷

⁷ Source: Instituto Nacional de Estadística y Geografía (Inegi), <https://www.fitchratings.com/research/es/non-bank-financial-institutions/fitch-affirms-fondo-ratings-at-aaa-mex-f1-mex-stable-outlook-28-06-2022>

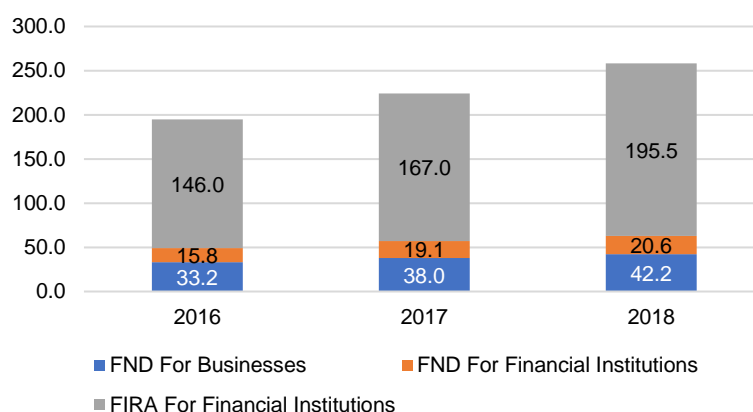


Figure 3.3.5 FND and FIRA Loans Outstanding

Source: Compiled from FND financial statements and CEDRSSA, Credit and financing instruments for the rural sector, in billions of pesos.

(2) Loans to agriculture by the National Agriculture, Forestry, Fisheries and Rural Development Financing Agency (FND)

FND is a development institution created from the liquidation in 2002 of the formerly existing National Rural Bank (Banco Nacional de Crédito Rural, BANRURAL), which operated under Financiera Rural, but changed its name in 2013. As of 2022, FND operates 94 locations in Mexico. In an interview with an official during our field survey in January 2023, the officer explained how the financial function of FND has been changed and how it is now being reorganized. However, it was suggested that the function of providing indirect loans to businesses through private financial institutions would be consolidated in FIRA, and direct loans to small and medium agricultural producers would be transferred to Banco de Bienestar, a bank newly organized by the government.

FND provides loans to agriculture as well as microfinance in rural areas. Information on outstanding loans by sector, including those for agriculture, is not publicly available. In addition to working capital, FND also provides capital investment financing (known as "spare parts financing (Crédito Refaccionario)") for agriculture.

A summary of the loan terms and conditions for capital investment financing is as follows:⁸

- Use of funds: Purchase or renewal of machinery and fixed assets (agricultural machinery, fertilizers, livestock, etc.)
- Loan Eligibility: Individuals and corporations engaged in agriculture, forestry, and fisheries in rural areas
- Loan amount: minimum 7,000 UDI (UDI is approximately 7.49 pesos as of August 31, 2022) and up to 80% of the investment amount.
- Average interest rate: Around 12%
- Repayment period: Up to 15 years

In addition, farmers who receive remittances domestically (i.e., receive payment from their agricultural product suppliers) may borrow funds for capital investment from the FND based on guarantees from their suppliers. The amount and term are the same as above, but there is no need to provide collateral such as real estate.

Note that loan disbursements (direct loans to individuals and corporations, including farmers) of FND in 2019 totaled 59 million pesos, the majority of which were short-term working capital. Short-term

⁸ Source: FND website <https://www.gob.mx/fnd/acciones-y-programas/credito-refaccionario-29544>

working capital loans range in amount from 50,000 pesos to 2.5 million pesos, and the average interest rate in recent years has been around 8%. On the other hand, the amount of capital expenditure financing mentioned above was only 11.5 million pesos, or less than 20% of the total loans executed⁹. In addition, guaranteed capital investment loans from sellers are limited at 0.6 million pesos.

FND has received government-guaranteed loans through the World Bank's Expanding Rural Finance Project, which provides loan funds to smallholder farmers through credit unions and other sources. Through the scheme, FND expects to provide \$800 million from 2016 through 2024.

FND's financial profile is as follows: While its capital adequacy ratio is high, it has posted annual deficits and its outstanding loans have been declining, since the central government has discontinued its support for guarantees and the government budget has been allocated to the countermeasures to the COVID-19. In addition to the World Bank funding mentioned above, the government also provides funds.

Table 3.3.3 FND Financial Summary

	2019	2020	2021
Outstanding credit	58,409	48,373	35,616
For Businesses	37,948	29,073	20,382
For Financial Institutions	20,461	19,303	15,234
Total assets	64,982	53,874	47,958
Borrowing from financial institutions, etc.	30,724	21,703	17,535
Debt balance	31,507	22,486	18,408
Net worth	33,475	31,388	29,550
Operating income	-2,896	-2,341	-966
Net income after tax	-2,953	-2,262	-1,074

Source: FND Financial Statements

Unit: million pesos

FND's key financial indicators are as follows: the NPL ratio is as high as 13.5% as of 2021. The company recorded losses due to bad debt losses.

Table 3.3.4 FND Key Financial Indicators Financial Summary

	2019	2020	2021
Non-Performing Loan Ratio	13.2% (in %)	11.0% (1.0)	13.5% (in %)
ROE	-8.4	-7.1	-3.5%
ROA	-4.4	-3.9%	-2.1

Source: FND Financial Statements

(3) Loans to farmers through Farm Related Trust Funds (FIRA)

FIRA is a public trust established in 1954 to facilitate loans by private financial institutions to the agricultural and livestock industries. Against this background, FIRA does not provide loans directly to farmers and other businesses, but rather through commercial banks, multi-purpose finance companies (SOFOM), credit unions, cooperative enterprises (SOCAP), and other financial institutions registered with the CNBV (National Banking and Securities Commission). The outstanding balance of loans provided by the FIRA continue to increase, reaching 195.5 billion pesos in 2018, as follows.

⁹ Source: CEDRSSA (2020), The importance of development banking in the agricultural sector (2020)

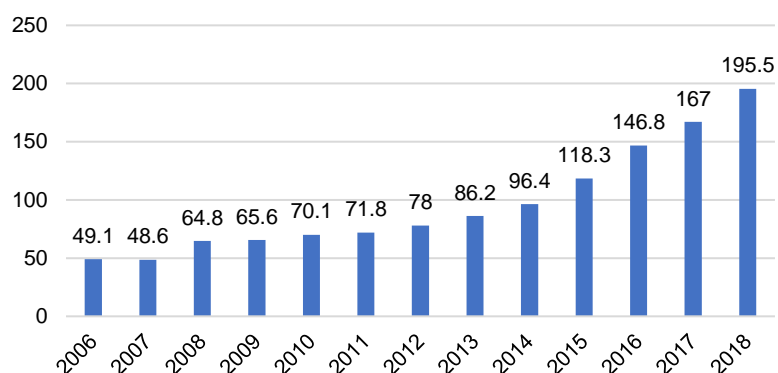


Figure 3.3.6 FIRA Loan Balance

Source: CEDRSSA (2020), The importance of development banking in the agricultural sector, in billions of pesos.

The majority of FIRA loans are provided to agriculture and livestock industries (56.8% and 24.5%, respectively), while those for rural finance, which account for 13.7%, are limited to businesses other than agriculture, livestock, forestry, and fishing (see next figure), and projects in towns with a population of less than 50,000. It also provides funds for microfinance up to 33,000 UDI¹⁰ (consumer loans are not eligible). FIRA also provides guarantees in addition to loans. When agricultural producers apply for loans from banks, FIRA can provide a guarantee as well if the company is already doing business with FIRA and is in good standing.

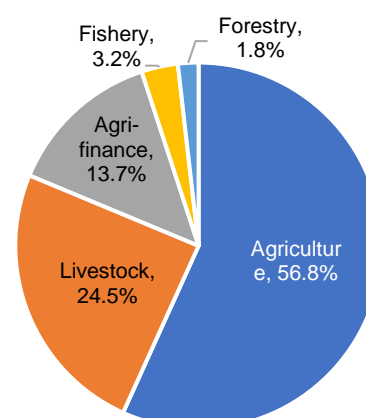


Figure 3.3.7 Sector Breakdown of FIRA Financing

Source: CEDRSSA (2020), The importance of development banking in the agricultural sector (2020)

FIRA provides short-term funds such as working capital as well as medium- and long-term equipment financing for the above sectors. The maximum loan term for equipment financing is 15 years (20 years in the case of forestry), while capital investment financing is about 20% of the total outstanding balance. FIRA provides financing to private financial institutions at interest rates ranging from 0.1% to percent to 10 percent, with the smaller financial institutions paying higher interest rates. The interest rate paid by the final borrower ranges from 12.5% to 19.5%, but may be lower when working with state governments, for example. While large foreign financial institutions appear to offer loans to the agricultural sector at lower interest rates, FIRA targets smaller producers who have difficulty obtaining such loans. FIRA is creditworthy based on the results of external rating agency ratings as of 2018, and non-performing loans appear to be limited.

Since FIRA is not licenced to collect deposits, it uses funds from outside financial institutions and the government as the source of financing. The cost of financing is the TIIE (interbank equilibrium rate) plus a risk premium based on the financial institution to which the loan is extended. In addition, FIRA has issued green bonds of \$130 million in 2018 and \$129 million in 2019 with the objective of reducing greenhouse gas emissions through the development of greenhouses and irrigation systems. The project is also a joint project of the European Union, the Latin American and Caribbean Investment Organization, and the French Development Agency, with financial support for the introduction of climate change mitigation technologies. The project provides low-interest loans for projects in areas such as environmentally friendly agriculture, efficient use of water, introduction of sustainable energy, and

¹⁰ UDI is approximately 7.49 pesos as of August 31, 2022.

efficient use of energy.

(4) Government Programs for Agriculture

The Mexican government, in conjunction with the 2019-2024 National Development Plan (Plan Nacional de Desarrollo, PND), called PEC (Programa Especial Concurrente para el Desarrollo Rural Sustentable). The program lists prioritized projects and allocates budgets to support rural development in the areas of agriculture, transportation, education, and others. The priority projects are listed below, but do not include programs that provide low-interest loans to farmers and rural areas.¹¹

Table 3.3.5 Rural Development Assistance Programs by the Mexican Government

program-name	2020 Approved Amount	2021 Requested Amount
Production for Health (Producción para el Bienestar)	11,000	11,356
Price Guarantee for Basic Foods (Precios de Garantía a Productos Alimentarios Básicos)	10,000	10,324
Fertilizantes	1,310	1,352
Sanitation and Safety of Agricultural Foods (Sanidad e Inocuidad Agroalimentaria)	4,029	4,159
Acquisition of domestic milk (Adquisición de leche nacional)	1,769	1,826
Social Milk Supply Program by Liconsa, S.A. (Programa de Abasto Social de Leche a cargo de Liconsa, S.A. de C.V.)	1,241	1,281
Rural Supply Program (by Diconsa, S.A.) (Programa de Abasto Rural a cargo de Diconsa, S.A. de C.V. (Diconsa))	2,147	2,217
Programa de Fomento a la Agricultura, Ganadería, Pesca y Acuicultura	1,494	1,542
Livestock Credit (Crédito Ganadero a la Palabra)	1,000	1,032

Source: CEDRSSA, Perspectives 2020 - 2021 and priority programs that are part of the Special Concurrent Program for Sustainable Rural Development, April April 2020

Unit: million pesos

3) Support by Japan and other development partners in agricultural finance

(1) Support by Japan

JICA is working to improve access to finance for small, medium, and micro businesses, particularly women-owned businesses, through Compartamos, a microfinance institution in Mexico, through the "Microfinance Project for Women Businesses in Mexico," an overseas investment and loan project approved in 2019. Although farmers are not excluded from the loan program, the company's lending to agriculture is considered limited, given that it provides financial services such as women's finance and commercial finance.

(2) Support by the IDB

While the IDB has implemented several projects for the agricultural sector, there are no identified projects that provide funding for farmers or FVC enterprises. As mentioned above, FIRA issued a green bond in 2018, for which the IDB provided support.

(3) Support by the World Bank

The World Bank has been implementing the Expanding Rural Finance Project since 2015, providing loans to FND with government guarantees, and FND, through credit unions and other entities, has

¹¹ Livestock Credit" is a program that provides non-monetary (in-kind) loans to dairy farmers, not loans.

provided loan funds to smallholder farmers. The project is expected to provide \$800 million from 2016 to 2024.

In addition, the Bank is implementing the Mexico Financial Inclusion Development Policy Financing starting in 2019 to promote financial inclusion. The Bank will provide a total of \$500 million in financial assistance contingent on the achievement of several policy goals related to financial inclusion (e.g., development of relevant legislation), and will not provide loans to farmers. The above policy goals also do not include anything related to loans to agriculture.

(4) Private Sector Investment and Finance by IFC, IDB-INVEST, and others

IDB-INVEST has implemented several investment and loan projects for private companies, and we could confirm that about 25 projects have been implemented in the past 20 years. The projects covered include the construction of greenhouses for companies producing vegetables, the construction of pig farms, the construction of fruit processing facilities, and the construction of warehouses and distribution centers, with amounts ranging from about \$5 million to \$60 million, but with an average of \$15 million.

In addition, IDB-INVEST has provided investment and loan funds to private financial institutions in about 70 projects over the past 20 years, and although most of the financial institutions that have received IDB Invest loans are commercial banks, several smaller institutions such as multi-purpose finance companies (SOFOM) and credit unions were also supported. There are also a number of smaller institutions, such as the Multipurpose Finance Company (SOFOM) and credit unions. Loan proceeds have been used by many financial institutions to expand their lending to small and medium-sized enterprises (SMEs).

The financial institutions that received IDB-INVEST loans included Agrofinanzas S.A. de C.V. (now Bankaool S.A.), an agricultural lender that is a credit union and had been making loans to the agricultural sector with FIRA funds. Agrofinanzas provided three loans totaling approximately \$9.5 million to IDB-INVEST between 2007 and 2012. Agrofinanzas has since merged with another financial institution to become a commercial bank called Bankaoo in 2018.

4) Possible ODA Loan Projects and Private Sector Investments and Finances

(1) Two-step Loan for the agricultural sector through FND or FIRA

xxThere might be a possibility that JICA provides an ODA loan for the agriculture sector through FND, a public financial institution (development institution), by co-financing with development partners such as the World Bank. However, given the declining trend in the amount of FND loans and the high ratio of non-performing loans (NPLs), this seems unlikely to be feasible.

The IDB and the World Bank have not provided loans to FIRA in the past, although it is possible that FIRA, as a public trust, could provide loan funds to farmers through ODA loans or overseas investments and loans, and that FIRA could sub-lend these funds to private financial institutions, which in turn would provide loans to farmers. However, the possibility of co-financing is low because the IDB and the World Bank have not provided loans to FIRA in the past. In addition, financial statements are not available, and it is unclear to what extent FIRA needs external financing.

(2) Private Sector Investments and Finance for Private Companies

If there are corporations engaged in large-scale agricultural production that can supplement the financial needs of processing and exporting companies, and if providing overseas investment and loan funds to such large corporations can support small- and medium-scale farmers in the country, Private Sector Investment and Finance could be provided to the corporations.

3.3.2 Guatemala

(1) Overview of the Financial Sector in Guatemala

1) Types of Financial Institutions and Supervisory Bodies in Guatemala

In Guatemala, financial institutions are supervised by the Superintendencia de Bancos de Guatemala (Superintendency of Banks). There are 93 financial institutions in the country under its supervision, of which 17 are banks (including one state-owned bank), 11 are financial companies, and the rest are insurance companies and money changers. In Guatemala, 90% of loans are provided by banks.¹²

In addition to these, savings and credit cooperatives provide loans. There are approximately 420 savings and credit cooperatives. They are registered with the Instituto Nacional de Cooperativas (INACOP), but they are not under the supervision of either the Superintendencia de Bancos or Instituto Nacional de Cooperativas.

2) State-Owned Banks in Guatemala

As of 2022, there is only one state-owned bank in Guatemala, El Crédito Hipotecario Nacional de Guatemala (CHN). CHN provides mortgages and vehicle loans to individuals and loans to small and medium-sized enterprises (SMEs). It also offers loans to the agricultural sector, but mainly to large farmers. Its lending to small and medium-sized farmers and cooperatives is limited.

In Guatemala, several trust funds of the government (ministries) also finance farmers. Government trust funds are explained below.

3) Microfinance in Guatemala

“Microfinance institution” is not clearly defined in Guatemala. CHN, the state-owned bank that provides micro-loans, and BANRURAL, discussed below, are also regarded as microfinance providers in the broadest sense. La Red de Instituciones de Microfinanzas de Guatemala (REDIMIF) is a networking organization for microfinance institutions in the country. REDIMIF, which has 16 members, including banks and NGOs, has regular meetings with the government to discuss institutional issues related to microfinance and provides training to its member organizations. However, REDIMIF does not offer financing to its member organizations. The lending by REDIMIF member organizations to the agricultural sector is limited.

Savings and credit cooperatives mentioned above provide loans to the agricultural sector. Savings and credit cooperatives are those registered with INACOP, whose primary business is "savings and credit." There are approximately 420 savings and credit cooperatives in Guatemala, mostly located in rural areas.

There are two federations of savings and credit cooperatives in Guatemala, FENACOAC (Federación de Cooperativas de Ahorro y Crédito de Guatemala) and FEDECOPE (Federación Integral de Cooperativas de Ahorro y Crédito de Occidente). FEDECOPE has 25 member cooperatives, while

¹² Source: INFORME DEL SISTEMA FINANCIERO A LA JUNTA MONETARIA DICIEMBRE DE 2021, SUPERINTENDENCIA DE BANCOS

FEDECOPE has 11 members.

FENACOAC and FEDECOPE act as the central banks for savings and credit cooperatives. While cooperatives are required to deposit a portion of the deposits collected from their members with FENACOAC or FEDECOPE as reserves, they also receive loans as needed. FENACOAC and FEDECOPE provide financial infrastructure such as loan management systems and training opportunities for credit and savings cooperatives. For savings and credit cooperatives belonging to FENACOAC, they operate under the name "MICOPE." Neither FENACOAC nor FEDECOPE have raised any external funding and are not planning to raise any external funds.

(2) Overview of Agricultural Financing in Guatemala

1) Overview of Agricultural Financing in Guatemala

Outstanding loans to the agricultural sector in 2019 amounted to GTQ 6,616 million, equivalent to 3.4% of total outstanding domestic loans. The share of loans to the agricultural sector in total outstanding domestic loans is declining, as shown in the following figure.

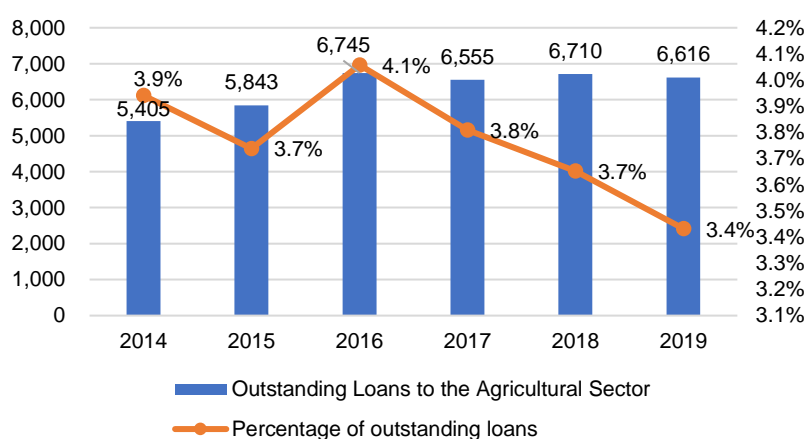


Figure 3.3.8 Amount and Percentage of Loans to the Agricultural Sector in Guatemala

Source: Banco de Guatemala (2020), Guatemala en Cifras
In millions of GTQ (quetzals)

Note that the loan interest rate for agriculture, livestock, forestry, and fisheries is set higher than other sectors at 11.16% as of 2021. Since the deposit rate is about 5%, the margin for loan interest rates for agriculture, livestock, forestry, and fisheries is about 6%.

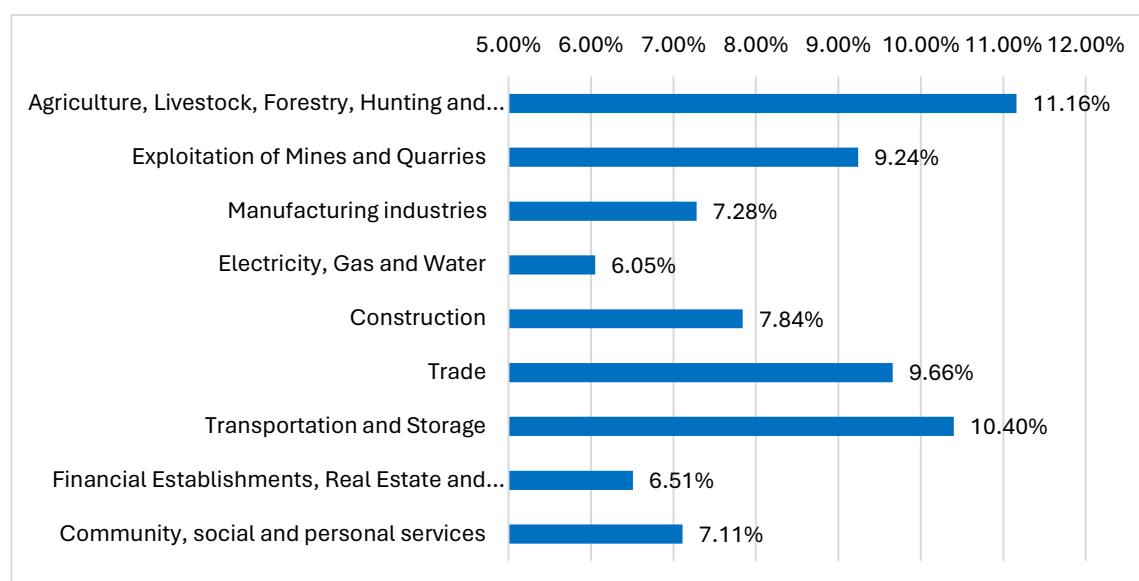


Figure 3.3.9 Average Loan Interest Rates by Sector in Guatemala

Source: INFORME DEL SISTEMA FINANCIERO A LA JUNTA MONETARIA DICIEMBRE DE 2021, superintendencia de bancos

2) Agricultural financing by BANRURAL

BANRURAL, formerly the Agricultural Development Bank, is no longer a state-owned bank but is still the main source of loans to the agricultural sector in Guatemala. The outstanding loan of BANRURAL as of 2021 is GTQ 36,552 million.

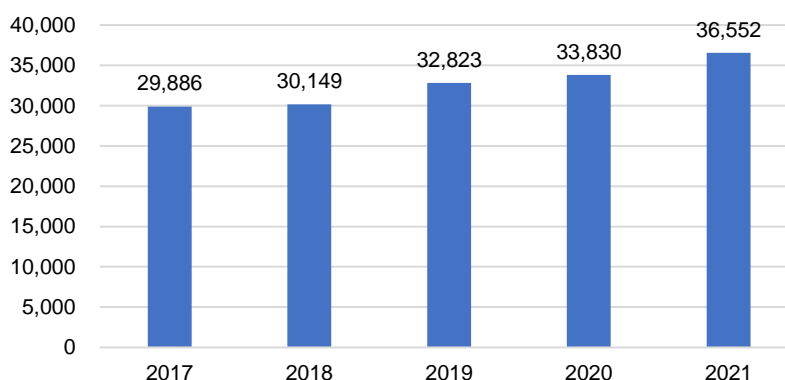


Figure 3.3.10 BANRURAL Loan Balance Trends

Source: BOLETÍN ANUAL DE ESTADÍSTICAS DEL SISTEMA FINANCIERO 2021
In millions of GTQ (quetzals)

BANRURAL's loans to agriculture used to be about 50% of its total outstanding loans, but the percentage has decreased over the years, reaching 11.4% in 2013¹³. The most recent percentage of agricultural loans is not available. However, suppose the percentage is 10%, BANRURAL's outstanding loans to the agricultural sector are estimated at GTQ 3,600 million. This means that the share of BANRURAL in the loans to the agricultural sector in Guatemala is about 50%.

¹³ World Bank (2013) Estudio de factibilidad para el diseño e implementación de una cobertura indexada a nivel macro contra sequía para la seguridad alimentaria

BANRURAL operates a network of more than 1,000 branches throughout Guatemala, with a solid presence in rural areas. As mentioned above, it provides loans to small and medium-sized farmers, cooperatives, and federations of cooperatives, as well as to savings and credit cooperatives. The loans to large farmers are somewhat limited. BANRURAL provides both short-term loans and medium- and long-term loans. In the case of vegetable farmers, the loan terms are generally six months in accordance with the harvesting periods. For avocados and coffee, loans are extended for 3 to 5 years.

BANRURAL's financials for the past three years are shown below. This table identifies no major issues in its capital adequacy ratio, profit margin, and other aspects. However, the ratio of loans past due 90 days or more is relatively high, with 3.95%¹⁴ as of 2021.

Table 3.3.6 Financial Summary of BANRURAL

	2019	2020	2021
Loans and advances	32,823	33,830	36,552
Total assets	74,672	85,158	95,536
Deposits	61,147	71,095	78,501
Total capital	7,646	7,897	8,982
Operating profit	925	973	1,444
Net profit after tax	864	936	1,306

Source: Superintendencia de Bancos Guatemala (2021), BOLETÍN ANUAL DE ESTADÍSTICAS DEL SISTEMA FINANCIERO 2021

In millions of quetzals

The table above shows that BANRURAL has used only about half of the funds raised through deposits for loans and advances. Therefore, BANRURAL would not need external funds other than deposits. However, as BANRURAL has received financing from CABEI (BCIE) and IDB Invest, it might be interesting to have external financing depending on interest rates and other loan conditions.

3) Government Programs for Agriculture

The government manages 23 different trust funds as of 2021. For some trust funds, BANRURAL acts as the fund manager.

Table 3.3.7 List of Government Trust Funds Managed by BANRURAL

Trust Fund Name	supervisory authorities
Fideicomiso Apoyo Financiero para los Productores del Sector Cafetalero Guatemalteco (Financial Support Trust for Coffee Growers)	MAGA (Ministry of Agriculture and Rural Food)
Fideicomiso Fondo de Protección Social (Social Protection Fund Trust)	MIDES (Ministry of Social Development)
Programa de Desarrollo Integral en Áreas con Potencial de Riego y Drenaje (Integrated Development Program for Areas with Irrigation and Drainage Potential)	MAGA (Ministry of Agriculture and Rural Food)
Crédito Rural (Rural Credit)	MAGA (Ministry of Agriculture and Rural Food)
Fondo Nacional para la Reactivación y Modernización de la Actividad Agropecuaria (National Fund for the Activation and Modernization of Agricultural Activities) FONAGRO	MAGA (Ministry of Agriculture and Rural Food)
Fideicomiso Proyectos Productivos de la Población Desarraigada (Trust Project for Production by Displaced Persons)	MAGA (Ministry of Agriculture and Rural Food)

¹⁴ Fitch homepage <https://www.fitchratings.com/research/banks/fitch-revises-banrural-outlook-to-positive-affirms-idrs-at-bb-09-05-2022>

Source: Ministry of Finance website

https://www.minfin.gob.gt/images/laip_mfp/images/laip_mfp/docs/inciso4_item21.pdf

Of the above, the Fideicomiso Apoyo Financiero para los Productores del Sector Cafetalero Guatemalteco (Financial Support Trust for Coffee Producers) is a trust fund which is planned to be operated until 2051, in which the government trusts GTQ 805.5 million. The trust fund will provide loans to coffee farmers who belong to the National Coffee Association (ANACAFE) through BANRURAL. The Trust Fund receives interest income on the loans and bears any losses from non-performing loans, while BANRURAL receives fees related to the management of the Trust Fund. The loan interest rate is 2% for small farmers and 3% for medium and large farmers.¹⁵

Fondo Nacional para la Reactivación y Modernización de la Actividad Agropecuaria (FONAGRO) also provides funds to farmers, mostly in the form of grant aids and some loans. FONAGRO provides funding to selected projects based on applications submitted by farmer groups. Depending on the nature of the project, FONAGRO decides the proportion of grants and loans. The proportion of loans is higher if the project is expected to be highly profitable. BANRURAL is involved only in loan disbursement and repayment processes but not in the loan screening process.

Other trust funds were terminated or planned to be terminated, and no other programs were providing concessional loans to farmers. In addition to the above, BANRURAL managed the following two programs of the government trust funds, but these were no longer operational as of 2022.

- Crédito para el desarrollo productivo DICOR II -CREDEPRODI:-
BANRURAL provided loans to small and medium-sized farmers (individuals) with funds deposited by the government.
- Crédito de desarrollo agropecuario -CREDESA:-
BANRURAL provided loans for investments by farmers to increase productivity using funds deposited by the government.

4) Other

Private banks also provide loans to the agricultural sector, but to a limited extent compared to BANRURAL. For example, Banco Industrial, the largest loan provider in Guatemala, provides loans to the agricultural sector but only to large companies such as sugar-producing companies that also produce sugarcane and oil companies that also produce palm oil. It does not provide loans for the agricultural production of small and medium-sized farmers.

On the other hand, Banco de los Trabajadores (BANTRAB) provides loans to savings and credit and savings credit cooperatives, as well as to microfinance institutions, to provide financing indirectly to farmers. It is planning to increase such financing in the future.

BANTRAB is a bank founded in 1966 as a bank for workers. Since 1999, it has diversified its business

¹⁵ Source: <https://www.anacafe.org/articles/ampliaci%C3%B3n-del-fideicomiso-permitir%C3%A1-atender-demanda-crediticia-y-reactivar%C3%A1-la-econom%C3%ADa-rural/>

areas by establishing a finance company, an insurance company, and a securities company.

BANTARB has the sixth largest loan balance in the country at GTQ 16,919 million as of 2021, but the information on the balance and percentage of agriculture loans was not available.

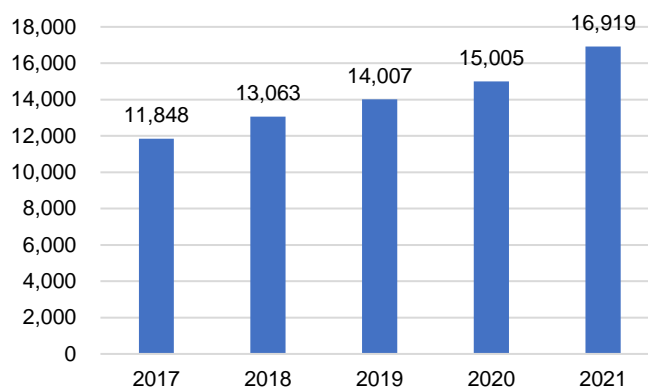


Figure 3.3.11 BANTRAB Loan Balance Trends

Source: BOLETÍN ANUAL DE ESTADÍSTICAS DEL SISTEMA FINANCIERO 2021
In millions of quetzals

The majority of BANTRAB's loans are mortgages and consumer loans to workers. Still, it also provides indirect financing to farmers by providing financing to savings and credit cooperatives, other cooperatives, and organizations that offer microfinance to farmers. The amount of outstanding loans for such microfinance is increasing, reaching GTQ 71 million in 2021 and 237 million in 2022. BANTRAB provides medium to long-term loans to such organizations, with interest rates of about 10% (7-14%).

BANTRAB's financials for the past three years are shown below. From this table, no problems with its capital adequacy ratio or profitability can be identified. The ratio of loans past due 90 days or more is also at an acceptable level of 1.87% as of 2021. Although funded primarily through deposits, BANTRAB borrows from Deutsche Bank and other banks and has received a line of credit from BCIE. Although involved in a project by the Ministry of Health of Guatemala with IFC, BANTRAB does not appear to be funded by IFC.

Table 3.3.8 Financial Summary of BANTRAB

	2019	2020	2021
Loans and advances	14,007	15,005	16,919
Total assets	26,289	27,839	30,993
Deposits	20,541	22,494	24,767
Total capital	3,318	3,883	4,544
Operating profit	773	936	956
Net profit after tax	698	806	762

Source: Superintendencia de Bancos Guatemala (2021), BOLETÍN ANUAL DE ESTADÍSTICAS DEL SISTEMA FINANCIERO 2021

In millions of quetzals

As a bank established for workers, BANTRAB has no particular large shareholders. The government of Guatemala only has 0.25% of its shares.

(3) Support by Japan and other development partners in agricultural finance

1) Support by Japan

JICA is providing "Asesor para promoción de inclusión financiera por medio de remesas de inmigración" from 2022, with the aim of strengthening the capacity of INACOP and cooperatives. This is because cooperatives in Guatemala provide migrant remittance services and migrant loans. Still, such remittance has not been fully utilized for investment due to the limited use of savings accounts and the lack of opportunities for residents to receive financial education.

JICA has provided only six Japanese ODA Loans to Guatemala, all for infrastructure development, such as roads. JICA has not provided ODA loans for the assistance of the financial sector.

2) Support by IDB

IDB has implemented several projects for the agricultural sector, but "Funding Climate-Smart Agricultural Technologies for Micro & Small Entrepreneurs and Farmers in Guatemala" is the only project that provides loan financing to the agricultural sector. The project provides financing for farmers, but on a pilot basis through microfinance institutions.

In addition, the "Partial Guarantee Mechanism to Promote the Use of Agricultural Technologies and Practices among Small Farmers in Guatemala" provides technical assistance and grant aid. In this project, FONACOAC provides automatic partial guarantees for loans made to farmers by savings and credit cooperatives.¹⁶ The grant amount provided by IDB for this project is \$2 million.

3) Support by the World Bank

The World Bank has implemented several projects in the agricultural sector below. However, none of them has provided financing to farmers.

- Responding to COVID-19: Modern and Resilient Agri-food Value Chains (approved in 2021)
- Enhancing MSME Productivity Project (approved in 2011)
- Project to Support a Rural Economic Development Program (approved 2006)

4) Private Sector Investment and Finance by IFC and IDB

IFC and IDB-INVEST have provided only a limited number of private-sector investments and finance in Guatemala's agricultural sector. IFC provided only two cases of financing (for one company), and IDB-INVEST provided financing (for one company) in the past 20 years. In all cases, IFC and IDB-Invest provided loans to sugar companies for expanding sugar-producing facilities (including power generation facilities) and farms. Some of the funds were used as bridge funds for sugar cane farmers. In addition, they provided equity investment and finance for the expansion of banana farms.

IDB-INVEST provided a \$25 million loan to BANRURAL in 2007, although the information on the loan purpose was not obtained. IFC has also provided loans to several private financial institutions in

¹⁶ Source: Project Summary

Guatemala to finance small and medium-sized enterprises (SMEs).

(4) Possible ODA Loan Projects and Private Sector Investment and Finance

1) Two-step loan for the agriculture sector through BANRURAL

There might be a possibility that JICA provides an ODA loan to BANRURAL, a private bank partially owned by the government, to give financing to farmers. However, it is unclear to what extent BANRURAL has funding needs, as it has been using only half of the funds raised from deposits to loans and the remaining half for security investment. In addition, the bank has not received any funds from development partners, such as the World Bank or IDB, and it would be unlikely to give co-financing to BANRURAL. As BANRURAL received a loan from IDB-INVEST in 2009, it might prefer receiving a private sector loan.

2) Private Sector Investment and Finance for Private Companies

IDB-INVEST has provided financing to only two private investors for the last ten years. Thus, it seems unrealistic to identify and form a new private sector investment or finance project in Guatemala's agricultural sector.

3.3.3 Honduras

1) Overview of the Financial Sector in Honduras

(1) Types of Financial Institutions and Supervisory Body in Honduras

The National Banking and Insurance Commission (Comisión Nacional de Bancos y Seguros: CNBS) is responsible for the supervision of financial institutions in Honduras. According to the Commission's 2020 Annual Report, the number of banks and other financial institutions under its supervision is 64 such as 15 commercial banks (Bancos Comerciales), 1 state-owned bank (Bancos Estatales), 1 central bank (Banco Central de Honduras: BCH), 10 financial companies (Sociedades Financieras), 5 private development financial institutions (Organizaciones Privadas de Desarrollo Financiero : OPDF), 11 holding companies (Sociedades Tenedoras de Acciones), etc. The Commission also supervises 14 insurance companies and 28 pension funds and securities companies.

(2) State-owned Bank in Honduras

The national banks in Honduras are the Agricultural Development Bank (Banco Nacional de Desarrollo Agrícola, BANADESA), which supports the agricultural and livestock sector, and the Honduran Production and Housing Bank (Banco Hondureño para la Producción y la Vivienda, BANHPROVI), which mainly funds the production and housing sector.

BANADESA was established in February 1950 as National Development Bank (Banco Nacional de Fomento: BANAFOM), and since July of the same year, it has been a state-owned bank that has supported mainly SMEs with the aim of improving domestic production capacity and the livelihood of the people. According to a report published by the IMF in September 2021, the bank is financially insolvent, and the IMF has proposed to the National Assembly to suspend its operations, and the president has appointed a trustee in bankruptcy to protect depositors and assets.

In addition, the National Banking and Insurance Commission, the financial supervisory agency, has ordered the bank to suspend new lending operations in accordance with regulatory guidelines for bankrupt financial institutions. According to a local report, the bank's non-performing loan ratio has

reached nearly 60% to 80%, and it is estimated that approximately 17-19 billion yen worth of funds will be required for the bailout.

BANADESA is a state-owned bank that aims to promote the growth of the productive sector through the provision of short-, medium-, and long-term financing, established as a result of a merger of Fondo de la Vivienda (FOVI) and Fondo de Crédito para el Desarrollo de la Producción (FONDEPRO) in 1997, and was incorporated as a joint stock company by BCH in 2005. It has mainly provided loans through banks and finance companies, but since 2018 it has also provided direct loans.

(3) Microfinance in Honduras

According to the Central American and Caribbean Microfinance Association (Redcamif), which covers seven countries in the Central American and Caribbean region, the total amount of microfinance loans in Honduras (in 2021) was approximately US\$530 million, or 53.3% of all rural loans in Honduras, about half of which were microfinance. The percentage of women borrowing from microfinance was 53% which is below the average of 60.7% for the seven member countries and is the second lowest to Panama (40.5%). Honduras has REDMICROH (Honduran Microfinance Association), and of the 24 member institutions under this network, 22 provide microfinance, including banks, non-banks, and NGOs.

According to the World Bank's database (MIX Market), about 30% of all individual borrowers borrow via village banking (a system in which villagers collect funds through deposits and other means and use the funds as a source of loans to villagers) or self-help groups (both are cooperatives, similar to cooperatives, in which villagers and group members This is relatively higher than in the other countries surveyed. This is a relatively higher percentage than in the other countries surveyed.

The average amount per loan across member institutions was \$1,367 as of 2018, but looking at averages by institution, the average loan amount for many NGOs was less than \$1,000, including \$319 for Fundación Adelante (NGO), which had the lowest average loan amount, This may be due to the fact that many NGOs are engaged in activities aimed at reducing poverty among low-income groups. The largest average borrowing amount was \$5,848 from Fundevi (a non-bank), which handles relatively large loans such as car loans and housing construction costs, as well as small loans such as household support and purchase funds.

2) Overview of Agricultural Financing in Honduras

(1) Overview of Loans to Agriculture by the Banking Sector

Outstanding loans by the Honduran banking sector to the agricultural sector totaled 26.1 billion Lempira at the end of June 2022, representing 6.3% of total outstanding loans. Outstanding loans to the agricultural sector have been increasing until the spring of 2019, after which they will come to a head. The percentage of total outstanding loans to the agricultural sector also increased until spring 2019, when it reached the 8% level, but has continued to decline since then (see next figure).

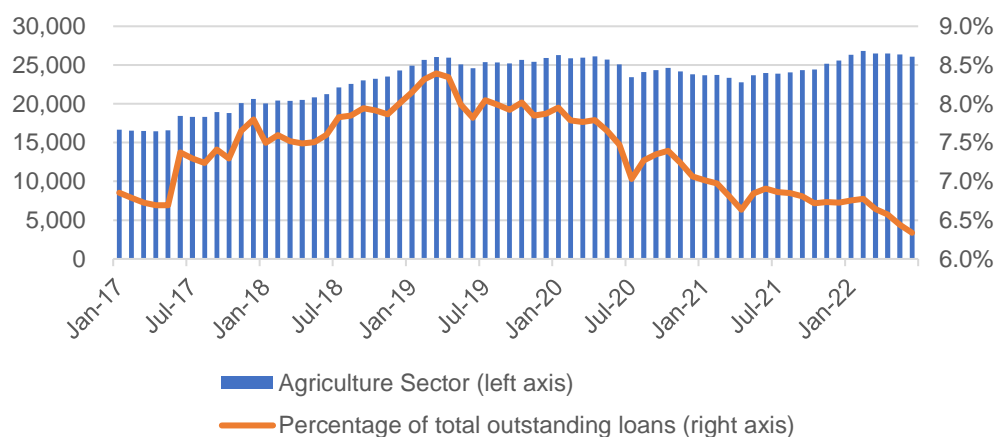


Figure 3.3.12 Outstanding Loans to the Agricultural Sector in Honduras

Source: Banco Central de Honduras website

Unit: million lempira

The default rate of domestic banks in Honduras was 3.1% for the agriculture sector, 2.1% for manufacturing industry, 3.4% for wholesale trade, 4.0% for real estate, and 4.2% for services at the end of June 2020 (see next table). Although the agriculture sector had the highest default rate from 2018 to 2020 when looking only at local currency loans, if foreign currency loans are included, the default rate is almost same as the average across sectors.

Table 3.3.9 Default Rates of Domestic Banks in Honduras by Sector

Content	Jun-18			Jun-19			Jun-20		
	Local currency loan	Foreign currency loan	Total amount	Local currency loan	Foreign currency loan	Total amount	Local currency loan	Foreign currency loan	Total amount
Agriculture	4.4	0.1	2.6	4.5	0.2	2.6	5.4	0.6	3.1
Manufacturing industry	3.1	0.1	1.5	4.4	0.2	2.1	4.1	0.3	2.1
Wholesale business	3.3	1.6	2.8	3.2	1.3	2.7	3.8	2.2	3.4
Real estate business	3.7	1.0	3.1	3.6	1.7	3.2	4.8	1.0	4.0
Service industry	1.8	0.5	1.1	1.9	0.5	1.2	3.2	0.2	1.7
Retail trade	4.2	2.2	4.0	4.0	2.2	3.9	4.3	0.7	4.2

Source: Banco Central de Honduras Informe de Estabilidad Financiera Junio 2020 Units: %.

The average interest rates in Honduras for new local currency loans in July 2022 were 11.5% for agriculture, 14.8% for livestock (cattle farming), 9.2% for fishing, 10.4% for manufacturing industry, and 10.5% for the service sector. Looking at recent years, while there have been several phases of increases in the cattle farming and fishing industries, agriculture has tended to decline moderately, in parallel with the service and industrial sectors. In addition, loan interest rates tend to fluctuate more for cattle raising, fishing, and agriculture than for services and industry (see next figure).

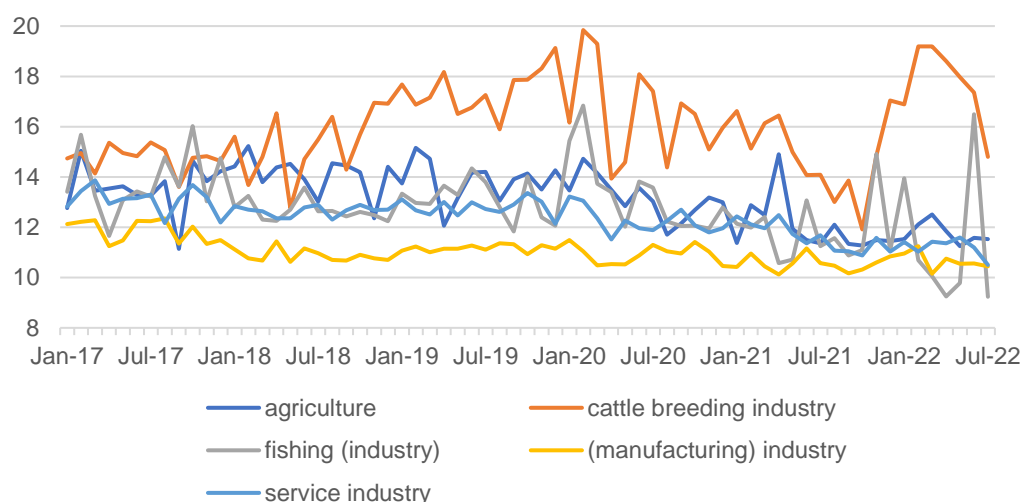


Figure 3.3.13 Average Monthly Interest Rates for New Loans in Local Currency for Each Sector in Honduras

Source: Banco Central de Honduras website Units: %.

Meanwhile, the average interest rate on local currency deposits was 2.48% as of June 2022. Looking at recent years, the rate remained stable in the 4% range until mid-2020, but has continued to decline since then (see next figure). The difference between the average interest rate on new loans to agriculture and deposits has been stable over the medium term, although it has swung between about 7% and 11% due to the recent downward trend in interest rates on new loans and the large fluctuations in loan rates, as already mentioned.

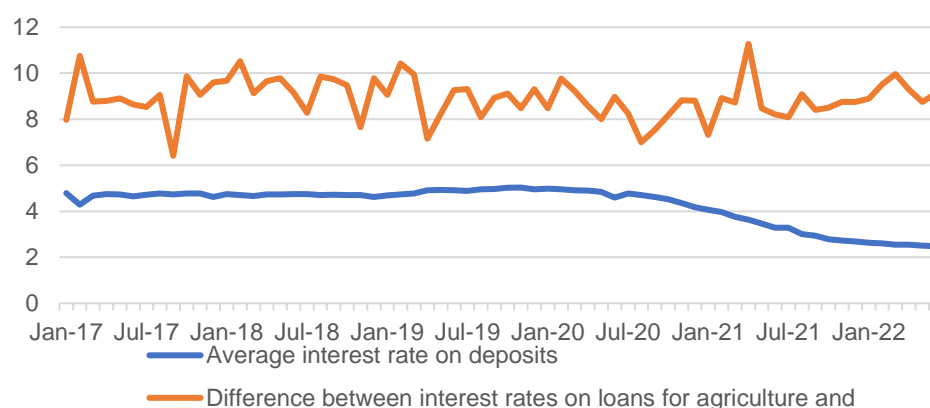


Figure 3.3.14 Average Interest Rates on Local Currency Deposits in Honduras

Source: Banco Central de Honduras website Units: %.

(2) Credit guarantee by BCH-Banhprovi Trust (Fideicomiso BCH-Banhprovi)

A public initiative to help finance the agricultural sector is the Credit Guarantee Fund (Fondos de garantía) operated by the BCH (Central Bank) and Banhprovi. This guarantees repayment of loans from financial institutions to the private sector to mitigate the impact of the COVID-19 epidemic and the damaging hurricanes of 2020. Although not limited to the agricultural sector, as of June 2021, a total of 820 million lempiras related to the agricultural sector had received support under this scheme.

3) Support by Japan and Other Development Partners in Agricultural Finance

(1) Support by Japan

The "Improving Livelihoods and Livelihoods of CCT Recipient Households through Financial Inclusion

Project" was a project to improve the livelihoods of the poorest households in the country by encouraging them to strengthen their household financial management and to practice savings. It is estimated that households participating in this project increased their annual income by approximately 45,000 Japanese yen.

(2) Support by IDB

The IDB is implementing a loan project titled Investing in The Banana Value Chain in Honduras with Renewable Energy and Data, which is aimed at recovering from the damage caused by hurricanes and the COVID-19.

(3) Private Sector Investment and Finance by IFC and IDB

Both IFC and IDB-INVEST have implemented several investment and loan projects in the past, but have not had a track record in the last 10 years. The past projects covered the expansion of production capacity of edible oil and food processing companies, facility expansion of shrimp farmers and processors, and production capacity of tilapia farmers and processors, and were in the range of \$10-30 million.

4) Possible ODA Loan Projects and Private Sector Investment and Finance

As a measure to support agricultural finance through ODA loans, TSL through the local national agricultural development bank could be a powerful tool, but in Honduras, the BANADESA is facing financial difficulties. On the other hand, there are no loan projects that support agricultural finance from other development partners, and it is necessary to proceed with a study starting with a list of local financial institutions that could serve as partners.

As mentioned in the previous section, there is also a concern that international organizations have no track record in the last 10 years with regard to investments and loans to private companies, and it will be necessary to carefully assess the companies subject to such investments and loans.

3.3.4 El Salvador

(1) Overview of the Financial Sector in El Salvador

1) Types of Financial Institutions and Supervisory Bodies in El Salvador

“Superintendencia del Sistema Financiero” (SSF) supervises financial institutions in El Salvador. There are 11 private banks, two state-owned banks, seven cooperative banks, and four savings and credit cooperatives under its supervision.

In addition, credit unions, workers' banks (Banco de los Trabajadores), and NGOs are providing small-sized financing in El Salvador, but they are not under the supervision of SSF.

Most banks in El Salvador are foreign-owned, and the share of domestically owned banks is very small. The share of loans by domestically owned banks is estimated to be around 5%.

2) State-Owned Banks in El Salvador

In addition to the Central Bank, there are three state-owned banks in El Salvador, namely Banco Hipotecario de El Salvador (BH) and Banco de Fomento Agropecuario (BFA), both of which are under SSF supervision. Another state-owned bank, Banco de Desarrollo de El Salvador (BANDESAL), mainly

provides financing to banks.

BH mainly provides loans to small and medium enterprises, while BFA offers loans to the agricultural sector. BANDESAL basically provides funds only to financial institutions, although it sometimes provides loans directly to enterprises. BANDESAL also provides credit guarantees. In addition, there are several other government trust funds, but none of these organizations provide loans to businesses or farmers.

3) Microfinance in El Salvador

As mentioned above, several financial institutions, such as credit unions and workers' banks, provide small-scale finance in El Salvador (Banco de los Trabajadores). However, they are not regulated by the SSF. FEDECREDITO and FEDECACES are network institutions of organizations that provide such microfinance.

FEDECREDITO is a federation of 48 credit unions and seven workers' banks that operate under the name. Members of FEDECREDITO provide financing to the agricultural sector, but such loans are rather limited, as only 0.8% of loans are directed to the agricultural sector. FEDECREDITO members seem to provide financing mainly for consumers.

FEDECACES is similar to FEDECREDITO, but its operations seem rather small compared to FEDECACES.

(2) Overview of Agricultural Financing in El Salvador

1) Overview of Loans to Agriculture, Forestry, and Fisheries in El Salvador

The outstanding loan amount to the agricultural sector in 2021 in El Salvador was \$403,839 million, representing 2.5% of all outstanding domestic loans.

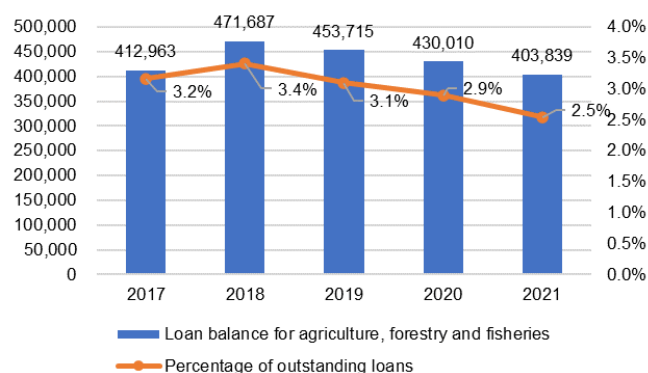


Figure 3.3.15 Amount and Percentage of Loans to the Agricultural Sector in El Salvador

Source: Prepared by a research team based on Superintendencia del Sistema Financiero.

Millions of U.S. dollars

As shown in the figure below, loans to the agricultural sector are mainly provided by banks (95.5%) and savings and credit cooperatives (3.7%), while the loans by cooperative banks are very limited.

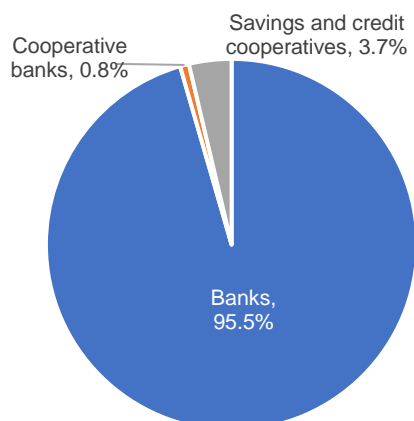


Figure 3.3.16 Percentage of Loans to Agriculture, Forestry, and Fisheries Industry by Type of Financial Institution (December 2021)

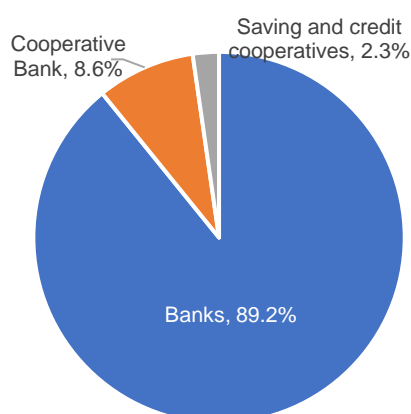


Figure 3.3.17 Percentage of Loans Outstanding by Type of Financial Institution (December 2021)

Source: Prepared by a research team based on Superintendencia del Sistema Financiero.

Note: This does not include loans by credit unions (Caja de Crédito), NGOs, etc., which are not subject to SSF supervision.

The two main loan providers to agriculture, forestry, and fisheries are Banco de Fomento Agropecuario (BFA) and Banco Hipotecario de El Salvador (BH), both of which are state-owned banks. The two banks provide 62% of the country's total loans to the agricultural, forestry, and fishery sectors.

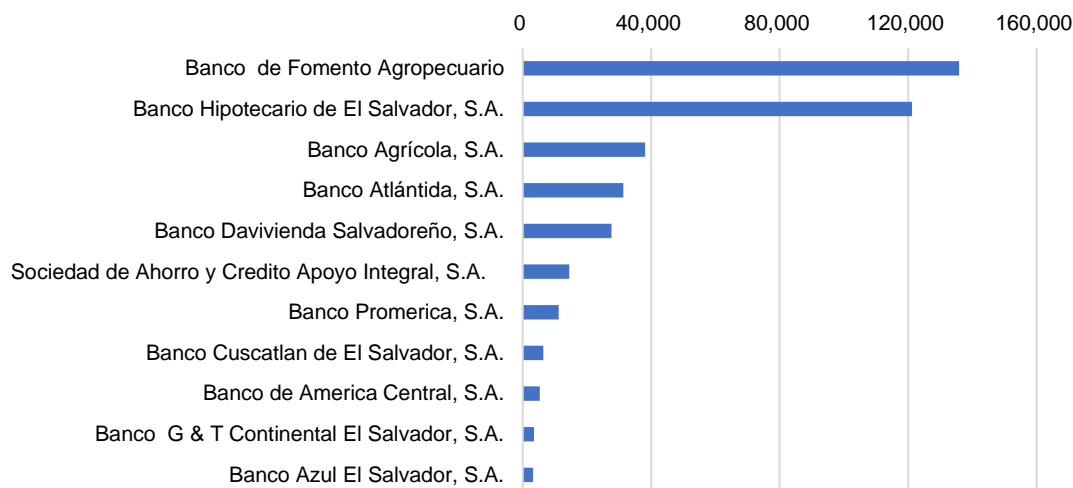


Figure 3.3.18 Outstanding Loans to Agriculture, Forestry, and Fisheries by Major Financial Institutions (December 2021)

Source: Prepared by a research team based on Superintendencia del Sistema Financiero.

Thousands of U.S. dollars

2) Agricultural financing by BFA

BFA is a state-owned bank established in 1973, separating the functions of the Ministry of Agriculture and Livestock. It provides about one-third of the country's agriculture, forestry, and fisheries loans through its 32 offices. The loans by BFA to agriculture are mainly for vegetables, sugarcane, coffee,

beekeeping, livestock, and fisheries.¹⁷

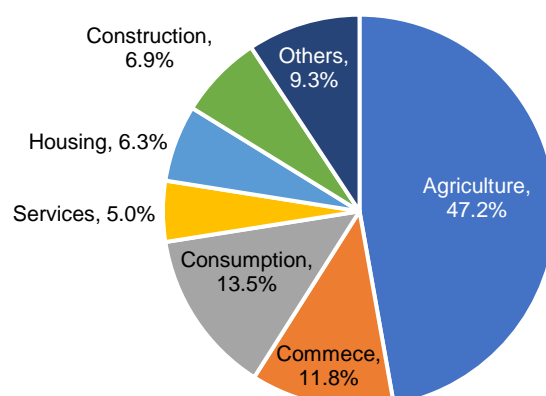


Figure 3.3.19 BFA Loan Portfolio Breakdown (2021)

Source: BFA Financial Statements

BFA's financial performance over the last three years is shown in the following table. From this table, no major issues can be identified in capital adequacy or profitability. The NPL ratio of BFA as of 2021 is 2.8%, slightly higher than the average of 1.8% but lower than the maximum limit set by the regulator (4%).

Table 3.3.10 Summary of BFA Financials

	2019	2020	2021
Loans and advances	267.4	270.0	275.6
Total assets	414.1	427.8	468.6
Deposit	318.8	369.3	334.9
Liability	17.2	11.9	11.7
Total capital	42.4	44.3	48.6
Operating profit	1.5	4.0	7.0
Net profit after tax	0.5	2.0	3.6

Source: BFA Financial Statements

Millions of U.S. dollars

3) Agricultural financing by BH

BH is a financial institution that provides loans to small and medium-sized enterprises (SMEs) and has 41 offices in El Salvador. BH's outstanding loans to agriculture are \$121 million, or about 30% of all outstanding loans to agriculture in El Salvador. As noted above, BH targets SMEs, and it is likely that agriculture loans are also targeted at SMEs.

BH provides loans for coffee production and processing, sugarcane production, grain production and processing, vegetable

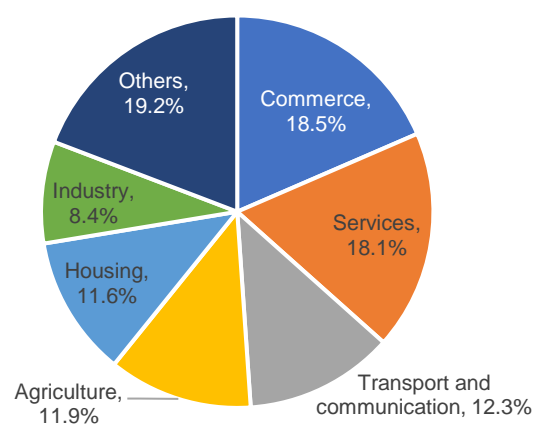


Figure 3.3.20 BH Loan Portfolio Breakdown (2021)

Source: BH Financial Statements

¹⁷ BFA Home Page

production and processing, fruit production and processing, livestock production, and fisheries (aquaculture). The majority of BH's loans to the agricultural sector are for coffee and sugarcane. For coffee, BH provides working capital for coffee cultivation, farm purchases and improvements, and processing equipment to individuals, corporations, and producer associations.

BH's financial performance for the last three years is shown in the following table. From this table, no major issues in capital adequacy and profitability can be identified. As BH used to have financing problems, it received loans from BANDESAL and BCIE. However, the number of deposits increased from 2019 to 2021, and the number of debts decreased accordingly. The NPL ratio of BH was 1.49% in December 2021, lower than the El Salvador average of 1.8%.¹⁸

Table 3.3.11 Financial Summary of BH

	2019	2020	2021
Loans and advances	791	883	993
Total assets	1,107	1,362	1,639
Deposit	797	1,059	1,340
Liabilities	127	117	96
Total capital	122	132	150
Operating profit	14.11	10.02	21
Net profit after tax	9.58	5.63	17

Source: BH Financial Statements

Millions of U.S. dollars

4) Agricultural financing by BANDESAL

BANDESAL is a state-owned bank established in 2012 by reorganizing Banco Multisectorial de Inversiones (BMI) to provide financing to micro, small, and medium-sized enterprises.¹⁹ BANDESAL basically provides financing to enterprises through financial institutions supervised by SSF.

Since BANDESAL's operations are defined by law and it is prohibited to provide direct loans to companies, BANDESAL has a separate entity, Fondo de Desarrollo Económico (FDE), which provides direct loans to companies, and Fondo Salvadoreño de Garantías, which provides credit guarantees. BANDESAL provides financing to FDE.

In addition, there are 12 trust funds managed by BANDESAL, one of which is Fideicomiso para el Desarrollo de la Micro y Pequeña Empresa (FIDEMYPE) (SME Development Fund). FIDEMYPE provides wholesale loans to other financial institutions for SME financing.

The breakdown of outstanding loans by BANDESAL is as in the table below. It allocates approximately 85% of the loan funds for wholesale loans to other financial institutions.

¹⁸ World Bank World Development Indicator

¹⁹ Source: bandesal website <https://www.bandesal.gob.sv/marco-institucional/>

Table 3.3.12 Breakdown of BANDESAL Loan Balances (2020)

	outstanding credit	ratio
Loans by BANDESAL (through other financial institutions)	394.3	81.6% (in %)
Loan by FIDEMYPE (through other financial institutions)	16.1	3.3% (3.3%)
Direct Financing by FDEs	49.4	10.2% (in %)
Direct financing by BANDESAL	23.6	4.9% (in %)
total amount	483.5	100.0

Source: BANDESAL (2020) Informe de labores del primer año de gestión del Presidente de la República de El Salvador
Millions of U.S. dollars

The following table shows the sector breakdown of loans made by BANDESAL. As can be seen from this table, 11.6% of the loans by BANDESAL are for the agriculture sector.

As the average loan size to the agricultural sector is about \$30,000, BANDESAL's loans to the agricultural sector are targeted at larger farmers and processors rather than small farmers.

Table 3.3.13 Outstanding Loans by Sector, 2020

	Outstanding loan amount	Share	Number of loans
Services	94.5	24.0%	3,854
Trade	89.3	22.6%	7,628
Agriculture	63.3	16.1%	2,069
Housing	43.6	11.1%	2,489
Manufacturing	38.5	9.8%	629
Other	65.2	16.5%	3,751

Source: BANDESAL (2020) Informe de labores del primer año de gestión del Presidente de la República de El Salvador
Millions of U.S. dollars

As mentioned above, FDE provides direct loans to companies. Out of the total FDE loans (\$49.4 million), \$6.8 million is to the agricultural sector. As its average loan size is \$320,000, it can be estimated that FDE loans to agriculture are targeting large companies.

BANDESAL's direct loans are for syndicated loans for the construction of power plants, etc., and are not for the agricultural sector.

The financials of BANDESAL for the last three years are as in the table below. From this table, no major issues in capital adequacy and profitability can be identified. BANDESAL cannot take deposits, so it has financing from the central bank and financial institutions. Loan providers to BANDESAL include IDB, BCIE, and KfW. IDB provides long-term financing (10-20 years) to BANDESAL.

Table 3.3.14 BANDESAL Financial Summary

	2019	2020	2021
Loan and advances	423	405	542
For Businesses	22	60	166
For Financial Institutions	399	343	373
Total assets	539	548	633
Borrowing from the Central Bank	47	38	29
Loans from other financial institutions	233	239	323
Total liabilities	286	286	364
Total capital	253	262	269

	2019	2020	2021
Operating profit	6	8	10
Net profit after tax	5	10	10

Source: BANDESAL Financial Statements

In millions of dollars. Note: This does not include FDE and other fund assets and liabilities balances.

5) Government Programs for Agriculture

The Ministry of Agriculture and Livestock of El Salvador has implemented the "Special Trust for the Agricultural Sector (Fideicomiso Especial del Sector Agropecuario, FIDEAGRO)" to support small and micro farmers.

FIDEAGRO funds are managed by BFA. FIDEAGRO provides subsidies and loans to farmers. It has provided \$20.3 million to about 8,500 farmers.²⁰

Although the program primarily targets grain-producing farmers, it covers dairy, vegetable farming, fruit farming, beekeeping, and fishing. It provides loans through BFA with a maximum of \$5,000 at 4-5% interest rates.²¹

(3) Support by Japan and other development partners in agricultural financing

1) Supports by IDB

The IDB has implemented several projects for the agricultural sector, but none seem to have provided financing to farmers.

On the other hand, IDB has provided several loans to BANDESAL (including former BMI). Most recently, IDB concluded two loan agreements with BANDESAL in 2015 for the financing of a \$100 million loan and in 2021 for the financing of \$200 million. Taking such financing, BANDESAL uses the funds to provide wholesale financing to financial institutions that provide SME loans. A part of such financing is directed to the agricultural sector.

2) Support by the World Bank

The World Bank has provided several projects in the agricultural sector in the past, and the most recent one in the last ten years is "Integrated Landscape Management and Restoration." No project by the World Bank has provided financing for farmers and SMEs.

3) Private Sector Investment and Finance by IFC and IDB

While IFC has not provided any equity investment or loans for the agricultural sector in El Salvador, IDB-INVEST has carried out three investment projects (for one company). In these projects, IDB-INVEST provided loans to a sugar company. The loan funds were used for the company's working

²⁰ Source: BFA website

²¹ Source: Office of the President of El Salvador <https://www.presidencia.gob.sv/gobierno-lanzo-fideagro-para-otorgar-creditos-con-tasa-preferencial-a-los-agricultores-ganaderos-y-pescadores/>

capital and bridge funds for sugarcane farmers.

IFC has provided financing to several financial institutions but has not given loans to state-owned banks.

IDB-INVEST has provided several loans to BANDESAL and its former body (BMI) several times. It has also provided loans to BH so that BH can expand lending to SMEs.

(4) Possible ODA loan projects and private sector investments and finance

It is difficult to provide ODA loans to the government of El Salvador at the time due to the rapid deterioration of the fiscal, economic, debt, and other conditions after 2020. Possible supports for agricultural finance in the future are as follows.

1) Support for small and medium farmers through BFA and BH

In case JICA provides ODA loans to the government of El Salvador, there would be two possible options: BFA, which provides loans to small and medium-sized farmers and agribusinesses, or BH, which provides loans mainly to small and medium-sized businesses but also to farmers. In such cases, the interest rates for farmers would not be able to be more than 4-5% because the government program administered by BFA provides loans to farmers at an interest rate of 4-5%.

The outstanding loans of BFA and BH to the agricultural sector are only \$135 million and \$121 million, respectively, while they have ample funding through deposits. Therefore, both BFA and BH might not need additional financing. It is also important to note that co-financing is impossible since there is no financial support from the IDB or the World Bank.

2) Support for Farmers and Agribusinesses through BANDESAL

There might be a possibility that BANDESAL takes an ODA loan so that it on-lends the funds to private banks for the financing of farmers and agribusinesses. The target end-borrowers would be larger farmers and agribusinesses rather than micro and small-scale farmers.

In this case, it should be noted that the loan interest rates for farmers and agribusinesses would be rather high because the loan funds go through several steps, such as BANDESAL and private banks.

In addition, as many international financial institutions, including IDB, have provided funds to BANDESAL, it may have already secured sufficient financing and may not need additional funds.

3.3.5 Panama

1) Overview of the Financial Sector in Panama

(1) Types of financial institutions and supervisory bodies in Panama

The Superintendencia de Bancos de Panamá supervises financial institutions in Panama, and according to its website, as of July 2022, in addition to the two state-owned banks, there will be 40 general license banks that are fully licensed to conduct banking business, and 15 international license banks that can only accept deposits from individuals and organizations based abroad. According to the Agency's website, as of July 2022, there will be 2 state-owned banks, 40 general license banks that are fully

licensed to conduct banking business, and 15 international license banks that can only accept deposits from individuals and organizations based abroad (in addition, there are 2 banks in voluntary liquidation and 4 banks in forced liquidation). Another government-affiliated bank, Banco de Desarrollo Agropecuario (BDA), is directly supervised by the executive branch through the Ministry of Agriculture, rather than by a supervisory agency.

(2) National Bank of Panama

The two state-owned banks in Panama that are supervised by the Superintendency of Banking are the Banco Nacional de Panamá (National Bank of Panama) and the Caja de Ahorros (Savings Bank).

Although the National Bank of Panama does not have the authority to issue currency, it has payment and settlement functions and effectively acts as the central bank. It offers short-, medium-, and long-term loans to businesses, depending on their needs. With 90 branches and 306 ATMs, it is the largest bank in Panama, and as a state-owned bank, it covers the entire country.

On the other hand, Savings Bank was founded in 1934 as a bank specializing in housing finance. Currently, it offers personal loans (mortgages, auto loans, quick loans, etc.). With 56 branches and 299 ATMs, it is comparable in size to the National Bank of Panama and operates nationwide.

BDA, on the other hand, is a government-affiliated financial institution established in 1973 with the objective of providing loans to meet the financial needs of the agricultural sector, especially for the low-income sector and small and medium-sized businesses. BDA has a total of 35 branches, ranging from 2 to 8 branches under regional managers in each of the 9 regions of the country.

(3) Microfinance in Panama

The main microfinance institutions in Panama are the eight member institutions of REDPAMIF (Panama Microfinance Association): banks, cooperatives, NGOs, and non-banks. According to the Central American and Caribbean Microfinance Association (Redcamif), the amount of lending by Panamanian microfinance institutions (in 2021) is about US\$350 million, or 13.2% of all rural lending in Panama. The SBP, the bank's supervisory body, allows banks to engage in microfinance operations, but the high cost of doing business has become a bottleneck, and as of 2022, there has been no significant activity except for REDPAMIF member Banco Delta.

According to the World Bank database, the main use of funds is for business financing, with an overall average loan amount of approximately \$6,000 per loan as of 2018. While FINANCIERA CREDIT (non-bank), listed on the Panama Stock Exchange and targeting small businesses and individuals, has an average loan amount of \$13,684, exceeding \$10,000, PROCAJA (average \$1,181), a Santiago-based NGO that aims to improve the lives of rural people, and Microserfin, a non-bank that focuses on helping smallholder farmers, have an average loan amount of \$6,000 per loan as of 2018. (average \$1,181), a Santiago-based NGO that aims to improve the lives of rural people, and Microserfin (non-bank, average \$1,588), which focuses on supporting small farmers. Even PROCAJA, which has the lowest average loan amount, exceeds \$1,000. Although the amount of microfinance loans is high compared to other countries, it is not enough to cover the cost of doing business for banks, considering that the amount is around 150,000 Japanese yen.

2) Overview of Agricultural Financing in Panama

(1) Overview of Loans to Agriculture by Domestic Banks

As of April 2022, outstanding loans to agriculture, livestock, and fisheries totaled \$1.9 billion, accounting for 3.4% of total outstanding loans in the country. Recent trends in outstanding loans to the agriculture sector indicate that growth has plateaued, and its share of total outstanding loans in the

country has remained in the low 3% range. Among the three subsectors, the livestock industry has the largest loan balance, accounting for over 70% of the total agricultural sector, followed by agriculture, which accounts for over 20% of the total, and fisheries, which accounts for only a few percent.

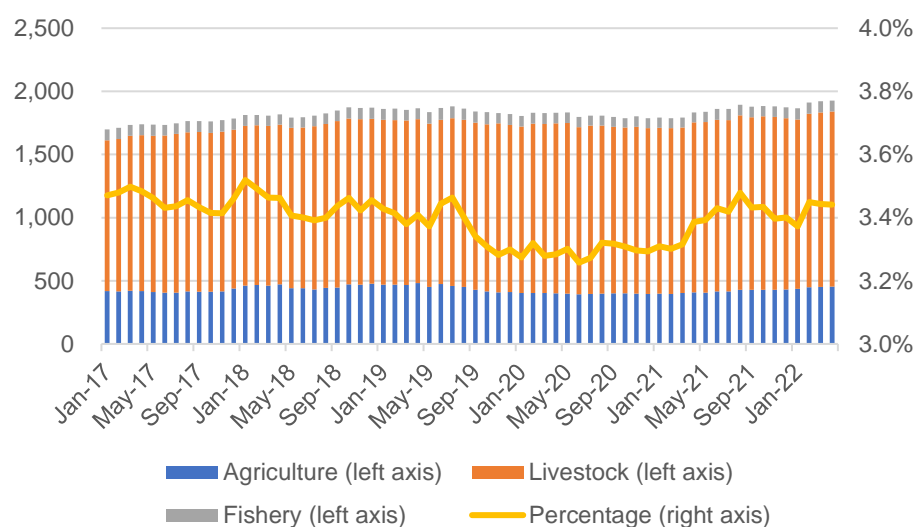


Figure 3.3.21 Outstanding Loans to Agriculture, Livestock, and Fisheries in Panama and Percentage

Source: Superintendencia de Bancos de Panamá website

In millions of U.S. dollars (million balboas)

The Superintendencia de Bancos de Panamá website shows delinquent loans to the agricultural sector through July 2019 (however, data for December 2017 is missing), but both the amount of delinquent loans and the ratio have been on a gradual increase since 2017. The ratio of delinquent loans has been in the high 3% to low 4% range.

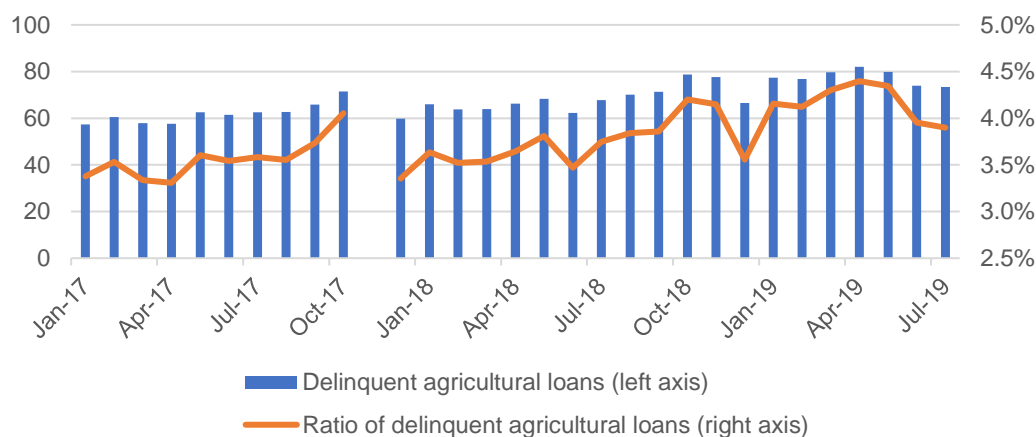


Figure 3.3.22 Amount of Delinquent Loans and Percentage of Delinquent Loans to the Agricultural Sector in Panama

Source: Superintendencia de Bancos de Panamá website In millions of dollars (million balboas)

On the other hand, delinquent loans in the banking sector as a whole, which had been on the rise for some time, began to increase sharply in the summer of 2021, with the delinquent loan ratio rising to 2.5% from around 2.0% in the previous period. This is thought to be due to the deterioration in the business conditions of loan recipients as a result of the stagnation of economic activity caused by the COVID-19 epidemic.

Comparing the delinquent loan ratio for loans to the agricultural sector already mentioned with the value for the banking sector as a whole, a clear trend toward larger loans to the agricultural sector can be read, as shown in the next figure.

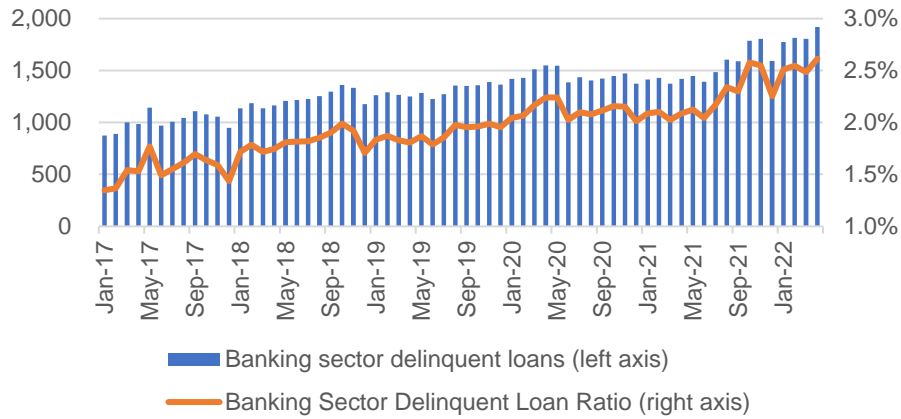


Figure 3.3.23 Amount of Delinquent Loans and Ratio of Delinquent Loans in the Banking Sector in Panama

Source: Superintendencia de Bancos de Panamá website
In millions of U.S. dollars (million balboas)

Looking at ROA as an indicator of profitability in the banking sector, ROA for the banking sector as a whole, which had been around 1.5% until 2019, declined sharply in 2020, when COVID-19 became widespread, and has been around 1.0% since 2021. For state-owned banks, including the National Bank of Panama, which also has a large balance of loans to the agricultural sector, the trend was similar to that of the banking sector as a whole until the end of 2020, but the downward trend has continued since 2021, falling to nearly 0.5% in 2022.

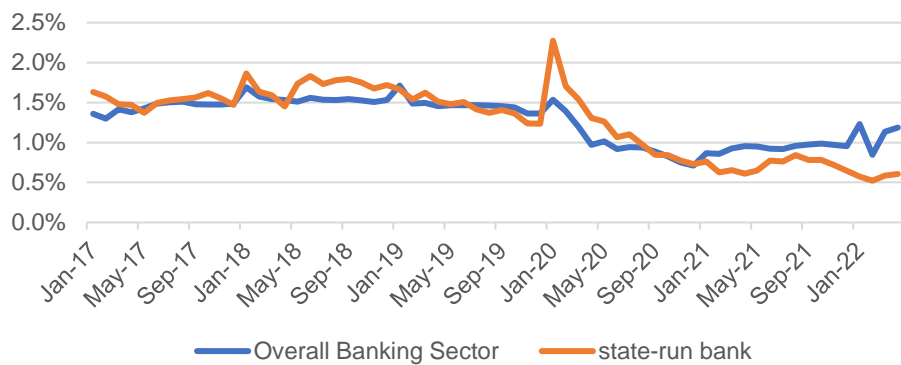


Figure 3.3.24 ROA of the Banking Sector in Panama

Source: Superintendencia de Bancos de Panamá website

(2) Government loan assistance programs for agriculture

In Panama, the Special Fund for Interest Compensation (Fondo Especial de Compensación de Intereses, FECCI) provides a mechanism for lower interest rates on loans to the agricultural sector.

When a business outside of the agricultural sector receives a loan of \$5,000 or more in Panama, the loan recipient must pay an additional 1% on top of the interest rate paid to the bank. The 1% paid by the loan recipient is pooled by the FECCI, and the FECCI provides subsidies for agricultural producers to receive a

4% interest rate reduction or exemption when they receive loans from banks and other institutions. Businesses that export non-traditional agricultural products are also eligible to receive interest rate reductions of 3.5%.

FECI provides funds for interest rate reductions and exemptions on loans to agricultural producers, etc., as mentioned above, and also provides 25% of the funds collected from financial institutions to the BDA at no cost to the BDA, which uses the funds to provide loans to the agricultural sector.

(3) Loans to the Agricultural Sector by the National Bank of Panama

As of April 2021, the National Bank of Panama's outstanding loans to agriculture, livestock, fisheries, and forestry totaled \$600 million, accounting for 12.1% of the bank's total outstanding loans. Of this amount, livestock accounted for nearly 80%, although the percentage has been slowly declining in recent years, followed by agriculture at around 20%, and only a small amount for fisheries and forestry.

Although the bank's agricultural loans have been on a slight downward trend in recent years and continue to decline as a percentage of total loans outstanding, it remains the largest domestic bank in terms of agricultural loans outstanding, accounting for 32.9% of all domestic bank loans to the sector, far ahead of the second largest domestic bank, Global Bank Corporation (20.3%) (see next figure). Global Bank Corporation (20.3%), which is in second place (see next figure).

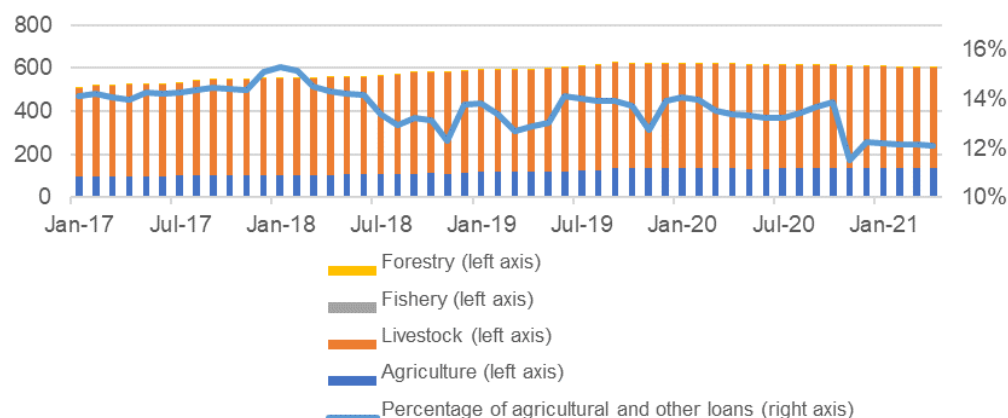


Figure 3.3.25 Outstanding Loans to Agriculture, Livestock, Fisheries, and Forestry by the National Bank of Panama

Source: Superintendencia de Bancos de Panamá website
In millions of U.S. dollars (million balboas)

The amount of delinquent loans (loans that are 90 days or more past due on principal or interest) as a percentage of the bank's total loan balance was \$85 million at the end of 2021, and the delinquent loan ratio was 1.7%. Looking at recent years, both of these figures rose sharply at the end of 2020, likely due to the worsening business conditions of the loan recipients as a result of the COVID-19 epidemic.

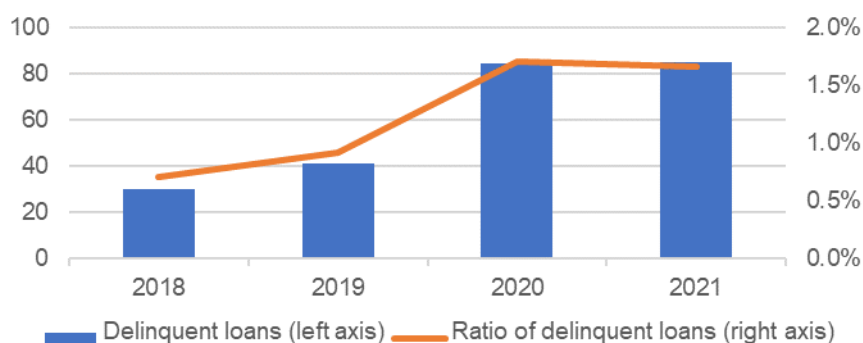


Figure 3.3.26 National Bank of Panama Delinquent Loans and Delinquent Loan Ratios

Source: Banco Nacional de Panamá Memoria Anual 2019, 2021

In millions of U.S. dollars (million balboas)

The National Bank of Panama's capital adequacy ratio has remained in the low 10% range and was 19.4% at the end of 2021; although profitability has deteriorated since 2020 due to the spread of COVID-19, the bank's financial health does not appear to be significantly affected at this time.

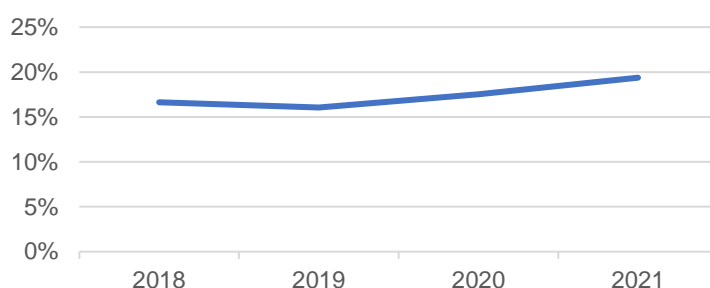


Figure 3.3.27 National Bank of Panama Capital Adequacy Ratio

Source: Banco Nacional de Panamá Memoria Anual 2019, 2021

(4) Loans to agriculture by BDA (Banco de Desarrollo Agropecuario)

BDA's outstanding loans to the agricultural sector totaled \$248.5 million in October 2021, up 4.5% from the previous year. This was the fourth-largest loan balance among domestic banks under the supervision of the Banking Supervisory Agency (BSA), and represented 12% of the total outstanding loans to the sector. Of this balance, \$43.2 million (17%) was for agriculture, \$121.5 million (49%) for livestock, and \$83.7 million (34%) for others.

In addition, loan programs are offered for specific productions or for specific topics such as climate change, support for women entrepreneurs, and sustainability, including

program-name	summary
Programa Panamá Agro Solidario	Interest-free loans up to \$100,000 for agriculture and livestock.
Mitigación y Adaptación al Cambio Climático	Financing for up to 25 years at an interest rate of 1% for projects that address climate change, such as rainwater harvesting and energy conservation.
Programa Cultivos Frutales de Exportación	Loans at 1% interest for up to 15 years for capital investment in the production of export crops such as avocados and mangoes.
Programa Repoblación Ganadera	Loans at 1% interest for up to 15 years for the purchase of cattle and horses for breeding, etc.
Programa Mujer Agro Emprendedora	Loans of up to \$50,000 with no interest or 2.5% interest rate to women starting a business in

program-name	summary
	agriculture-related fields.
Programa Sostenible en las Comarcas	Loans up to \$30,000 at 1% or 3% interest for up to 15 years for projects related to sustainability.
Programa Mi Primer Crédito Agropecuario	Loans up to \$25,000 at 0.5% or 3.5% interest rate to 18-25 year olds starting an agriculture-related business.

The average loan interest rate as of October 2021 is 1.94%, which is significantly lower than the average loan interest rates of 6.15% for agriculture and 6.39% for livestock in the domestic banking sector as of November 2021, and is claimed to be highly beneficial to micro, small, and medium-sized businesses. BDA does not have to repay or pay interest on the funds it receives from FECCI. On the other hand, BDA does not obtain funding through deposits or from other financial institutions.

Although BDA's financials are not publicly available, and information such as NPL ratios and capital adequacy ratios cannot be confirmed, it is assumed that a significant percentage of the loans are difficult to collect, partly because the loans are funded by grants received from FECCI, as mentioned above.

(5) Loans to agriculture by other financial institutions

Private financial institutions also provide loans to the agricultural sector, but like the National Bank of Panama, they generally provide funds for the purchase of real estate for agricultural producers or provide loans on a real estate collateral basis, and not many financial institutions provide unsecured loans to small and medium-sized farmers.

Of the private financial institutions in Panama, Global Bank has been somewhat active in lending to the agricultural sector, and it has the largest balance of loans to the agricultural sector among private financial institutions. The bank has also been providing funds for the purchase of real estate and lending to the agricultural sector on the basis of real estate collateral, but has recently begun to provide loans to smaller rice farmers and dairy farmers that do not require real estate collateral.

In the case of rice farmers, if they grow and produce rice based on a contract with a rice miller who does business with Global Bank, Global Bank will consider the contract as collateral and provide short-term financing without requiring any other collateral. When rice farmers purchase inputs such as fertilizers, they often pay the suppliers as accounts payable, and in such cases, they generally pay an interest rate of 18% per annum in addition to the price they pay. By replacing this with a loan from Global Bank, the cost can be reduced (rice farmers can receive the 4% interest reduction/exemption from FECCI mentioned above, so the interest rate borne by the rice farmers is 3-4%).

In the case of dairy farmers, similarly, loans for capital investment are provided to dairy farmers who produce and deliver milk based on contracts with dairy companies, without requiring them to provide real estate collateral. By purchasing generators and refrigeration equipment, dairy farmers can raise the grade of milk they produce from C to B, thereby improving the purchase price, which is expected to increase farmers' income.

3) Donor Initiatives in the Agricultural Sector

(1) Support by IDB

The IDB is implementing the Sustainable and Inclusive Agricultural Innovation Project, a loan project to support small-scale family farmers to introduce environmentally sustainable technologies and improve productivity. The project is being implemented by the Ministry of Agricultural Development and the Agricultural Technology Development Institute as the implementing agency.

(2) Investment and Loan Projects by IFC and IDB

IFC and IDB-INVEST have provided one long-term loan each to a local subsidiary of a foreign bank to finance an agriculture-related enterprise. Both loans were in the amount of \$25 million.

4) Possible yen loans and overseas investments and loans at this time

(1) Two Step Loan through the National Bank of Panama or BDA

Both banks are actively developing FVC-related low-interest loan programs, and may consider two-step loans for agriculture through either or both banks. In addition, since both banks have a large balance of loans to livestock producers, TSL for dairy and other industries could be considered by leveraging their customer bases.

(2) Provision of funds for overseas investments and loans to private companies

If Panama's domestic financial institutions need funds for agricultural sector loans, they could offer foreign investments and loans. For example, one idea would be to provide funding to Global Bank to help finance loans to rice farmers and dairy farmers. If Global Bank were to provide funds for overseas investment and loans, it would be a prerequisite that the interest rate should be at the same level as the deposit rate.

3.3.6 Dominican Republic

1) Overview of the Financial Sector in the Dominican Republic

(1) Types of financial institutions and supervisory bodies in the Dominican Republic

Financial institutions in the Dominican Republic are supervised by the Superintendencia de Bancos de la República Dominicana (Superintendency of Banking Supervision of the Dominican Republic), which is responsible for 49 Financial Intermediation Entities (FIEs). In addition to the 49 Financial Intermediation Entities, the agency supervises bureau de change, trust companies, credit bureaus, auditing firms, and representative offices of foreign financial institutions. Financial intermediaries include 17 Multiple Banks, 14 Savings and Credit Banks, 6 Credit Corporations, 10 Savings and Loan Associations, and 10 Government Financial Institutions (GFIs). institutions, and two government-affiliated financial institutions (Public Entity).

(2) State-owned Bank of the Dominican Republic

The two national banks in the Dominican Republic are the Banco Agrícola de la República Dominicana (BAGRICOLA) and the Banco de Desarrollo y Exportaciones (BANDEX), an export credit agency. .

BAGRICOLA was founded in 1945 and currently has 32 branches, 5 regional offices, and 32 business offices throughout the country. It has 964 employees, of which only 264 work at the head office. Through short-, medium-, and long-term loans, the bank aims to increase the productivity of domestic agriculture and thereby improve the standard of living in rural areas. Sixty percent of all loans are to agriculture, followed by agribusiness and micro-entrepreneurs, and livestock.

(3) Microfinance in the Dominican Republic

The Dominican Republic has a non-profit microfinance organization called REDOMIF (Dominican Republic Microfinance Association), which has 31 member institutions. The 31 member institutions include 8 banks, 5 cooperatives, 8 NGOs, 3 non-banks (associations), and 7 partner institutions such as the French Development Agency and Redcamif (Central American and Caribbean Microfinance Association).

According to Redcamif, microfinance lending in the Dominican Republic in 2021 was approximately

\$770 million, or roughly 30% of all rural lending in the country. In addition, the percentage of women using microfinance is more than half (56.4%), but slightly below the average of the seven member countries (60.7%).

According to the World Bank's database, the use of funds is almost equally split between business financing and household support. The average amount per loan as of 2018 is approximately \$1,800, but looking at the average amount for individual institutions, many NGOs and cooperatives, which are the main players in microfinance in the country, provide loans in hundreds of dollars on average (the median loan amount overall was \$738.). Motor Crédito, which raises the average significantly, is a bank with an average loan amount of over \$8,000. The higher average is likely due to the bank's focus on auto loans and capital investment loans to agriculture.

2) Overview of Agricultural Financing in the Dominican Republic

(1) Overview of loans to agriculture by financial intermediaries other than BAGRICOLA

As of May 2021, the outstanding balance of loans to agriculture, livestock, and forestry (excluding fisheries) totaled 25.6 billion Dominican pesos, equivalent to 1.7% of total outstanding loans in the country. While there have been short-term fluctuations in the amount of loans to agriculture and other sectors, over the years there has been an increasing trend, but the percentage of total outstanding loans in the country has been declining (see next figure). However, there are some private financial institutions that are taking distinctive approaches, such as Banco ADEMI and Banco ADOPEM, which focus on loans to smallholder farmers.

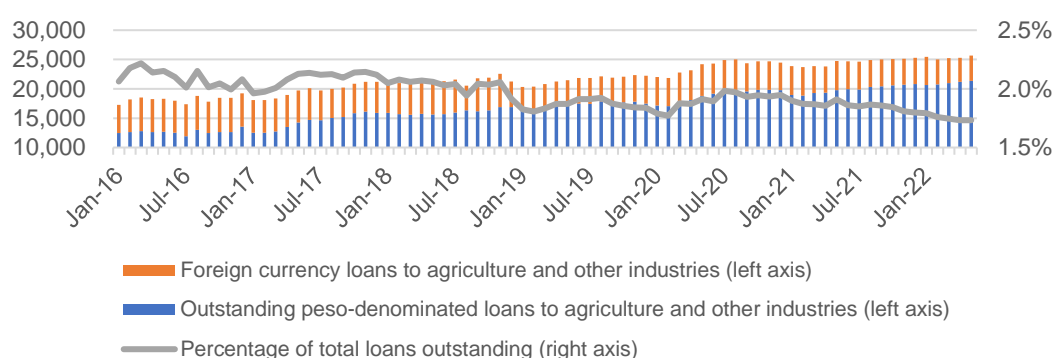


Figure 3.3.28 Outstanding Loans to Agriculture, Livestock, and Forestry in the Dominican Republic and Percentage

Source: Superintendencia de Bancos de la República Dominicana website
In millions of Dominican pesos

As of April 2022, the interest rate on peso-denominated loans to agriculture, livestock, and forestry was 12.1%, lower than the average for all industries of 13.5%. The interest rate on foreign currency-denominated loans to agriculture was 4.0% as of the same date, while the average for all industries was 6.2% (see next figure). Nevertheless, according to interviews with local private banks, their interest rates for loans to agriculture and other industries are higher than those of the state-owned BAGRICOLA. Looking at the trend of interest rates on these loans, especially those denominated in pesos, the downward trend has continued in recent years, but has recently turned upward.

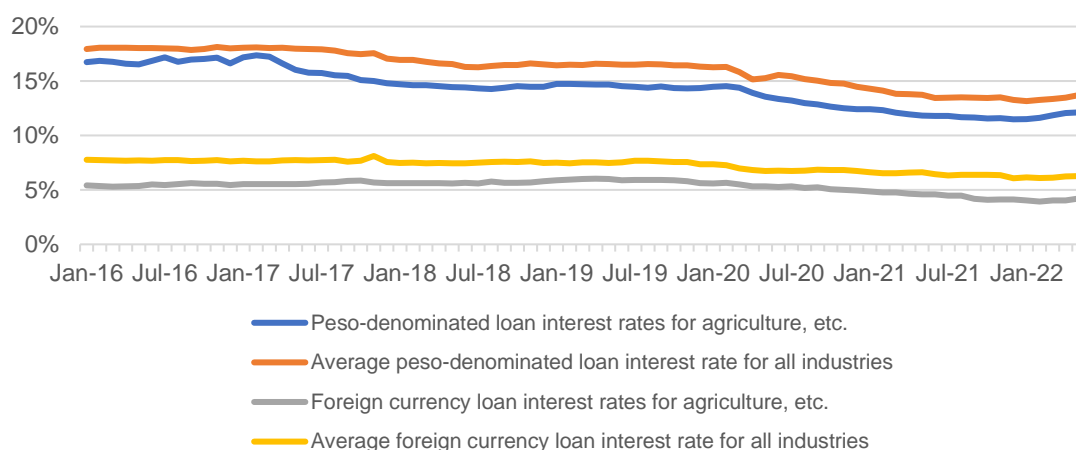


Figure 3.3.29 Average Interest Rates on Loans to Agriculture, Livestock, and Forestry and to All Industries in the Dominican Republic

Source: Superintendencia de Bancos de la República Dominicana website

Given that the deposit rate for all financial intermediaries as of April 2022 was 1.8%, the margin for loans to agriculture, livestock, and forestry was about 10%. Deposit rates, like loan rates, have been declining in recent years, but the decline in loan rates has been more significant, and the margin for loans to agriculture and other industries has gradually declined from about 13% at the beginning of 2016 (see next figure).

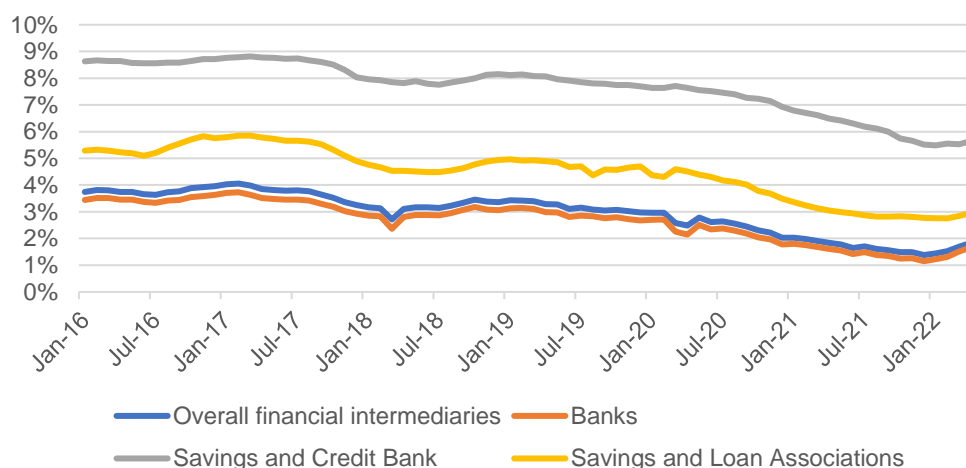


Figure 3.3.30 Deposit Interest Rates in the Dominican Republic

Source: Superintendencia de Bancos de la República Dominicana website

The ratio of delinquent loans (the percentage of loans that are 30 days or more past due on principal or interest payments) has been consistently higher for loans to agriculture, livestock, and forestry than for the total outstanding loans, but both have been gradually declining since early 2022, and as of May 2022 were 4.2% for loans to agriculture and 1.1% for the total outstanding loans (see next figure). As of May 2022, the share was 4.2% for agricultural loans and 1.1% for total outstanding loans.

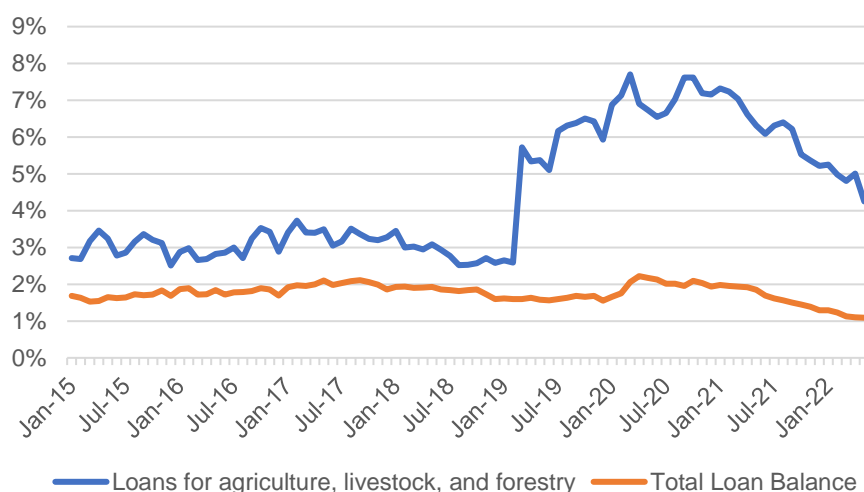


Figure 3.3.31 Ratio of Delinquent Loans to Agriculture and All Industries in the Dominican Republic

Source: Superintendencia de Bancos de la República Dominicana website

As of May 2022, the capital adequacy ratio of financial intermediary institutions was 16.2% and return on assets (ROA) was 2.5%. Looking at recent trends in these indicators, capital adequacy ratios have remained in the upper 10% range and ROA in the lower 2% range (see next figure), and these statistics, including the ratio of delinquent loans, do not indicate any major problems with the overall financial soundness or profitability of financial intermediary institutions.

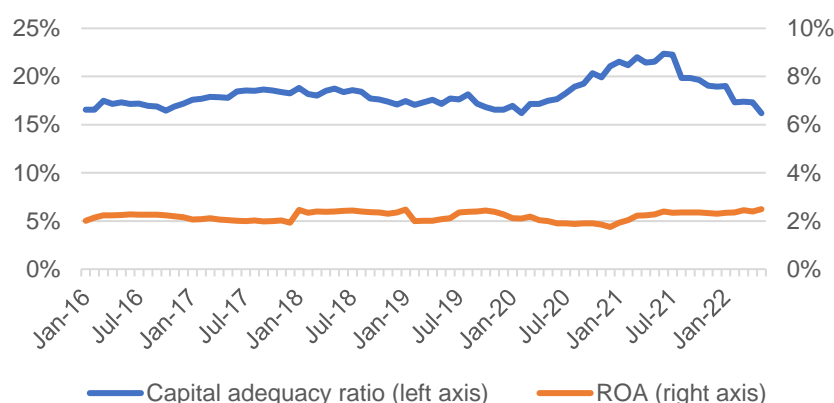


Figure 3.3.32 Capital Adequacy and ROA of Financial Intermediaries in the Dominican Republic

Source: Superintendencia de Bancos de la República Dominicana website

In addition to loans provided by financial intermediaries, the Special Fund for Agricultural Development (Fondo Especial para el Desarrollo Agropecuario: FEDA) provides loans at interest rates as low as 0.5%. The loan recipients are producers who have experience, track record, potential, and social impact, although it is difficult for them to obtain loans from regular banks, and they are trying to increase the repayment rate by providing guidance on business plans and repayment plans, as necessary. However, under the current government, it is believed that the approach is changing, for example, by providing grants focused on the promotion of specific industries.

(2) Loans to Agriculture by the Agricultural Bank of the Dominican Republic (BAGRICOLA)

The Dominican Agricultural Bank (BAGRICOLA) had the outstanding balance of loans to agriculture, livestock, forestry, and fisheries of 49.3 billion Dominican pesos at the end of 2022, accounting for

62.4% of all outstanding loans to the sector by the country's intermediary financial institutions.²² However, in the last decade, BAGRICOLA has rapidly increased its loan balance, and since 2014, it has accounted for a majority of the total loans outstanding to the sector in the country.

The 49.3 billion Dominican pesos loans includes the government's agricultural loan program, which is managed by BAGRICOLA, and the balance of BAGRICOLA's own loans is 35.9 billion Dominican pesos. Loans managed by BAGRICOLA are subject to the supervision of the Superintendency of Banks, while those entrusted by the government are not. The ratio of delinquent loans to outstanding loans, including government loan programs,²³ was 16.08% as of October 2022, while BAGRICOLA's own outstanding loans stood at 6.6% at the end of 2022.

Government agricultural loan programs administered by BAGRICOLA include CONALECHE, a loan program for dairy farming, and INDOCAFE, a loan program to improve the quality of Dominican coffee, with outstanding loans of 1 billion Dominican pesos and 400 million Dominican pesos respectively at the end of 2020. In addition, a special program of zero-interest loans has recently been implemented in response to COVID-19, with the aim of revitalizing the agricultural sector. The Special Zero Interest Loan Program began lending around August 2020 with an overall budget of 5 billion pesos, but the budget was quickly exhausted due to the flood of applicants. In addition to these various programs, donor assistance programs and the previously mentioned FEDA loan collection operations are also outside the supervision of the Banking Supervision Agency.

BAGRICOLA's clients are mainly small- and medium-sized farmers, especially small-scale farmers. When a branch receives an application for a loan, a sales representative, called a "development agent," goes to the site to check the condition of farmland and infrastructure, interview the applicant to investigate his/her farming experience, interview the applicant's neighbors to check their behavioral aspects, and collect as much information as possible from various quantitative and qualitative aspects. However, since it is a government-affiliated organization, it will evaluate not only the commercial aspects but also the social aspects generated by the loan. For example, whether the project contributes to regional food security.

The fact that development agents take good care of their clients by making frequent rounds of visits to farmers even after the loan has been disbursed, following up on the client's overall production activities to understand the site and sending advice as needed, is one of the factors that have kept the ratio of delinquent loans financed by BAGRICOLA's own funds under control. This is thought to be one of the reasons why the ratio of delinquent loans financed by BAGRICOLA's own funds has been kept low.

²² While the data in the previous section were generated for loans to agriculture, livestock, and forestry, the data in this section add fisheries to these sectors. However, both BAGRICOLA and other financial intermediaries only provide a small amount of loans to fisheries compared to loans to other agriculture-related industries.

²³ Percentage of receivables for which no principal or interest payment has been made more than 30 days after the due date.

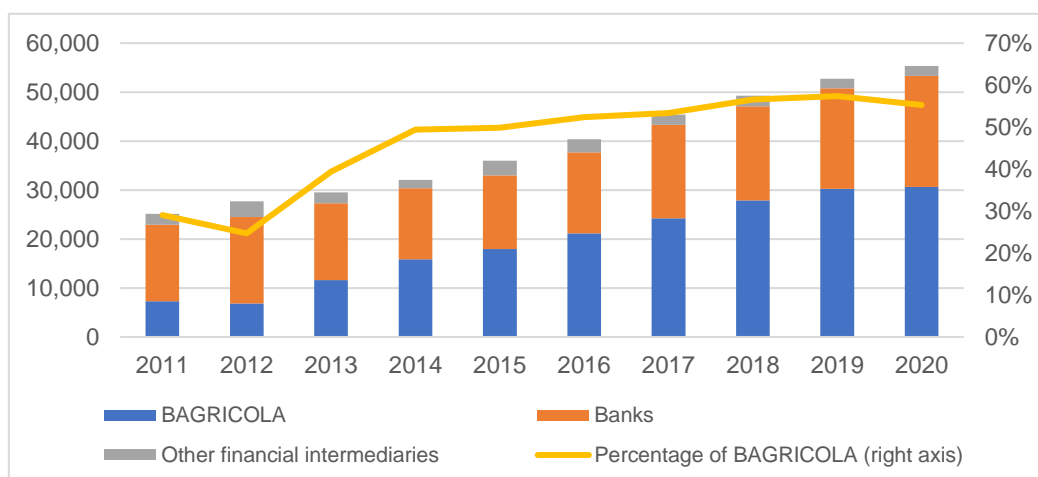


Figure 3.3.33 Outstanding loans by BAGRICOLA and other financial institutions to agriculture, livestock, forestry, and fisheries

Source: Banco Agrícola de la República Dominicana Plan Estratégico 2021-2024
In millions of Dominican pesos

Annual loan disbursements to agriculture, livestock, forestry, and fisheries in 2022 were 34.7 billion Dominican pesos, an increase of 11.9% over the previous year (see next figure), with the exception of 2020, which was negative year over year due to COVID-19, which has been increasing steadily in recent years.

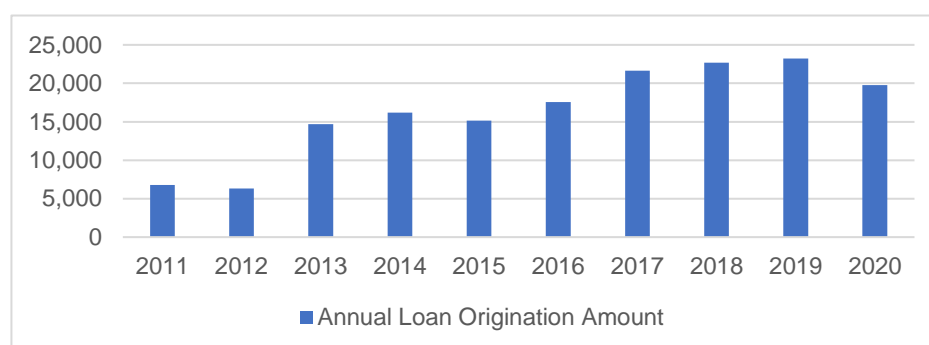


Figure 3.3.34 Annual Loan Originated by BAGRICOLA for Agriculture, Livestock, Forestry, and Fisheries

Source: Banco Agrícola de la República Dominicana Plan Estratégico 2021-2024, in millions of Dominican pesos.

A breakdown of the annual loan disbursements categorized by crop in 2022 shows that rice accounted for the largest share of the total, at 25.4%. This was followed by beef and dairy cattle at 8.1% and cocoa at 7.9% (see next figure). In addition, loans to agribusinesses and microenterprises with no specific crop accounted for 15.8% of the total.

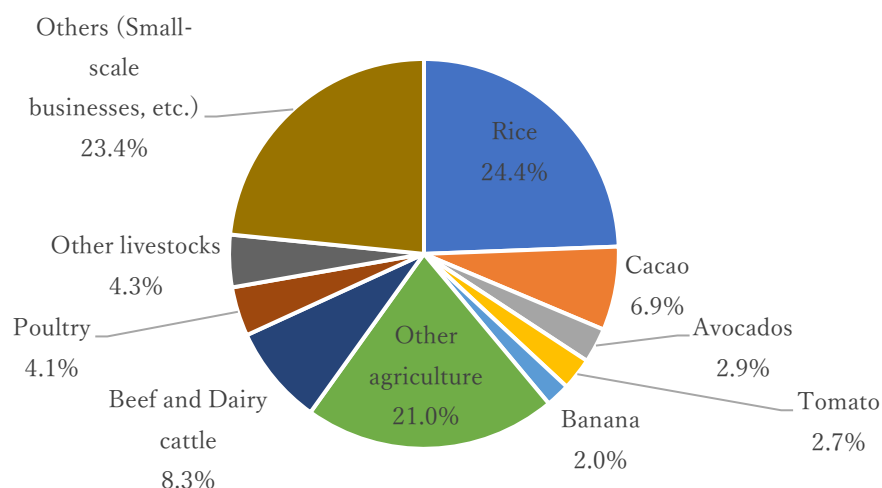


Figure 3.3.35 BAGRICOLA Annual Loan Originations by Crop in 2022

Source: Bancos de la República Dominicana Memoria Anual 2020

3) Support by Japan and Other Development Partners in Agricultural Finance

(1) Initiatives by the IDB and World Bank

The IDB is preparing a loan project titled Sustainable Investment Financing Program and Improvement of Productivity in the Agricultural Sector of the Dominican Republic, through BAGRICOLA which will provide medium- to long-term financing to small and medium-sized farmers and livestock producers. On the other hand, there are no projects by the Bank to provide loans to farmers.

(2) Private Sector Investment and Finance by IFC and IDB

In the Dominican Republic, IFC provided loans totaling \$15 million more than 20 years ago to beverage manufacturers for the expansion of their processing facilities, but there is no other track record, including IDB-INVEST.

(3) Supports by the Central American Bank for Economic Integration (CABEI/BCIE)

CABEI titled Project to Strengthen Financing for the Agricultural Sector with a Technological and Sustainable Approach in the Dominican Republic, The TSL project, which supports financing for the introduction of sustainable agriculture for small and micro agricultural producers through BAGRICOLA, was approved in November 2021. The project was also approved by the Dominican Congress in November 2022. The project is a loan to BAGRICOLA in the amount of US\$60 million, with a loan term of 20 years (grace period of 5 years) and an interest rate of 6-month LIBOR plus 240 bps, to be sub-loaned to agricultural producers engaged in environmentally sound initiatives such as organic farming, precision irrigation, and pastoral improvement for livestock.

4) Possible ODA Loan Projects and Private Sector Investment and Finance

(1) Two-step loans for agriculture through BAGRICOLA

In its nearly 70-year history, the bank has established a certain presence in the country and has stable management with an equity ratio by the government of over 40%. The bank has established a system in which development agents stationed at each branch closely follow up with client agricultural producers to support their business and encourage their growth. It would be possible to consider a two-step loan project by coordinating with the projects planned by the IDB and CABEI and adjusting the items to be financed and the projects to be financed.

(2) Private Sector Investments and Finance for Local Private Financial Institutions

Some private non-governmental financial institutions such as BAGRICOLA, Banco ADOPEM, and Banco ADEMI focus on loans to women and small- and medium-scale agricultural producers, and can be considered for overseas investment. Both of these two financial institutions are based on organizations established as NGOs, and they are proactive in their social contribution activities. Many of them also have experience in receiving financial or technical assistance from development partners such as the IDB and IFC. However, as already mentioned, interest rates on deposits are low and the cost of financing by commercial financial institutions does not appear to be high.

3.4 Environmental and Social Considerations and Gender

3.4.1 Guatemala

1) Environmental and social considerations

(1) Systems and Laws

The procedures for environmental and social considerations in Guatemala are regulated by the Regulation on Environmental Assessment, Control and Monitoring (No. 137-2016). When a new project is planned, the project is classified into any of four categories, namely, Category A, B1, B2, or C, in order of impacts' magnitudes. An Environmental Impact Assessment (EIA) report is required for a Category A project, while an Initial Environmental Examination (IEE) report is to be prepared for projects in other categories. The Regulation No. 137-2016 mentioned above, stipulates that the Ministry of Environment and Natural Resources (MEE) will determine the specific contents to be described in EIA and IEE reports. It is noted that an online examination is currently introduced to simplify the procedures for obtaining an environmental license, and it is possible to gain licenses for Category C in about one month.

The environmental impact assessment system in Guatemala is characterized by the fact that an environmental license is required for all categories of projects. Environmental monitoring in the project implementation stage is handled by officials of the Ministry of Environment and Natural Resources, not by the project proponent. The Regional Office of the Ministry of Environment and Natural Resources is in charge of monitoring low-risk Category B2 and C projects, while the Directorate of Environmental Management and Natural Resources of the Ministry (Central) is in charge of Category A and B1.

(2) Environmental and social management systems of financial institutions

Financial institutions and funds in Guatemala do not have an explicit ESMS (Environmental and Social Management System¹), assign personnel related to environmental and social considerations, or establish rules to ensure that financing projects do not cause environmental impacts. However, they perform the necessary procedures, such as requesting approvals from the Ministry of Environment and Natural Resources for any construction projects, etc., in accordance with national laws.

Some financial institutions, which have been supported by international donors (e.g., Banco CHN), recognize the shortage of human resources in terms of environmental and social considerations and the necessity of capacity development on the matter in addition to financial support, when Japan provides loans to financial institutions in Guatemala. Thus, it is proposed to include capacity development in environmental and social considerations in the case of the yen loan provision in Guatemala.

2) Gender

(1) Outline

Guatemala's gender inequality index ranks at 119th out of 189 countries, and its gender gap index is very low, ranked at 113th out of 115 countries in 2020. According to the United Nations Development Program, women in Guatemala earn 56 cents while men earn one dollar. In addition, the participation rate in the labor force of women is 37.4%, the lowest among Latin American and Caribbean countries, which drops further to 28.1% in rural areas (ILO, 2017). However, in recent years, women's participation in the agricultural sector has increased as many young men are engaged in migrant work.

The Government of Guatemala has regarded advancement of women's status as one of main national

¹ "ESMS" is used for JICA funded projects, while "environmental and social risk management system (ESRMS)" is generally used in the six countries. However, their functions are the same.

challenges, and based on the “Intergovernmental Agreement 200-2000”, the Presidential Agency for Women was established in 2000 as a public policy advisory and coordinating body for the comprehensive development of Guatemalan women. “K'atun 2032” also states that the government will work with indigenous peoples and children on gender inequality to eliminate historical inequalities.

Regarding women's activities in the agricultural sector, the basic stance is that they assist men rather than participate in farming activities. Seemingly, it is due to the heavy burden of farm work while taking care of children for women. On the other hand, it is said that women are better suited for tasks that require careful manual labor, such as hand-picking, fruit selection, and processing (packing) during coffee harvesting, and women often take on these tasks. In Guatemala, however, many women are unable to continue working after marriage due to the traditional belief that women should stay at home and take care of the family after marriage. Moreover, employment opportunities for women in rural areas are limited to assisting with farming or weaving, and if not, they often work as housekeepers in wealthy urban households.

In fact, a 19-year-old unmarried woman (see the picture right), who works at a blackberry cooperative's processing plant (sorting and packing) in Chimaltenango Province near Guatemala City, said “I can work with my friends of my generation and like my job. But, once I get married, I would be busy with household chores, which makes it difficult for me to continue the work.” According to a cooperative executing board member, he does not encourage female workers to quit their jobs after marriage, however, most of them are unmarried women, and they tend to quit the cooperative after their marriages unless their husbands have great understanding. In addition, the blackberry cooperative owns blackberry farms, and the male members go to the farms, while the female members grow blackberries on farmland around their homes. In other words, even if the women do farm work, the area is limited. However, when the husband is away for work, the wife has more decision-making power and is more likely to work outside the home.



According to a 30-year-old female employee of the Trust National Fund for the Revitalization and Modernization of Agricultural Activities (FONAGRO), the FONAGRO office in Guatemala City has about the same number of male and female employees, but in the regional offices, there is a higher percentage of male employees. Even though she has a college degree, she is simply called Señorita, which means “Miss”, instead of called as “Lida. (a lady who has a bachelor’s degree)”. It means that her educational background is not respected very much by her male coworkers. Seemingly, some men feel uncomfortable acknowledging women with high education.

(2) Status of Support for Rural Women

(a) Ministry of Agriculture, Forestry and Food

The Ministry of Agriculture and Pastoral Food (MAGA) has developed a gender equality policy, “Política Institucional para la Igualdad de Género (Institutional Policy for Gender Equality)”, in 2016 to promote gender equality. However, women do not have decision-making power even now, and discrimination and violence against women are still prevalent. In addition, although MAGA has a Gender Unit, it does not have an adequate budget, which makes it difficult to operate without international donor’s financial support. The number of staff assigned to the Gender Unit is also limited, ranging from two to six, which is not enough to handle a wide range of tasks. Furthermore, the members of the Unit are working other jobs at the same time and are not able to devote themselves to this work.

(b) IDB Lab

Women who don't have collateral face difficulties in gaining loans. In response to the situation, IDB Lab's microcredit takes various measures, for instance, 1) financing the Génesis Empresarial Fund, which operates rural financial inclusion, so that women in rural areas, and indigenous peoples can get support to use digital technology for payments and remittances through the Fund (<https://www.iadb.org/en/project/GU-T1302>), and 2) funding climate-smart agricultural technologies for micro & small entrepreneurs and farmers in Guatemala (<https://www.iadb.org/en/project/GU-T1315>).

Another approach is to implement the "Guarantee program" in the private sector of cardamom cultivation to create a model of women's economic activity and introduce such a model to IDB's development partners (NGOs, private banks, etc.). Furthermore, when lending to high-risk borrowers, technical assistance is provided to increase the repayment rate, and guarantees have a similar risk-hedging effect (making repayment possible). With the "Guarantee program", the government guarantees 50% of the loan amount, thus reducing the risk for the bank.

(c) Financial institutions in Guatemala

FONAGRO pays attention to gender equality, and 45% of the beneficiaries are women. In order to promote lending to women, female applicants are screened with higher priority compared to men, as far as loan applicants have the same conditions. Similarly, CHN gives high priority to women's groups (female members only) for lending. Concretely, the interest rate is set at 14% and 12% for mixed-gender groups and women-only groups, respectively. In the case of loans to women's groups, collateral is not required, and CHN staff visit and assess the site in advance to decide whether to lend or not.

In addition, Banrural is launching a program called "Unidos para Crecer", which means "Growing together" that focuses on female entrepreneurs, promotes savings, and strengthens financial inclusion and education. Specifically, the program provides financial education and training for women. BANTRAB also offers higher interest rates for working women's accounts and conducts campaigns to secure more female customers.

(3) Gender equality for the yen loan

Governmental agencies, financial institutions, and foundations in Guatemala have implemented preferential treatment for female farmers and entrepreneurs, and seemingly they recognize the importance of women's inclusion for social development. However, given the difficulty for women in Guatemala to continue working after their marriage and childbirth, their working places are limited to around their homes or harvesting and packing, even if they are engaged in farming. It is necessary to gradually promote gender equality through financing targeting small-scale activities.

Regarding the sale of agricultural products, competition among producers is keen regardless of international or domestic markets. In fact, a producer (male) who was packing and exporting high-quality vegetables to El Salvador switched to other crops because he could not win the price competition with producers in El Salvador, who imitated his production methods. In other words, female producers and entrepreneurs are required to keep high-quality products so that they can be competitive. It is important to identify profitable crops based on market needs to get benefits through sale of products. Therefore, if Japan provides loans, it is necessary not only to provide preferential treatment to women but also to support them in developing business plans, quality control, and capacity building in marketing.

3.4.2 Panama

1) Environmental and social considerations

(1) Legal System for Environmental and Social Considerations

The Environmental Law was enacted in 1998 and partially amended in 2009. Any projects in Panama are classified into Category I, II, or III in terms of environmental impact, with Category III projects with probable significant impacts. An Environmental Impact Study Report is required for all projects, however, the necessary contents to be studied and written vary depending on the category. Category I projects are expected to cause small-scale impacts and do not require a description of mitigation measures and monitoring plans, while Category II and Category III projects require Environmental Impact Study Reports, which cover project outlines, expected positive and negative impacts of the projects, mitigation measures, and monitoring methods.

(2) Environmental and Social Considerations by Financial Institutions

In Panama, the Superintendency of Banks of Panama, under Rule No. 008-20101 (as amended by Rule 9-2017 of November 2017), requires banks to manage and prevent risks by showing 12 types of risks, including environmental risks. Some banks, for instance, BDA, Global Bank, and Baneco, have codes or ESMSs, which emphasize financing and business in an environmentally responsible manner.

Global Bank applies UNEP-FI's Environmental and Social Risk Management System and, with support from the IDB, revises the system to comply with the IFC Performance Standards. In addition, Global Bank has published a "Sustainability Report (2021)" referring to the SDGs and indicates the policy of sustainable corporate management. Meanwhile, BDA requires "Help Desk Technicians" to implement mitigation measures in cooperation with the Ministry of Environment. It is necessary to consider soil productivity, control waste and effluent, and provide technical guidance for prevention of discharge of pesticides and oil into the surrounding area. Baneco also has its "Exclusion List" showing 11 types of businesses, which are not eligible for finance, such as child or forced labor, racist and/or anti-democratic media, pornography, prostitution, etc.

Given that each bank considers environmental and social impacts, it is thought that financial institutions in Panama have already reached a sufficient level of environmental and social considerations. Therefore, loan projects can be implemented without big problems when they receive loans from Japan.

2) Gender

(1) Outline

The Government of Panama promotes equal opportunities for women, and the "Action Plan for Equal Opportunities for Women 2014-2024" has been developed. However, there are some difficulties in the implementation of that plan due to insufficient coordination among organizations and budget, and financing for entrepreneurial cooperatives, microcredit programs, and rural development has not progressed as planned. Furthermore, women earn only 61% of men's working income, and inequality in employment opportunities, labor force, and working environment is a major problem for women in Panama.

Financial inclusion is not sufficient, even though lending is extensively implemented in Panama. For example, the percentage of rural residents who have bank accounts is 20% lower than that in urban areas. The percentages of women who have bank accounts and access to loans account for only 17% and 21%, respectively². In response to such a situation, IDB Invest has approved non-sovereign loans aiming to improve access to loans for small and medium enterprises and female entrepreneurs.

The land ownership rate of women is about 30%, which is higher than in other LAC countries. In the case rice production, women are extensively involved in VC, not only in production but also in milling.

² Source: IDB and the Inter-American Investment Corporation, 2021, IDB Group Country Strategy with Panama 2021-2024

Also, women are engaged in dairy farming. Regarding rice farming, some large-scale farmers have more than 1,000 ha of farmland per family, and if there are no boys in such farmers, girls take over, so there are some large-scale female farmers. In general, however, such cases are rare, and the initiative taken by women in the agricultural sector is limited.

In rural areas, there are many female farming groups consisting of friends, neighbors, and relatives, and they cultivate crops and sell them collectively for school lunches. However, most of them are small-scale farmers and not officially registered, and their activities remain within the communities. Although women have the right to participate in formal cooperatives and associations, practical participation is difficult. Women's education levels are generally lower than men's, and they often feel that there is no space for women in unions.

According to the IDB Panama office, IDB implements small-scale and pilot projects focusing on small farmers in the Pacific Coast region, who own about 2.5 ha and less of farmland, to improve food security, organization strengthening, adaptation to climate change, improvement of market access, investment capacity, and agricultural technology, including gender equality.

(2) Status of Support for Rural Women

Some financial institutions have established policies and programs for women in rural areas. For example, BDA has a loan program for female farmers, with 0% interest as far as FECEI subsidies are available, and 2% interest in other cases, respectively. Global Bank, on the other hand, has also prepared a program for female entrepreneurs with lower fees. In addition, since many women do not understand the importance of bookkeeping and record keeping, financial institutions organize short-term basic bookkeeping training, which takes about 30 minutes.

Banesco has also implemented the “Banesco Entrepreneurship Program” since 2015, which has identified more than 15,000 entrepreneurs in 10 provinces in Panama and provided them with a total of 500,000 hours of training. The program has been implemented in a gender-equal manner, with 76% of the participants being women.

(3) Indigenous People

Panama has indigenous people, who account for about 10% of the population, and there is a large economic disparity between them and the rest of the Spanish-speaking people. Regardless of gender, many of them live in state-owned lands, namely, national parks, without land ownership. As a result, they have no land as collateral, making it difficult for them to access loans. Also, some of them do not speak Spanish and face difficulties in communication. While the government supports indigenous peoples, private financial institutions rarely provide loans to such indigenous peoples.

(4) Consideration of women and vulnerable people in the yen loan

Various subsidies, such as the government's Interest Subsidy Program (FESI), have been introduced by financial institutions in Panama, and they pay attention to gender equality. Therefore, lending by the Government of Japan to Panama can be implemented without any big problems. Still, since women are not engaged in farming very actively, issues for women in the agricultural sector cannot be very clearly identified. On the other hand, as mentioned, access to bank accounts in rural Panama is 20% lower than in urban areas, and the percentages of women who have bank accounts and access to bank loans are only 17% and 21% of the total, respectively. Thus, financial inclusion of the indigenous peoples and women is important.

3.4.3 Dominican Republic

1) Environmental and social considerations

(1) Legal System for Environmental and Social Considerations

Environmental and social considerations in the Dominican Republic are regulated by the Environmental and Natural Resources Law 64-00 (2000). “Chapter 6 of the Law, mentioning Environmental Monitoring and Audits” in the Law describes that the impacts on the environment and natural resources caused by construction, projects, and activities must be prevented, controlled, and mitigated as much as possible.

Any projects are classified as Category A to D depending on the nature and scale of the project. Category A project has the potential to have a significant impact on the environment and is obligated to conduct an EIA. Category B has the potential to have a moderate impact on the environment and is obligated to conduct an IEE. Category C has a negligible potential to affect the environment and is obliged to comply with current environmental regulations. Category D has minimal potential to impact the environment and requires compliance with applicable environmental regulations. All categories need to get permits prior to project implementation. It is noted that the names of permits are different depending on the Category. They are “Environmental license”, “Environmental authorization”, “Environmental permit”, and “Minimal impact registration certificate” for Category A, B, C and D.

Project categorization is done based on the “Compendium of Regulations and Procedures for Environmental Authorizations of the Dominican Republic (2014)” (hereafter, the Compendium). The Compendium provides detailed project classifications by sector, such as industry, forestry, and agriculture. For example, greenhouses with an area of up to 5,000 m² are classified as Category D, high-tech greenhouses with an area of 5001 to 25,000 m² are classified as Category C and high-tech greenhouses with an area exceeding 25,001 m² are classified as Category B.

According to Superintendencia de Bancos de la República Dominicana, in accordance with Regulation 8-2010 and its amendments, it is needed for all banks to identify, manage, and mitigate different types of risks, including social and environmental risks and to conduct an EIA/IEE as required. A Norwegian organization established a council of central supervisory authorities in the Central American region to develop environmental regulations. In this context, it is expected that the regulation will be completed and published within the next two to three years.

(2) Environmental and Social Considerations by Financial Institutions

Bangricola, which has the largest amount of loans in the agricultural sector, considers environmental and social impacts when the bank provides loans to any projects. The branch has each “development agent”, who visits the project sites to assess the lands, agricultural experience, and infrastructure of the applicants. The agent compiles collected information into a report, which is then evaluated by a credit analyst. If the applied activity is irrigation, the availability of water sources and risk of pests, etc., are also investigated. Although Bangricola implements environmental and social considerations in this way, it has yet to establish its own ESMS. However, as of November 2023, a draft operational manual for environmental and social considerations has been prepared and will be finalized soon.

Banco ADOPEM conducts environmental risk assessments of applied projects. It has yet to establish a department for such a risk assessment, however, a person in charge of environmental aspects has been assigned, and it is planned to establish a risk assessment department. At this moment, some existing departments, such as the “Project Department”, handle environmental and social risk assessment.

Based on the situation mentioned above, financial institutions in the Dominican Republic have not yet established ESMSs or departments for environmental and social risk management, but they have experience in environmental impact assessment of their projects and taking measures to reduce or

mitigate those impacts. When loans are provided by the Government of Japan to financial institutions in the Dominican Republic, it is thought that proposed projects will be implemented considering environmental and social impacts properly.

2) Gender

(1) Outline

In the Dominican Republic, 96% of domestic businesses are small, medium, and micro enterprises (Ministry of Commerce and Industry, 2013), and when it comes to small-scale self-employment, most of them are women. Since such women don't own collateral for loan applications, it is difficult for them to get loans from banks. As a result, they have no choice but to borrow from friends and relatives or use informal moneylenders with high interest rates. Under the circumstances, microcredit attracts their attention. However, most of the applicants for loans in the agricultural sector are men and the number of female applicants is limited.

In recent years, the agricultural sector in the Dominican Republic has grown considerably due to the high demand for organic and fair trade in fruits, vegetables, cocoa and bananas, as well as fresh produce in response to the growing tourism sector. On the other hand, small-scale agricultural producers, who are engaged in the traditional production of coffee, rice, and beans, cannot take advantage of such a trend. In addition, the percentage of women in rural areas engaged in labor is 38.1%, lower than the 49.5% of urban women (IFAD, 2017). It means that the opportunity for economic development for women in rural areas is limited despite of growth of the agricultural sector.

In this context, an entrepreneurial movement has been observed among women. For example, a cocoa processing association (Association de Esperansa Onida³) consisting of 25 women, is working actively. The association was established in 1972 by a group of women, who wanted to play an active role in society in addition to housework and childcare. USAID, INFOTEP (Instituto Nacional de Formación Técnico Profesional: government vocational training institute), and CONACADO (Confederación Nacional de Cacaocultores Dominicanos) have provided processing equipment, training, e.g., business management, production management, and post-harvest processing, and other assistance to improve the technology of the association.

At this moment, the association produces and sells organic processed cacao products, namely, cacao powder, cacao liqueur, cacao balls, and cacao butter (see photo right). Of these, liqueur and cacao balls account for more than half of sales. The products are sold to middlemen, then they are sold in the tourist areas, including Santo Domingo. In addition, before the pandemic, tourists came to this association for agri-tourism to purchase and eat the products.



Members of the Cacao Producers Association and processed cacao products they produce and sell

The members manage their household chores and their own home farming

³ In the Dominican Republic, there are two types of associations: associations and cooperatives. Associations are organizations that have not yet reached the cooperative stage and are not entitled to the benefits provided for in the Cooperative Law.

with association activities, and they communicate well with their spouses so that their husbands do not object to their work in the association. It is not difficult for the members to work outside homes, especially for the generation that has finished raising their children. In the busy season, the 25 members work on a two-shift system, namely, morning and afternoon, to balance family affairs and association activities. Although some men are still reluctant to allow their wives to earn an income, the dual-income system is becoming more prevalent even in rural areas, and the number of working women outside the homes is increasing. The association plans to increase its membership from the current 25 and to contribute to the development of the community. At present, they promote the association and encourage other women to participate through educational activities such as domestic violence prevention, and women's dinner parties.

(2) Status of Support for Rural Women

(a) Central Bank

The Central Bank of the Dominican Republic (BCRD) flies the banner of the social inclusion philosophy and has published the “National Strategy for Financial Inclusion 2022-2030”. It aims to promote financial inclusion in the Dominican Republic through the coordination of policy to provide financial services to those who don’t have bank accounts. Based on the coordination for the inclusive financial system promotion, the Strategy mentioned above was established, and it is the first attempt at financial inclusion in the Dominican Republic.

(b) BANGRICOLA

Bangricola has a policy of lending with priority to women in rural areas and youth who are involved in agriculture. The bank staff have participated in the agricultural fairs to attract more customers regardless of gender. Since the agricultural sector is male-dominated, many of the borrowers are male, and only about 10% of the borrowers are women. Meanwhile, a total of 182 “development agents” with agricultural knowledge are assigned to each branch to evaluate farmland conditions, agricultural experience, and infrastructure, 15% of whom are women.

(c) Banco ADOPEM

ADOPEM was founded in 1982 as an NGO called the Dominican Association for Women's Development, and in 2004, the banking department of the NGO was independent and established as ADOPEM, which continues operation in the NGO sector. ADOPEM covers the entire country by microfinance operations in 10 provinces, particularly poverty areas (60-80% of the population is classified as “poor”). Priority of lending is given to socially vulnerable groups, such as women, who had no choice but to borrow cash from the informal sector, such as friends and relatives.

ADOPEM also has a relatively high percentage of female clients in the agricultural sector, 35%, which is higher than that of Bangricola. It has a program called “Agro-Mujer” (meaning rural women), which is exclusively for women and small-scale female entrepreneurs. It also conducts various financial inclusion activities, such as an improvement program in macadamia nut VC under the support of the IDB.

(3) Gender considerations when loans are provided

According to a member of the women's cocoa processing association mentioned above, it is important that their association is socially recognized, which brings about pride and motivation for them. Compared to gender situations in Panama and Guatemala, women in the Dominican Republic are seemingly more active in the agricultural sector, and women's works outside the home are accepted in their societies. Also, given that financial institutions try social inclusion, it will not be too difficult to encourage women to participate in financing, if loans are provided by the Government of Japan.

In the Dominican Republic, agro-tourism, which combines agriculture and tourism, has begun, and women's activities in the field are also expected in the future. However, in order to sell to tourists, it is essential to control and improve quality. For example, the cocoa powder sold by the women's association mentioned above is packed in a simple plastic pack, which does not clearly indicate the producer's name, expiration date, or certificate of organic products. Also, it is important to devise a stylish design to get attention of tourists. In addition, some women who have actually used cacao butter in their creams as cosmetics pointed out that it causes rough skin, thus, quality improvement is needed. The "story" of female producers and contributing to the development of the community should be appealed to tourists. In other words, it is important to provide technical assistance to improve the quality of products and marketing skills according to the sales target in addition to financial inclusion.

3.4.4 Honduras

1) Environmental and social considerations

(1) Legal System for Environmental and Social Considerations

The National Environmental Impact Assessment System (Sistema Nacional de Evaluación de Impacto Ambiental, hereafter SINEIA) was established under Decree 104-93 of May 27, 1993. SINEIA states that environmental impact assessment is to be implemented in order to prevent probable negative impacts by industrial facilities, and other activities, which may pollute or degrade the environment or natural resources. With the creation of SINEIA and the amendment of the Environmental Law in 2015, the Ministry of Energy, Natural Resources and Environment (Acuerdo N 008-2015 Reglamento del-SINEIA) was developed by the Ministry of Natural Resources, Environment and Mining for the SINEIA Regulation. The Ministry is responsible for reviewing EIA reports and approving environmental licenses.

Projects, works and activities, whether initiated or not, are classified into four categories, taking into account factors and conditions related to their size, characteristics, nature, potential environmental impacts and risks as follows:

Category 1: Projects, works, and activities that are considered to have low potential environmental impact or environmental risk; SINEIA F-01 forms are required to be completed. Note that projects classified below Category 1 are classified as having very low environmental impact or environmental risk. Therefore, they are not subject to the environmental permitting process but must comply with current environmental laws, as well as the Code of Good Environmental Practices of Honduras.

Category 2: Projects, works, and activities that are considered to have moderate potential environmental impacts or risks, require preparation of SINEIA Form F-02 (Environmental Assessment Document) and simplified Environmental Management Plans.

Category 3: Projects, works, and activities that are considered to have high potential environmental impacts or environmental risks, require preparation of SINEIA Form F-02 (Environmental Assessment Document) and Environmental Management Plans.

Category 4: Projects, works, and activities that are considered to have very high potential environmental impacts or environmental risks. Large-scale development projects are included in this category; an EIA report and environmental management plan should be prepared.

Note that the categories (Compendio de Legislación Ambiental, 2011) provide a detailed categorization method.

(2) Environmental and Social Considerations by Financial Institutions

In Honduras, "Resolution GES No. 333/31-07-2020: Environmental and Social Risk Management Standards Applicable to Financial Institutions" (National Banking and Insurance Commission, 2020)

has been published, and “Article 6: Social and Environmental Risk Management System” of the Resolution states that senior management shall take necessary mitigation measures to minimize/reduce environmental and social risks, and that the board of directors shall be responsible for their involvement, in accordance with the treaties, agreements and national laws in terms of environmental, social, health, safety and working conditions. Based on the Resolution, each financial institution should implement environmental and social risk management.

The Honduran financial institution (Banco de Occidente S. A.) has established a “List of Projects Prohibited from Financing”, which shows a list of projects, which can cause negative environmental and social impacts, e.g., projects that damage World Heritage sites or nature reserves, production or trade of radioactive materials, projects that use drift nets longer than 2.5 km. The bank has also established a list of projects that are ineligible for financing. In addition, the bank has an environmental and social risk officer, who has a master of degree in environmental and development engineering. Thus, the ESMS is thought to have reached a certain level.

2) Gender

The Government of Honduras developed and began implementation of the “National Financial Inclusion Strategy” in 2015. However, sufficient progress was not observed, since the National Banking and Insurance Commission (CNBS), namely, the main supervisory body for the financial sector, was not fully empowered to implement the Strategy and did not have sufficient women's financial inclusion perspective. CNBS launched a women's financial inclusion plan in 2019 to collect basic information and needs. The collection of gender disaggregated data in financial services is going on⁴.

(1) Consideration for women when providing yen loans

In Honduras, information on only one institution, namely, Banco de Occidente S. A., was available. So far, Banco de Occidente S. A. does not give special consideration to female applicants in lending. Thus, careful consideration should be given to women if the loans are provided by the Government of Japan.

3.4.5 Mexico

1) Environmental and social considerations

(1) Legal System for Environmental and Social Considerations

The General Law on Ecological Equilibrium and Environmental Protection (1987) is the fundamental law of environmental protection. The Law consists of three regulations, namely, 1) “Regulations for Enforcement of the General Law on Ecological Balance and Environmental Protection in Relation to the Registration of Emissions and Transfer of Pollutants”, 2) “Regulations for Enforcement of the General Law on Ecological Balance and Environmental Protection in Relation to Air Pollution Prevention and Control” and 3) “Regulations for Enforcement of the General Law on Ecological Balance and Environmental Protection in Relation to Environmental Assessment” (the EIA Regulations hereinafter). According to the EIA Regulations, projects in the agricultural sector, which have significant impacts on the environment, such as the construction of irrigation facilities, canals and reservoirs covering more than 100 hectares of agricultural land, or the construction of works or structures in nature conservation areas, must implement environmental impact assessment and get approval by the federal or state competent authorities.

(2) Environmental and Social Considerations by Financial Institutions

⁴ Source: Alliance for Financial Inclusion, 2023, The Role Regulators Play in Closing the Financial Inclusion Gender Gap: A Case Study of Honduras, https://www.afi-global.org/wp-content/uploads/2023/03/The-Role-Regulators-Play-in-Closing-the-Financial-Inclusion-Gender-Gap-Honduras_v2.1.pdf (DL January 2024)

The Mexican Foreign Trade Bank implemented an environmental and social risk management system (ESRMS) based on national legislation and the International Finance Corporation (IFC) Performance Standards and Equator Principles in 2017⁵. Furthermore, the Agricultural Trust Bank (FIRA), a government-owned bank, with the cooperation of the IDB, developed and implemented an ESRMS in 2018. On the other hand, the Caja Alianza Union, the Agriculture, Forestry and Fisheries Finance Corporation, and the National Banking and Securities Commission do not have their own ESRMS. Still, they determine the eligibility of the applied projects based on the laws related to the environment in Mexico. In other words, the status of ESRMS formulation varies among financial institutions in Mexico.

2) Gender

The Government of Mexico developed the “National Financial Inclusion Strategy” in 2016 (revised in 2020) to promote financial inclusion. The National Council for Financial Inclusion, a coordinating body that includes senior representatives of the national financial sector, implements the financial inclusion of women as the main target. In addition, the Inter-Institutional Gender Equality Commission was established to address financial inclusion from a gender perspective. The National Banking and Securities Commission is the supervisory body of financial institutions, which promotes women's financial inclusion.⁶

The Agricultural Finance Corporation promotes financial inclusion of rural residents for community development and considers gender equality, such as giving preferences to activities by rural women to promote their participation and development in economic activities⁷. Meanwhile, FIRA has issued the first Social Gender Bond (BSG) of 3 billion pesos in 2020 and plans to issue the second and third BSG, which will be 100 billion pesos in total⁸. In other words, gender considerations in financial institutions in Mexico have made progress.

3.4.6 El Salvador

1) Environmental and social considerations

(1) Legal System for Environmental and Social Considerations

The Environmental Law (Ley del Medio Ambiente, Decree No. 233, 1998) was enacted by the Ministry of Environment and Natural Resources (MARN) for environmental and social considerations in El Salvador. MARN categorizes proposed projects according to their scale and degree of impact on nature as stated in Article 22 of the Decree and instructs the project proponent on the procedures necessary to obtain environmental approval.

Proposed projects are categorized as Group A and Group B. The former are projects with little or no expected environmental impacts and do not need documentation related to environment. The MARN classifies Group B into Category 1, which is assumed to be a project with little impact, and Category 2, which is expected to be a project with significant impact, based on the environmental impact application form. The proponent must conduct an environmental impact assessment only for projects in Category 2. In the agricultural sector, environmental impact assessment is necessary for agricultural development

⁵ When financial institutions finance large-scale projects such as infrastructure construction projects, they assess and manage environmental and social risks to ensure that the projects are implemented with full consideration of the impact on the natural environment and local communities.

⁶ Source: Alliance for Financial Inclusion, 2023, The Role Regulators Play in Closing the Financial Inclusion Gender Gap: A Case Study of Mexico, https://www.afi-global.org/wp-content/uploads/2023/08/Mexico_The-Role-Regulators-Play-in-Closing-the-Financial-Inclusion-Gender-Gap.pdf (2024 (January DL))

⁷ Source: Cuenta Pública 2020, Financiera Nacional de Desarrollo Agropecuario, Rural, Forestal y Pesquero, <https://www.cuentapublica.hacienda.gob.mx/work/models/CP/2020/tomo/VII/Print.HAN.01.INTRO.pdf> (January 2024 DL)

⁸ Source: IDB, IDB | Mexico issues the first Social Gender Bond in the national stock market through FIRA (iadb.org), January 2024 DL

and integrated rural development located in vulnerable areas. On the other hand, small-scale agricultural development projects do not require environmental impact assessment.

(2) Environmental and Social Considerations by Financial Institutions

The Banco Hipotecario of El Salvador has already developed an ESRMS, which is used to screen the applied projects. It also has a department in charge of ESRMS, which prepares annual reports on environmental, social, and risk issues to the Superintendency of Audit Bank and international donors. On the other hand, no ESRMS has been established for the Cooperative of Producers of El Salvador (ACAPRODUSCA) or the General Support Foundation of El Salvador (FUSAI, a non-profit organization). In other words, the status of ESRMS formulation varies depending on the institutions, and it is necessary to support some financial institutions for ESRMS formulation if loans are provided by the Government of Japan.

2) Gender

In El Salvador, the National Council for Financial Inclusion and Education (CNIEF) is in charge of the implementation of the “National Financial Inclusion Policy for 2021-2024”. The Central Bank of El Salvador, the coordinator of CNIEF promotes the policy mentioned above.⁹ Also, the Government of El Salvador has initiated a program to increase digital payment opportunities to encourage women, especially women in rural areas, to access financing.¹⁰

Banco Hipotecaria has a program called “Women in Action” (Mujer en acción) starting in 2019, which provides financial education to women in order to promote their access to loans. Meanwhile, the Producers Cooperative (ACAPRODUSCA) has a project to support women in starting their own businesses, with loans of up to \$1,000 if they have a guarantor. In addition, FUSAI offers community training that addresses human development, finance, and business. Thus, financial institutions in El Salvador have sufficient experience.

⁹ Source: The Role Regulators Play in Closing the Financial Inclusion Gender Gap: A Case Study of El Salvador, El-Salvador_Role-Regulators-Play-in-Closing-the-Financial-Inclusion-Gender-Gap.pdf (afi-global.org) (DL January 2024)

¹⁰ Source: Plan International Japan, 2018, EM2030 SDG Gender Indicators, Data to Drive Change EM2030 SDG Gender Indicators (plan-international.jp) (DL January 2024)

Chapter 4 Food Value Chain Analysis

4.1 Selection of Commodities

4.1.1 Selection Process

Estate commodities such as coffee, banana, and sugarcane are major agricultural products in the Caribbean region of Central America, and it is necessary to improve their access to estate crop FVCs in order for small and medium-sized farmers to increase their profits. On the other hand, these FVCs are operated by a small number of large landowners and companies, and the question is whether there are sufficient needs for ODA support and whether these needs will benefit many stakeholders.

Therefore, it is also necessary to strengthen FVC for agricultural products with high potential for future growth and value addition, even if their share of production value is currently low. In fact, in Honduras, the cultivation of profitable horticultural commodities is being recommended for small-scale farmers whose livelihoods depend solely on coffee, which has recently been exposed to a price slump. In addition, in small countries like El Salvador, where there is no comparative advantage in the production and marketing of such agricultural products, JICA assistance is also focusing on the development and strengthening of FVCs that can be developed in niche markets such as organic vegetables, agricultural products used as raw materials for flavoring agents, and medicinal plants.

In selecting the commodities for the FVC analysis, relevant information on major agricultural products based on import/export statistics was organized, and then policy documents, other donors, and past efforts by JICA were considered. In other words, the selection was made based on the top commodities in terms of export value, while considering commodities that are expected to provide many employment opportunities due to a certain length of the value chain, commodities recommended by the government, and commodities eligible for JICA support. The number of target commodities was first determined by selecting five agricultural, livestock, and fishery products from each country, and then, based on discussions with JICA, three commodities from each country were selected.

4.1.2 Commodities Selected on Each Country

Table 4.1.1 shows the items selected for the country-specific survey by September 2022 and the main reasons for their selection.

Table 4.1.1 Commodities for FVC Analysis and Reasons for Selection

Country	No.	selection	Commodity	Classification.	The reason for the selection (production and trade potential, etc.)
Mexico	1	○	Avocado	Horticultural crops	It is one of the country's strategic commodities, and demand is growing in Europe, Japan, and China, while domestic production in Mexico is also increasing. It is expected that some farmers may not be able to start avocado cultivation even if they want to due to some barriers to entry, including lack of funds. The JICA office is also very interested in avocados. Although there are some challenges, there are enough regions and layers to deploy this survey and future efforts.
	2	○	Beef cattle	Livestock	Among the six countries, the production value is the highest, which is characteristic of the country. It is designated as a so-called "clean country" that is not infected with mad cow disease or avian influenza, and exports to Japan, such as beef tongue, are growing. ¹

Country	No.	selection	Commodity	Classification.	The reason for the selection (production and trade potential, etc.)
	3	○	Vegetables	horticultural crop	In recent years, investment needs for vegetable cultivation utilizing smart agriculture in urban and suburban areas have been increasing, and medium-scale farmers are said to be highly interested.
	4	○	Tuna	Fisheries	Tuna is an export commodity to Japan, the U.S., and other countries. In 2015, Mexico occupied the sixth position in Japan's "tuna and skipjack" classification. In addition, the U.S. has imposed unreasonable restrictions on U.S. exports, which were resolved in a WTO ruling in 2017. Tuna and other marine products are also caught and farmed in Baja California (Ensenada) and other areas, and this is an area that will continue to grow in the future.
	5		Rice	Food crop	It is the fourth largest imported commodity in terms of demand. The development of irrigation in the south has become one of the policies due to the decrease of water resources in the northern region, and along with it, new varieties are being developed for dissemination in the coming years.
	Conclusion				(1) Avocados, (2) Beef cattle, (3) Vegetable, and (4) Tuna as an associate target item.
Guatemala	1	○	Cardamom	Industrial crop	Although the harvested area in the country is small, it is one of the main export products (No. 1 in export value). Indigenous people in the highlands grow this crop, and improving FVC could help them improve their livelihoods. The challenge is that it is difficult to collect the crop due to poor location conditions. In past JICA surveys (FVC surveys), it was considered one of the important commodities. However, since ethnic minorities are the main producers, this product's financing eligibility needs to be considered.
	2	○	Coffee	Industrial crop	Since demand for specialty coffee is on the rise and mainly involves small farmers, FVC improvements are expected to help correct the disparity between urban and rural areas.
	3	○	Broccoli	horticultural crop	Highland vegetables such as broccoli have high potential and are good in relation to the ongoing SHEP and Agricultural DX survey. Some Japanese companies have been suffering from a shortage of broccoli supply.
	4		Melon	Horticultural crop	Export demand to the U.S. is increasing, making this a promising crop for the future.
	5		Rice	Food crop	As the third largest import item, there is room for consideration from the perspective of import substitution.
	Conclusion				(1) cardamom, (2) coffee, and (3) broccoli.
Honduras	1		Melon	Horticultural crop	The third most important agricultural product in terms of exports, muskmelon occupies the second position in terms of global export share, is unique among the six countries, and is considered to be highly worthy of conducting a survey.
	2	○	Coffee	Industrial crops	It is the agricultural product with the highest export value, and is currently undergoing conversion of cultivation to specialty coffee and expansion of sales channels. Many producers still suffer from low prices due to a lack of value addition, and there is still ample room for FVC development.
	3	○	Dairy	Livestock	It is the third largest producer in the country in terms of value after coffee, palm oil, and other craft commodities. This could serve as a good example as the domestic demand for milk has been noted to be increasing in Central American and Caribbean countries.
	4	○	Lemon	Horticultural crop	Traditionally, coffee and bananas have been the main agricultural products, but in recent years, the government has been promoting crop diversification. The selection was made based on the potential for market demand in the future.
	5		Tomato	Horticultural crop	It is one of the most important products exported from Mexico to the North American market and could be a candidate for diversification due to the expected demand in the export market.
	Conclusion				(1) lemon, (2) coffee, and so on.
EI Salvador	1	○	Coffee	Industrial crop	Since it is a major agricultural commodity and produces specialty coffee, it could be a candidate for investigation for the VC of specialty coffee.

Country	No.	selection	Commodity	Classification.	The reason for the selection (production and trade potential, etc.)
	2	○	Chicken	Livestock	The country ranks first in terms of production value, with exports in the 20 th , and domestic demand is significant.
	3	○	Vegetables	Horticultural crop	JICA's technical assistance program is being implemented in eastern El Salvador, and collaboration is possible. The country ranks fifth in export items, although coffee is the most prominent export item.
	4		Corn and beans	Food crop	It does not have high added value, but since it is a staple food, it could be a candidate in terms of import substitution. There is demand for the product because it is also produced but also exported.
	6		Rice	Food crop	It is the second largest imported commodity. It is also one of the top 10 most important commodities in terms of harvested area.
	Conclusion				(1) coffee, (2) chicken, and (3) vegetables were confirmed with the office.
Panama	1	○	Rice	Food crop	Rice is the staple food in Panama, with the largest area planted.
	2	○	Dairy	Livestock	Dairy farming is an important industry in the region, with pastureland about three times the size of cultivated land. A project to improve cattle productivity is underway with the University of Panama as the CP.
	3		Coffee	Food crop	The Panamanian coffee Geisha variety is rare and highly valued worldwide. However, the same variety is extremely difficult to cultivate, and production is low. Because of its special standing, it is considered to be of high research value in terms of comparison with other countries. The Panama Canal Watershed Management Project is a project of various types. With regard to coffee, we hope to conduct research while keeping in mind the need to improve livelihoods in watershed management and in poor areas (including indigenous peoples and women workers).
	4	○	Plantain	Food crop	It has the fourth largest harvested area in the country with high production value. Unlike monopoly banana cultivation by large corporations, VCs for domestic demand are thought to have been formed, making it well worth investigating. However, it remains to be seen whether investment needs of sufficient scale exist.
	5		Maize	Food crop	Second largest importer. The country is the only high-income country among the target countries, and import substitution rather than food security could be the primary objective.
	Conclusion				(1) Rice (coffee is also a candidate depending on the selection of other countries), (2) dairy, and (3) plantain.
Dominican Republic	1	○	Cocoa	Industrial crop	Cacao is the main crop in the country and the quality is high, with organic cacao accounting for about 70% of the total. The potential for value-added in the region is expected. In Cote d'Ivoire, TSL was processed by a large company and the appropriateness of TSL was not high. If farmers and SMEs are involved in bean fermentation in the country, there may be a need for TSL. There is also a need for investment in the production sector, as replanting is required every 20 years or so. Cacao is very important in the Dominican Republic, but USAID recently conducted a study that can be leveraged (broad-based FVC expert).
	2		Organic banana	Horticultural crop	Organic banana exports to the EU are expanding, and specific VC needs for certification and food safety are anticipated.
	3	○	Fisheries	Fisheries	Given that marine products are imported, a study could be conducted on VC focused on those for resorts.
	4		Avocado	Horticultural crop	It ranks first in harvested area in the horticultural sector. It is an easy-to-load commodity, and logistics-related needs after production can be expected.
	5	○	Rice	Food crop	It is produced in rural areas and consumed in urban areas, and has a history of JICA support.
	6		Tobacco	Industrial crop	Ranks high in both imports and exports. It is not food, but it could be a candidate from an industrial perspective; it is not clear at this time if VCs are involved with SMEs. For large companies, "overseas investment and financing" may be an option. Health impacts have been widely pointed out, and

Country	No.	selection	Commodity	Classification.	The reason for the selection (production and trade potential, etc.)
					JICA is unlikely to actively consider providing assistance to increase their cultivation due to the risks involved.
				Conclusion	(1) cacao, (2) fisheries (limited to those for resorts), and (3) rice. However, vegetables and other commodities for domestic demand may be accepted in place of rice.

*1: https://www.maff.go.jp/aqs/hou/pdf/JP_Cloven-hoofed_animals_other_than_pigs_and_wild_boars20191024.pdf

Table 4.1.2 shows the number of selected commodities surveyed by crop category (ex., horticultural crops and industrial crops) and by country. As shown in this table, three commodities were selected for each country, with the exception of Mexico, where four commodities were selected. Five horticultural and industrial crops were selected by crop category, followed by four livestock, three food crops consisting of rice and plantain, and two marine products (Mexico and the Dominican Republic). As shown above, the overall selection of commodities is generally well-balanced, but when examined by commodity, coffee, which is also a major industry, was selected in the largest number of countries (3). It is said that each country has its own unique coffee FVC, and the purpose of this survey was to make such a cross-sectional comparison.

Table 4.1.2 Number of FVC Surveyed by Country and Crop Category

Classification.	Commodity	Mexico	Guatemala	Honduras	El Salvador	Panama	Dominican Republic	total
Horticultural crops	Avocado	○						1
	Tomato							0
	Broccoli		○					1
	Melon							0
	Lemon			○				1
	Vegetables	○				○		2
	Organic banana							0
Total		2	1	1	1		5	
Industrial crops	Cocoa						○	1
	Cardamom		○					1
	Coffee		○	○	○			3
	Tobacco							0
Total		2	1	1		1	5	
Food crops	Rice					○	○	2
	Corn and beans							0
	Plantain					○		1
Total					2	1	3	
Fisheries	Tuna	○						1
	Fishery						1	1
Total		1				1	2	
Livestock	Chicken meat				○			1
	Beef cattle	○						1
	Dairy			○		○		2
Total		1			1	1	4	
Total		4	3	3	3	3	3	18

Note: Item names include the names of the five items listed in the first extraction. "○" indicates the final selection and the number indicates the number of items.

4.2. FVC Questionnaire Survey

4.2.1 Survey Method

This section summarizes the results of the FVC questionnaire survey conducted in the six Central American and Caribbean countries covered by the study (Mexico, Guatemala, Honduras, El Salvador, Panama, and the Dominican Republic), employing local staff. Two questionnaires, Questionnaire A and Questionnaire B were developed with different targets and objectives (Table 4.2.1). Questionnaire A was designed for organizations such as government agencies, associations of commerce and industry, and NGOs that have an overall picture of FVC for each target commodity. The purpose of Questionnaire A was to understand the flow of FVC for each commodity and to identify challenges and potentials from a third-party perspective. The survey team conducted interviews similar to Questionnaire A by the field survey in Guatemala, Panama, and the Dominican Republic and did not hire local staff for this purpose.

As a next step, local staff directly visited the major players identified by Questionnaire A and conducted a survey using Questionnaire B to understand their current status, challenges, and funding needs. In Questionnaire B, the online tool, Kobo Toolbox (About [us | KoboToolbox](#)) was used for data collection and management.

Table 4.2.1 Survey Objectives and Targets

Questionnaire	Target	Objective
A	Government agencies, associations of commerce and industry, NGOs, etc.	Interviews with associations for each commodity to understand the flow, challenges, and potential of each FVC
B	Players of each FVC	Interviews with players on each FVC to understand current status, challenges, and funding needs

Source: JICA survey team

The number of samples in each country is shown in Table 4.2.2. A total of seven different FVC players, from production to distribution, were targeted. It was planned to collect 5 to 6 samples for producers and 2 to 3 samples for other players in Questionnaire B, but the planned number of samples was not obtained for some items due to the refusal by the survey targets. However, it was able to secure the originally planned number of samples for many items. An average of 12 samples were collected for each commodity, and 228 samples were collected and analyzed for the whole survey.

Table 4.2.2 Number of Samples on Each Country and Player

No. of sample	Mexico				Gautemala			Honduras			El Salvador			Panama		Dominican Republic				
	Avocado	Beef cattle	Vegetable Tomato Nopal	Tuna	Cardamom	Coffee	Broccoli	Coffee	Dairy farming	Lemon	Coffee	Chicken	Vegetable	Rice	Daily farming	Plantain	Cacao	Fishery	Rice	
A	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
1. Input supplier	5	1	5	5	2	-	-	3	3	3	-	-	-	-	-	-	2	-	1	
2. Producers	5	9	2	4	4	4	5	5	5	8	4	9	12	4	3	3	4	3	10	
2-1. Agricultural Association	-	2	-	1	-	4	1	3	-	1	-	-	-	2	1	-	2	1	1	
3. Aggregator	-	-	-	-	1	2	1	3	-	-	2	6	4	-	-	-	1	1	1	
4. Processor	1	-	1	2	-	3	-	-	2	2	5	-	-	3	-	-	-	-	3	
5. Wholesaler	-	-	-	-	-	-	-	-	-	3	-	-	-	1	-	1	-	-	-	
6. Retailer	-	-	1	-	-	2	-	-	3	-	-	-	-	4	3	2	-	-	-	
7. Exporter	1	-	-	-	1	1	1	3	-	-	3	-	-	-	-	-	2	-	-	
Sub-Total	12	12	9	12	0	8	16	8	17	13	17	14	15	16	14	7	6	11	5	16

TOTAL 228 samples

Source: JICA survey team

4.2.2 Mexico

The questionnaire survey was conducted for four target commodities: avocado, beef cattle, vegetables (nopal and tomato), and tuna in Mexico. The results of each survey are summarized below.

1) Avocado

(1) FVC Structure

AgroPark of yecapixtla was interviewed using Questionnaire A in order to understand the avocado FVC flow in Mexico and the various challenges and potentials involved. The company is a private Mexican company that collects, wholesales, and exports avocados and vegetables and is one of the organizations with knowledge of the entire avocado FVC in Mexico, especially in the Morelos state.

FVC Flow (Category: Morelos State)

In the Avocado FVC in Morelos state in Mexico, FVCs mainly consist of input suppliers (100 companies), producers (7,500 farmers), aggregators (5 companies), processors (2 companies), exporters (2 companies), or retailers (for domestic consumption). This report describes FVCs for export, which are the particular focus of the firms surveyed in the questionnaire.

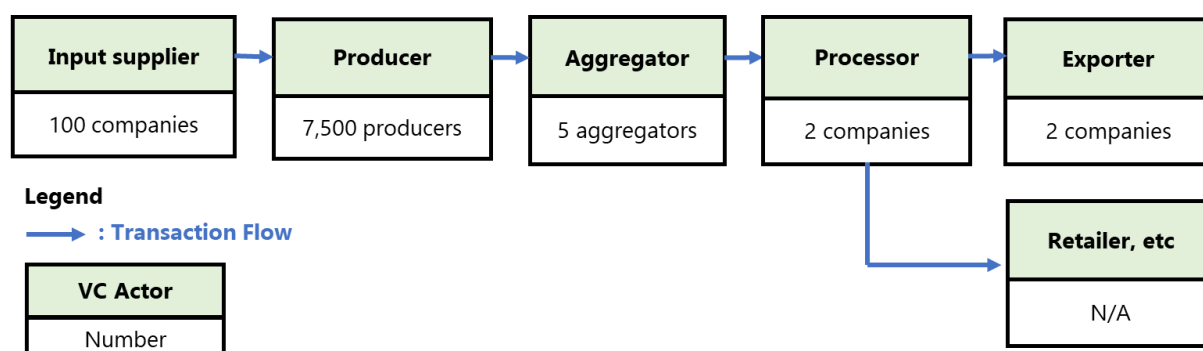


Figure 4.2.1 Avocado FVC Flow (Mexico)

Source: JICA survey team

Exit of Avocado FVC

In Morelos state, Mexico, 90% of the avocados are for the domestic market and the remaining 10% for export. The breakdown of the domestic market is 10% for modern markets such as supermarkets and hotels, 30% for traditional markets such as private stores, and the remaining 60% is distributed to private companies that manufacture and sell processed products using avocados as raw materials. The most important FVC exit was identified as export by the interviewed organization, which is the result of insufficient production of export-quality avocados due to farmers' lack of knowledge and lack of facilities for post-harvest management.

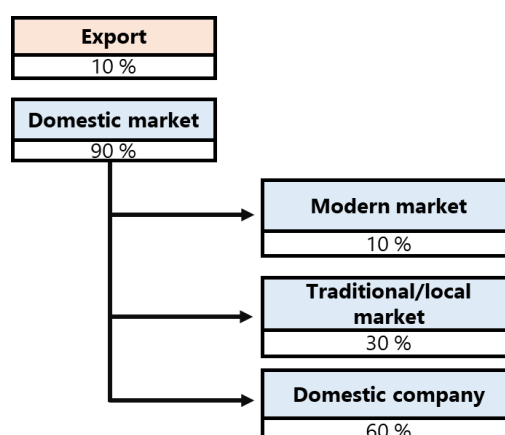


Figure 4.2.2 Percentage of Avocados for Export and Domestic market (Mexico)

Source: JICA survey team

(2) Challenges for Each Player and Opportunities for Business Expansion

AgroPark of Yecapixtla and each FVC player were interviewed using questionnaire B about the challenges for each player and opportunities for business expansion.

Results of Interviews with AgroPark of yecapixtla

In an interview with AgroPark of yecapixtla, overall FVC and each player's challenges and opportunities for business expansion were interviewed. Players with particularly serious challenges or high potential were ranked from 1 to 3, with 3 stars for 1st place, 2 stars for 2nd place, and 3 stars for 3rd place, and these are listed in the table. The same interviews were conducted for the whole survey, and the results are shown in each table.

Table 4.2.3 Challenges and Opportunities for Each Player on the Avocado FVC (Mexico)

Overall VC Challenges and Opportunities	<p><u>Main challenges: Lack of knowledge of producers and lack of post-harvesting knowledge and storing facilities</u></p> <p>The above are bottlenecks and the production of avocados for export is low in the state of Morelos.</p> <p><u>Main opportunities: high avocado production and exports in Michoacán state</u></p> <p>Most avocados for export are produced in Michoacán, where they are highly profitable.</p>
Input suppliers ★★★	They are dependent on chemical fertilizers and pesticides and believe that organic farming should be promoted.
Producer	In order to meet export standards, measures against pests such as Avocado seed weevil, Small avocado seed weevil, and <i>Stenoma catenifer</i> are essential.
Aggregators	The selling price is high relative to the purchase price.
Processors ★★	Global GAP and other certifications should be obtained.
Exporter ★	Lack of collection points, refrigerators, and size selection machines.

Source: JICA survey team

The importance of each player's challenges and potential (severity of the challenge and demand for assistance):

★★★ = most important, ★★ = second most important, ★ = third most important

Results of Interviews with Each Player

Based on the aforementioned FVC flow, interviews were conducted with the main players (Input suppliers, producers, processors, and exporters) using Questionnaire B. The main challenges identified as a result of the interviews with each player are summarized below. At each site visited, the top three overall challenges (bottlenecks) were interviewed, and separately, financial and technical challenges were interviewed. Since the financial and technical challenges were limited questions, the severity of the challenges was scored on a scale of 3 (Very serious: 3 pts, Serious: 2 pts, Not so serious: 1 pt) as a reference value, and divided the total value by the number of respondents to obtain the average importance. The average importance of the respondents was calculated by dividing the total by the number of respondents (see the numbers in the red box in Table 4.2.4).

Since the scoring figures cannot be compared in the same way when there are multiple respondents for the same challenge or when there is only one respondent, the number of samples is also included in parentheses to the right of the scoring figures as another indicator. The survey contents and analysis methods described above are the same for other commodities and other countries.

Input suppliers

Main challenges: Low sales prices, lack of publicity, high fertilizer prices, lack of budget for

producers

Financial challenges: Seasonal sales fluctuations

Technical challenges: Lack of training opportunities in rural areas

Producers

Main challenges: High fertilizer prices, pests, lack of knowledge of soil analysis, high bank interest rates

Financial challenges: Lack of funds to invest in infrastructure

Technical challenges: Collection points, cold chain, need for fruit sorting machines

Processors

Main challenges: Low market prices, high production costs, high fertilizer costs

Financial challenges: Delays in payment for avocado sales

Technical challenges: Insufficient workspace

Exporter

Main challenges: No response

Financial challenges: Exchange rate differences with countries

Technical challenges: No response

High fertilizer prices were mentioned as the main challenge by Input suppliers, producers, and processors. Three producers mentioned the lack of funds for infrastructure development as a financial challenge and the need for collection points, cold chains, and fruit sorting machines as a technical challenge. It is thought that infrastructure development in the former case refers to facilities and machinery in the technical (actually financial) challenge. Input suppliers mentioned the lack of training opportunities, especially in rural areas, as a serious technical challenge. No positive responses were obtained from exporters.

Table 4.2.4 Challenges on Each Player on the Avocado FVC (Mexico)

		Input supplier	Producer	Processor	Exporter
General challenge	1st	<ul style="list-style-type: none"> Low price of products Lack of promotion High price of fertilizers 	<ul style="list-style-type: none"> High price of fertilizers Pests and diseases (<i>Colletotrichum gloeosporioides</i> Penz, etc) 	<ul style="list-style-type: none"> Low market prices 	<ul style="list-style-type: none"> Not answered
	2nd	<ul style="list-style-type: none"> Insecurity and theft Lack of budget of the customers 	<ul style="list-style-type: none"> High price of fertilizers Lack of knowledge of soil analysis study 	<ul style="list-style-type: none"> High production costs 	<ul style="list-style-type: none"> Not answered
	3rd	<ul style="list-style-type: none"> Not answered 	<ul style="list-style-type: none"> High interest rates from banks 	<ul style="list-style-type: none"> High price of fertilizers 	<ul style="list-style-type: none"> Not answered
Financial challenge		<ul style="list-style-type: none"> Fluctuation of the sales depends on the season 	<ul style="list-style-type: none"> lack of capital to invest in infrastructure 	<ul style="list-style-type: none"> Timely payment of the sale of the avocado 	<ul style="list-style-type: none"> Exchange rates with other countries
Technical challenge		<ul style="list-style-type: none"> Lack of trainings, especially in countryside 	<ul style="list-style-type: none"> Need a collection center, a cold chain and an avocado sorter 	<ul style="list-style-type: none"> Not enough space 	<ul style="list-style-type: none"> Not answered

1) Red cells in the table: Financial and technical challenges are scored with Very serious=3.0, Serious=2.0, Not so serious=1.0, and the total value is divided by the number of respondents as the score.

2) Blue cells in the table: The number of respondents is shown in parentheses.

Source: JICA survey team

Summary of Challenges and Potential for Avocado VC

As a result of interviews with AgroPark of yecapixtla and the various players, one of the challenges commonly identified by both parties is the lack of collection points, cold chains, and fruit sorting machines. Another major challenge is the lack of capital to purchase those facilities and equipment. Producers also mentioned high-interest rates on loans as a challenge. The AgroPark of yecapixtla is promoting organic farming, and there is potential to introduce organic fertilizers as an alternative to expensive chemical fertilizers or as a value-added. The firm also cited farmers' lack of knowledge (mainly in terms of pests and diseases and post-harvest handling) as a challenge in meeting the standards of avocados for export, but no similar challenges were mentioned by farmers in the survey.

(3) Financing Needs for Each Player

Financing plans that each player has were interviewed. In the Mexican avocado FVC player surveyed in this study, plans to obtain financing were confirmed by one material supplier (Figure 4.2.3), although sufficient responses pertaining to financing were not obtained. The amount of financing demand is shown in Figure 4.2.4. The amount of loan demand for the input supplier was 45,481 USD (n=1). Regarding the previous experience of loans received, 101,068 USD (n=1) was confirmed for processors.

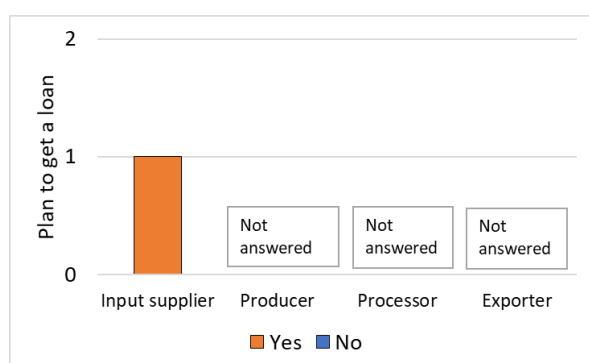


Figure 4.2.3 Avocado FVC Player's Financing Plan (Mexico)

Source: JICA survey team

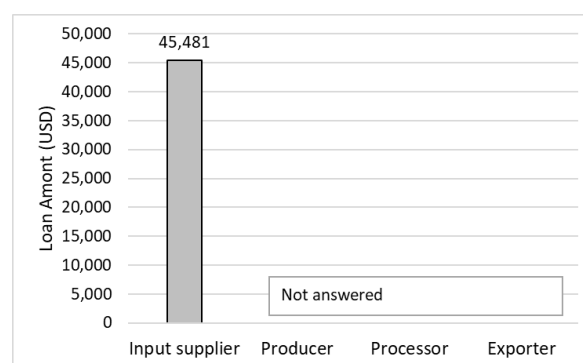


Figure 4.2.4 Avocado FVC Player's Amount of Loan Requested (USD) (Mexico)

The objectives for the above loans are listed in Table 4.2.5. For the Input suppliers, the loan amount was 45,481 USD, and the purpose of the loan was the cost of procurement of materials, infrastructure development, and advertising.

Table 4.2.5 Purpose of Loans on Avocado FVC Players (Mexico)

VC Player	Purpose of Loan
Input supplier	Cost of procurement of materials, infrastructure, and advertising
Producer	No answer
Processor	No answer
Exporter	No answer

Source: JICA survey team

(4) Existing Support System

Regarding the existing support in the avocado FVC in Mexico, each player was interviewed regarding whether they receive support from other countries, their own country, NGOs, or others. As a result, all

five producers who responded to this question indicated that they receive financial support from the government, either in the form of subsidies or loans, or provision of agricultural machinery and equipment. One producer and one exporter indicated that they had never received the support, and any response was not received from processors.

Table 4.2.6 Support to Avocado FVC Players (Mexico)

VC Player	Availability of support	Support organization	Support
Input supplier	0/1	-	-
Producer	5/5	government	Financial support such as grants and loans Provision of agricultural machinery and equipment
Processor	No answer	No answer	No answer
Exporter	0/1	-	-

1) "Number of players who responded that they have support/number of respondents" is indicated in the "support" column.

Source: JICA survey team

(5) Others

Introduction of Digital Technology and Green Technology

The survey also examined each player's digital technology (digital transformation, DX) and green technology implementations. For the purpose of this survey, DX was defined as "the digitization of all or part of the work generated in a business from traditional and analog methods, such as manual work, for the purpose of improving efficiency and productivity. Green technology means "efforts to reduce environmental impact by introducing innovative technologies to achieve a sustainable society." Still, this survey exceptionally describes a wide range of environmentally friendly efforts, including organic farming, as long as they are "efforts to reduce environmental impact.

First, DX confirmed the use of smartphones and drones by input suppliers, the use of drones to spray pesticides, and advanced digital technology by producers. Respondents of input suppliers and producers who are not currently using drones also expressed interest in using drones in the future. Processors could not confirm whether they have implemented DX or are interested in it, and exporters did not respond.

Table 4.2.7 Adoption of Digital Technology for Avocado FVC Players (Mexico)

VC Player	Percentage	DX	Digital technology adopts in the future
Input supplier	2/3	Use of smartphones and drones	DX implementation in drone, microbiological, physicochemical, and molecular analysis
Producer	5/5	Pesticide application by drone, use of smartphones	drone
Processor	0/1	-	-
Exporter	No answer	No answer	No answer

1) For digital technology, the number of players/respondents who indicated that they have implemented the technology.

Source: JICA survey team

The survey result shows the promotion of recycling on input suppliers, the application of organic fertilizers on producers, and the introduction of solar energy on processors, as green technology. As for green technology that they would like to adopt in the future, input suppliers are interested in products with low environmental impact.

Table 4.2.8 Adoption of Green Technology for Avocado FVC Players (Mexico)

VC Player	Percentage	Subsidies	Green technology	Green technology adopts in future
Input supplier	2/3	0/3	Promotion of recycling	Introduction of products with low environmental impact
Producer	5/5	0/5	Introduction of organic fertilizers	-
Processor	1/1	0/1	solar energy	-
Exporter	No answer	No answer	No answer	No answer

1) Number of players/respondents who indicated that they have implemented Green Technology.

Source: JICA survey team

2) Beef cattle

(1) FVC Structure

Unión ganadera regional general del Estado de Morelos (General Regional Cattle Union of the State of Morelos) was interviewed to understand the beef cattle FVC flow and various challenges in Mexico. This organization is a branch in Morelos state of the national livestock production union, and is one of the organizations with knowledge of beef cattle FVC in Mexico.

FVC Flows (Category: Mexico)

Beef cattle FVC in Mexico mainly consists of input suppliers (58,000 companies), producers (739,000 farmers), aggregators (113,748 companies), processors (934 companies), exporters (139 companies), or retailers (for domestic consumption). This report describes FVCs for the domestic market, which are more produced.

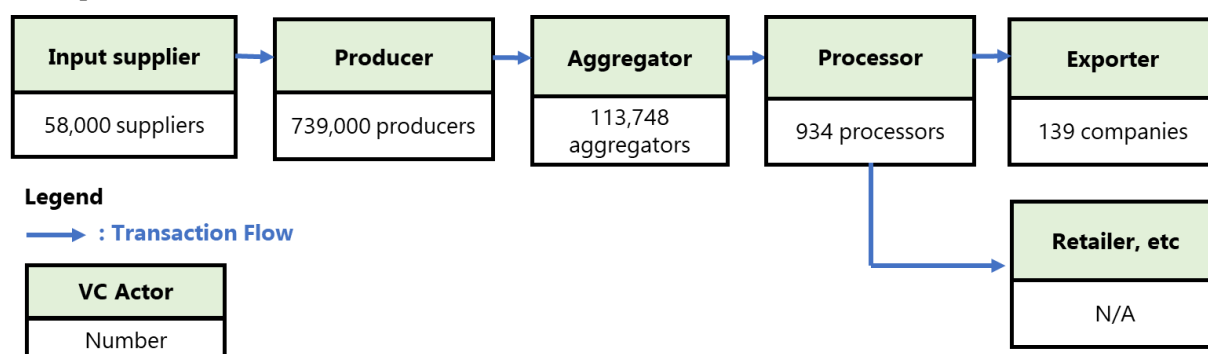


Figure 4.2.5 Beef Cattle Flow (Mexico)

Source: JICA survey team

Exit of Beef Cattle FVC

In Mexico, 93.6% of all beef cattle are destined for the domestic market and 6.4% for export. In the domestic market, 20.3% is distributed to modern markets such as supermarkets and hotels, 16.9% to traditional markets such as private stores, 52.0% to butcher stores, and the remaining 10.8% to other markets. Among these, exports were chosen as the most important FVC exit, it is mainly because the volume of exports, especially to the U.S., is increasing year by year, making it a valuable source of foreign currency.

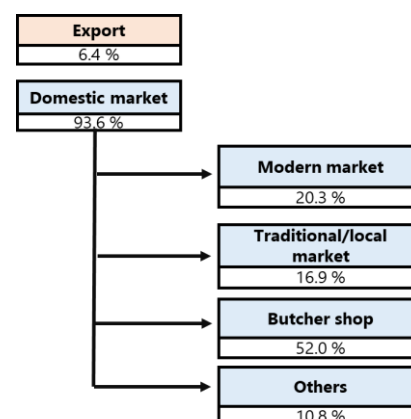


Figure 4.2.6 Percentage of Beef Cattle for Export and Domestic Market (Mexico)

Source: JICA survey team

(2) Challenges for Each Player and Opportunities for Business Expansion

The following are the results of interviews with Unión ganadera regional general del Estado de Morelos and each players regarding the challenges and opportunities for business expansion.

Results of Interviews with Unión ganadera regional general del Estado de Morelos

As a result of the interview with Unión ganadera regional general del Estado de Morelos ,entire VC and each player on the challenges and opportunities for business expansion are listed below.

Table 4.2.9 Challenges and Opportunities for Each Player on the Beef Cattle FVC (Mexico)

Overall VC Challenges and Opportunities	<p><u>Main challenges:</u> Beef imports, mainly from the U.S., are competing with domestic cattle.</p> <p><u>Mian opportunity:</u> Production and exports are increasing due to global beef consumption</p>
Input suppliers (including feed) ★★★	<p>Good Manufacturing Practices (GMP) certification will guarantee the safety of the beef cattle produced.</p> <p>This is important for producing quality beef cattle.</p>
Producer	There is an increase in production volume due to growing demand and value-adding efforts such as improved varieties and traceability.
Aggregator	No answer
Processor ★★	Value-added through certification.
Retailer	No answer
Exporter ★	It is necessary to secure safe and necessary quantities to meet import demand.

Source: JICA survey team

Importance of challenges and potentials of each player: ★★★ = most important, ★★ = second most important, ★ = third most important

Results of Interviews with Each Player

Based on the VC flow, interviews were conducted with the main players (Input suppliers and producers) using Questionnaire B. The main challenges identified are summarized below.

Input suppliers

Main challenges: Inability to expand business scale, value-adding

Financial challenge: Lack of capital to increase the number of cattle

Technical challenges: N/A

Producers

Main challenges: Pest infestation, high interest on bank loans

Financial challenges: Procurement of materials such as trucks, milking machines, livestock scales, forage harvesters, etc.

Technical challenges: No answer

Among the players interviewed, one material supplier cited lack of capital and nine producers cited lack of money to procure trucks and other materials and equipment as challenges. As for technical challenges, the response of Input suppliers was "N/A," and a response was not obtained from producers.

Table 4.2.10 Challenges for Each Player on Beef Cattle FVC (Mexico)

		Input supplier	➤		Producer
General challenge	1st	• Cannot increase the scale of operations			• Pests and diseases
	2nd	• To add value to the operations			• High interest rates from banks
	3rd	• Not answered			• Not answered
Financial challenge		• Lack of capital to increase the cattle	1.0	(1)	• Acquisition of materials such as a truck, milking machine, livestock scale, and forage harvester.
Technical challenge		• N/A	N/A	N/A	• Not answered

Note 1) Red cells in the table: Financial and technical challenges are scored with Very serious=3.0, Serious=2.0, Not so serious=1.0, and the total value is divided by the number of respondents as the score.

Note 2) Blue cells in the table: The number of respondents is shown in parentheses.

Source: JICA survey team

Summary of Challenges and Potentials of Beef Cattle FVC

According to the Unión ganadera regional general del Estado de Morelos, a livestock cooperative, beef imports, mainly from the United States, compete with domestic cattle, while production and exports are increasing due to the increase in global beef consumption. Input suppliers were selected as the most important FVC players in producing quality beef cattle. In a survey of each player, lack of capital was cited as a challenge for Input suppliers, while pests, high-interest rates on loans, and inability to procure materials were cited as challenges for producers.

(3) Financing Needs for Each Player

Future financing plans of each player were not confirmed since positive responses were not obtained. (Figure 4.2.7). In terms of past financing, input supplier had 100,000 USD (n=1) of financing.

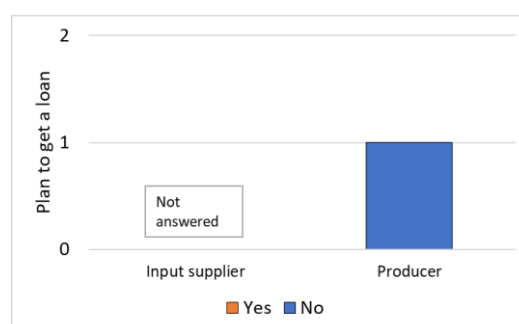


Figure 4.2.7 Beef Cattle FVC Player's Finance Plans (Mexico)

Source: JICA survey team

(4) Existing Support System

Existing support for beef cattle FVC in Mexico is summarized below. As a result of interviewing

each player regarding the existence of support from other countries, their own country, NGOs, etc., it was unable to confirm any support for input suppliers, while producers had received training related to their business from the government.

Table 4.2.11 Support to Beef Cattle FVC Players (Mexico)

VC Player	Availability of support	Support organization	Support
Input supplier	0/1	-	-
Producer	9/9	Government	Training related to business

Note 1) "Number of players who responded that they have support/number of respondents" is indicated in the "support" column.

Source: JICA survey team

(5) Others

Introduction of Digital Technology and Green Technology

Beef cattle FVC players mentioned the use of smartphones and tablets in input suppliers, and all nine of the producers mentioned the use of smartphones as an example of digital technology.

Table 4.2.12 Adoption of Digital Technology for Beef Cattle FVC Players (Mexico)

VC Player	Percentage	DX	Digital technology adopts in the future
Input supplier	1/1	Use of smartphones and tablets	Microchip, use of center technology
Producer	9/9	Use of Smartphones	Use of tablets

1) For digital technology, number of players/respondents who indicated that they have implemented the technology.

Source: JICA survey team

Regarding Green Technology, both Input suppliers and producers cited the use of cattle manure as an organic fertilizer.

Table 4.2.13 Adoption of Green Technology for Beef Cattle FVC Player (Mexico)

VC Player	Percentage	Subsidies	Green Technology	Green technology adopts in the future
Input supplier	1/1	0/1	Cattle manure as organic fertilizer	No answer
Producer	9/9	No answer	Cattle manure as organic fertilizer	No answer

1) Number of players/respondents who indicated that they have implemented GreenTech

Source: JICA survey team

3) Vegetables (Nopal)

(1) FVC Structure

Based on the results of the field survey, this report describes the vegetable FVC flow and each challenge in Mexico. This report describes FVCs for nopal and tomatoes.

FVC Flow (Category: Morelos State)

Domestic consumption is the main focus of the Nopal FVC in the Morelos state in Mexico, with Input suppliers (100 companies), producers (3,000 farmers), aggregator (10 companies), processors (5 companies), retailers, and exporters (2 companies) as the main player of the FVC. This report describes the most typical FVC for domestic consumption.

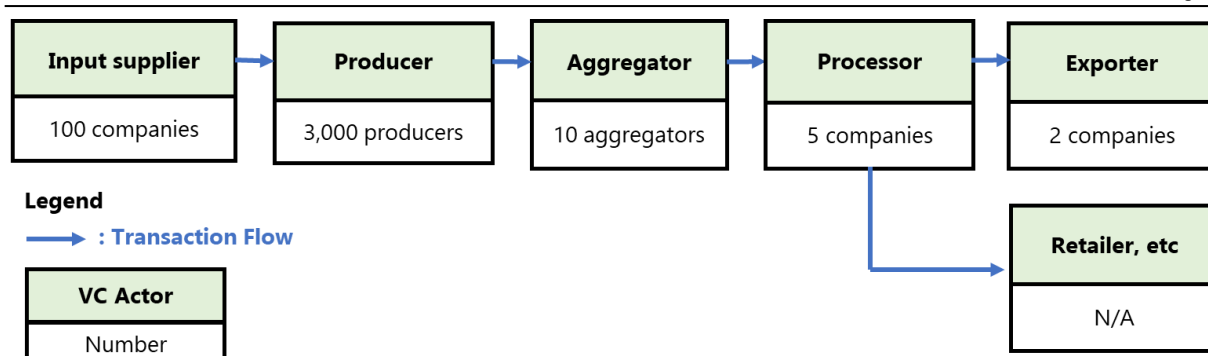


Figure 4.2.8 Nopal FVC Flow (Mexico)

Source: JICA survey team

Exit of Nopal FVC

Nopal produced in the Morelos state in Mexico, is 10% for export and the remaining 90% is distributed for the domestic market. The breakdown of the domestic market is 20% for the modern market, 30% for the traditional market, and 50% for distribution to the private sector. Export was chosen as the most important VC exit because of the regulations and laws that restrict exports. Export destinations included Japan, in addition to the U.S., France, and Germany.

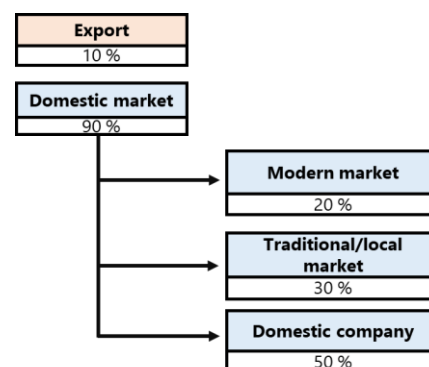


Figure 4.2.9 Percentage of Nopal for Export and Domestic Market (Mexico)

Source: JICA survey team

(2) Challenges for Each Player and Opportunities for Business Expansion

The results of the field survey and interviews with each of the players regarding the challenges and opportunities for business expansion are described below.

Results of Field Survey

In interviews, the entire FVC and each player on the challenges and opportunities for business expansion were surveyed. The main challenges faced by Nopal FVC are the difficulty in securing products that meet quality standards for export and the lack of sufficient advertising and promotion for export, resulting in awareness of Nopal FVC as a food product outside of Mexico. The main opportunity is that demand will continue to increase in the future because of increasing domestic demand and the anticipation of continued high demand in aspects such as nutritional value and utilization of by-products.

Table 4.2.14 Challenges and Opportunities for Each Player on the Nopal FVC (Mexico)

Overall VC Challenges and Opportunities	<p>Main challenges: Lack of quality and PR for export The lack of quality for export and lack of promotion and advertising for export.</p> <p>Main opportunities: Increased domestic demand and high nutrition, use of by-products The state of Morelos is the main producer of nopal in the country. Per capita consumption of nopal has been increasing in recent years, and demand for nopal is expected to continue to grow, as it is rich in dietary fiber, zinc, calcium, and vitamins, and can also be used as an ingredient in alcoholic beverages, cosmetics, and dyes.</p>
Input supplier	Reduce the use of chemical fertilizers and pesticides and promote organic farming.
Producers ★★★	Insects such as <i>Metamasius spinoiae</i> and <i>Dactylopius opuntiae</i> , and diseases such as Black Spot

	are the main causes of damage. Increases in quantity and quality are needed, as well as organic farming initiatives that are in high demand.
Aggregator (Association)	There is room for improvement in collection and transportation.
Processors ★★	Need to purchase quality raw materials for export and processing technology and facilities.
Retailer	Lack of transportation, warehousing, and refrigeration facilities.
Exporter ★	There are challenges with collection, sorting, refrigeration facilities, and certification. Promote exports.

Source: JICA survey team

Importance of challenges and potentials of each player: ★★★ = most important, ★★ = second most important, ★ = third most important

Results of Interviews with Each Player

Based on the aforementioned FVC flow, interviews were conducted with main players (Input suppliers, producers, and processors) using Questionnaire B. The main challenges identified as a result of the interviews with the players are summarized below.

Input suppliers

Main challenges: Low sales, rising purchase prices, lack of capital

Financial challenges: Lack of financing for producers, low sales

Technical challenges: Lack of comprehensive technical support for producers in cultivation

Producers

Main challenges: High cost of fertilizer, drought, insect damage

Financial challenge: High bank interest rates

Technical challenges: Drought, insect management, lack of skilled labor

Processors

Main challenges: Unstable market prices, climate change (drought, fog, frost)

Financial challenges: Inability to pay as needed

Technical challenges: Lack of facilities and workspace

For Input suppliers, the challenges were loans to producers and high bank interest rates. In common with all players, they felt challenges in terms of disease and quality in terms of production.

Table 4.2.15 Challenges on Each Player on the Nopal FVC (Mexico)

		Input supplier	Producer		Processor	
General challenge	1st	<ul style="list-style-type: none"> Low sales Product price increase Lack of money for the purchase of products 	<ul style="list-style-type: none"> High price fertilizers Drought in recent years Pest control 		<ul style="list-style-type: none"> Market price fluctuation Climatic changes (droughts, hailstorms, frosts) 	
	2nd	<ul style="list-style-type: none"> Lack of training of agricultural producers High price of fertilizers 	<ul style="list-style-type: none"> Nopal weevil (Insect) To obtain certifications 		<ul style="list-style-type: none"> High production costs Pests in the cultivation of nopal down the quality. 	
	3rd	<ul style="list-style-type: none"> No support from the government for subsidy Supply Chain Crisis due to Covid-19. 	<ul style="list-style-type: none"> High interest rates of banks Lack of skilled labor 		<ul style="list-style-type: none"> Inflation of inputs and supplies. 	
Financial challenge		<ul style="list-style-type: none"> There is no credit offers for traditional farmers 		<ul style="list-style-type: none"> High interest rates of banks 	N/A	N/A
		<ul style="list-style-type: none"> Low sales 				<ul style="list-style-type: none"> Timely payment of the sale
Technical challenge		<ul style="list-style-type: none"> Lack of comprehensive technical advice for farmers' cultivation management. 		<ul style="list-style-type: none"> Drought in recent years Pest control Lack of skilled labor 	N/A	N/A
						<ul style="list-style-type: none"> Lack of equipment Lack of space to work

1) Red cells in the table: Financial and technical challenges are scored with Very serious=3.0, Serious=2.0, Not so serious=1.0, and the total value is divided by the number of respondents as the score.

2) Blue cells in the table: The number of respondents is shown in parentheses.

Source: JICA survey team

Summary of Challenges and Potential of the Nopal FVC

Morelos, the main nopal production area, currently accounts for about 10% of exports among total production, but the high nutritional value and potential for non-food uses and other uses have generated much interest in exporting nopal. However, it was suggested that there are challenges in obtaining certification and improving quality (against diseases and pests) for exporting.

(3) Financing Needs of Each Player

The future financing plans for each player were investigated, and two producers' loan plans were confirmed (Figure 4.2.10). The amount of financing needed for each is shown in Figure 4.2.11. The average financial need among producers was 176,870 USD (n=2, highest value 353,739 USD, minimum value 176,870 USD). Regarding previous experience with loans, 75,801 USD (n=1) on input suppliers and 63,168 USD (n=2, highest value 101,068 USD, minimum value 25,267 USD) for processors were confirmed.

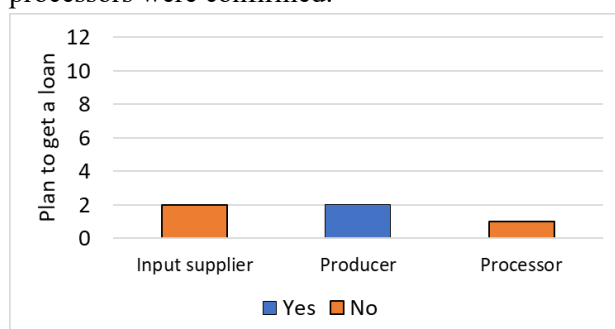


Figure 4.2.10 Nopal FVC Player's Financing Plan (Mexico)

Source: JICA survey team

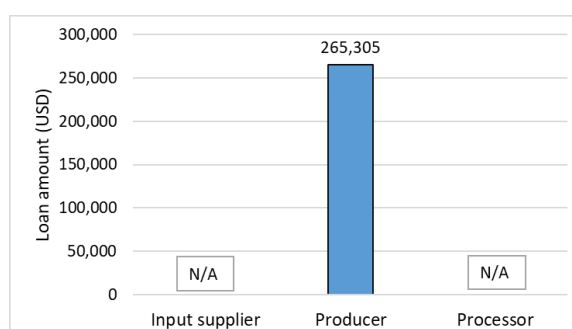


Figure 4.2.11 Nopal FVC player's Amount of Loan Requested (USD) (Mexico)

The loan objectives for the above loans are described in Table 4.2.16. The purpose of the producers' loans was to build a collection center.

Table 4.2.16 Purpose of Loans on Nopal FVC Players (Mexico)

VC Player	Purpose of Loan
Input supplier	NA
Producer	Construction of a collection point
Processor	NA

Source: JICA survey team

(4) Existing Support System

Existing support in the Nopal FVC in Mexico is summarized below. Any support was not confirmed for input suppliers and processors, while all four respondents of producers had received support for the provision of facilities and machinery or training related to their business.

Table 4.2.17 Support for Nopal FVC Players (Mexico)

VC Player	Availability of support	Support organization	Support
Input supplier	0/2	-	-
Producer	4/4	Government	Providing facilities, machinery, and training related to business
Processor	0/1	-	-

1) "Number of players who responded that they have support/number of respondents" is indicated in the "support" column.

Source: JICA survey team

(5) Others

Introduction of Digital technology and Green technology

Nopal FVC players, input suppliers, producers, and processors cited the use of smartphones and tablets as examples of digital technology.

Table 4.2.18 Adoption of Digital Technology for Nopal FVC Player (Mexico)

VC Player	Percentage	DX	Digital technology adopts in the future
Input supplier	3/4	Use of drones and smartphones	Power generation by solar panels
Producer	4/4	Use of smartphones and tablets	-
Processor	2/2	Use of apps and tablets	-

1) For digital technology, number of players/respondents who indicated that they have implemented the technology.

Source: JICA survey team

All of the players interviewed indicated that they have implemented Green Technology. Input suppliers cited recycling of containers and other materials, producers cited the use of compost, and processors cited the introduction of solar energy as examples.

Table 4.2.19 Adoption of Green Technology for Nopal FVC Player (Mexico)

VC Player	Percentage	Subsidies	Green Technology	Green technology adopts in the future
Input supplier	4/4	0/1	Recycling containers, etc., and making compost	-
Producer	4/4	-	Use of compost	-
Processor	2/2	0/1	Introduction of solar energy	-

1) Number of players/respondents who indicated that they have implemented Green Technology

Source: JICA survey team

3) Vegetables (Tomatoes)

(1) FVC Structure

The FVC for tomatoes is described below. Questionnaire A was not collected for tomatoes, and data was obtained from Questionnaire B for input suppliers, producers, and retailers in the Morelos state.

(2) Challenges for Each Player and Opportunities for Business Expansion

The results of interviews with each player regarding the challenges and opportunities for business expansion are listed below.

Results of Interviews with each player

Based on the aforementioned VC flow, interviews were conducted with main players (Input suppliers, producers, and processors) using Questionnaire B. The main challenges identified as a result

of the interviews with the players are summarized below.

Input suppliers

Main challenges: High purchase prices and low sales of fertilizers and other products

Financial challenges: Farmers' inability to obtain loans to build irrigation facilities, lack of working capital

Technical challenge: Lack of farmers' knowledge of insurance

Producers

Main challenge: Lack of financing

Financial challenges: Lack of capital to invest in collection areas, refrigeration facilities, and fruit sorting machines.

Technical challenge: No phytosanitary station

Processors

Main challenge: Inability to obtain financing

Financial challenges: Lack of financing

Technical challenges: No answer

Retailer

Main challenge: Macro-financial uncertainty

Financial challenges: No answer

Technical challenges: No answer

Challenges related to financing and capital were raised by input suppliers, producers, and processors, and one processor mentioned challenges related to financing as very serious challenge.

Table 4.2.20 Challenges on Each Player on the Tomato FVC (Mexico)

		Input supplier	▶	Producer	▶	Processor	▶	Retailer	
General challenge	1st	<ul style="list-style-type: none"> High price for fertilizers Product price increase Low sales 		<ul style="list-style-type: none"> Financing 		<ul style="list-style-type: none"> Financing 		<ul style="list-style-type: none"> Contingencies of micro economic 	
	2nd	<ul style="list-style-type: none"> High price for fertilizers Low educational level of staff Capital of farmers to buy input 		<ul style="list-style-type: none"> Not answered 		<ul style="list-style-type: none"> Byproducts is not utilized 		<ul style="list-style-type: none"> Not answered 	
	3rd	<ul style="list-style-type: none"> Lack of credits to small agricultural producers. 		<ul style="list-style-type: none"> Not answered 		<ul style="list-style-type: none"> Need of industrialization 		<ul style="list-style-type: none"> Not answered 	
Financial challenge		<ul style="list-style-type: none"> No credit offers for traditional farmers for the installation of irrigation systems. 	3.0 (1)	<ul style="list-style-type: none"> Capital to buy collection center, cold room, and red tomato sorter 	1.0 (1)	<ul style="list-style-type: none"> Financing 	3.0 (1)	<ul style="list-style-type: none"> Not answered 	N/A N/A
		<ul style="list-style-type: none"> Lack of budget for operation 	3.0 (1)	<ul style="list-style-type: none"> Financing 	N/A N/A	<ul style="list-style-type: none"> Lack of space 	1.0 (1)		
Technical challenge		<ul style="list-style-type: none"> Lack of knowledge of insurance for farmers 	2.0 (1)	<ul style="list-style-type: none"> There is no phytosanitary 	3.0 (1)	<ul style="list-style-type: none"> Not answered 	N/A N/A	<ul style="list-style-type: none"> Not answered 	N/A N/A

1) Red cells in the table: Financial and technical challenges are scored with Very serious=3.0, Serious=2.0, Not so serious=1.0, and the total value is divided by the number of respondents as the score.

2) Blue cells in the table: The number of respondents is shown in parentheses.

Source: JICA survey team

Summary of Challenges and Potential of Tomato FVC

Mexico's climatic conditions are ideal for growing tomatoes, and the country is known as one of the world's leading exporters of tomatoes. Many of the players interviewed for this study cited challenges related to lack of financing and capital. The financing needs of each player are noted below.

(3) Financing Needs for Each Player

Future financing plans by each player were investigated and plans to obtain financing were confirmed for one material supplier (Figure 4.2.12). The loan amount is shown in Figure 4.2.13. There was a financing need of 7,580 USD (n=1) for the input supplier. 7,833 USD (n=3, highest value 10,000 USD, lowest value 3,500 USD) was also identified as an input supplier's past experience of loans.

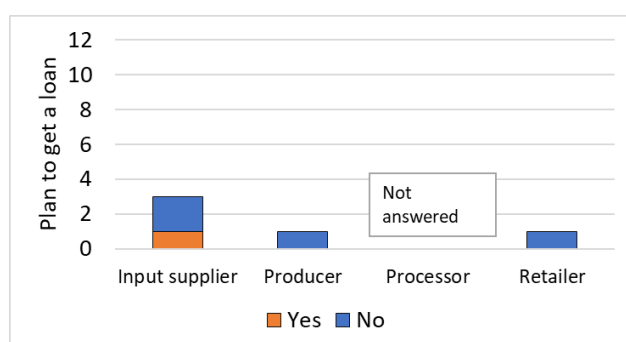


Figure 4.2.12 Tomato FVC Player's Financing Plan (Mexico)

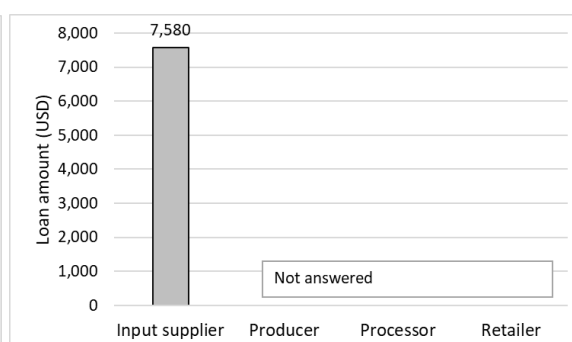


Figure 4.2.13 Tomato FVC Player's Amount of Loan Requested (USD) (Mexico)

Source: JICA survey team

Table 4.2.21 lists the purpose of the above loans. The purpose of the loan for the Input suppliers was to purchase trucks for transportation.

Table 4.2.21 Purpose of Loans on Tomato FVC Players (Mexico)

VC Player	Purpose of Loan
Input supplier	Purchase of trucks
Producer	NA
Processor	NA
Retailer	NA

Source: JICA survey team

(4) Existing Support System

Existing support in the tomato FVC in Mexico is summarized below. Any support was not identified for Input suppliers and processors, while for producers, all four respondents had received support in provision of facilities and machinery, or training related to their business.

Table 4.2.22 Support for Tomato FVC Players (Mexico)

VC Player	Availability of support	Support organization	Support
Input supplier	3/3	Government, insurance companies	Providing facilities, equipment, and other business-related training
Producer	1/2	Government	Provision of facilities and equipment

Processor	1/2	-	-
Retailer	-	-	-

1) "Number of players who responded that they have support/number of respondents" is indicated in the "support" column.

Source: JICA survey team

(5) Others

Introduction of Digital Technology and Green Technology

The tomato FVC players, both Input suppliers, producers, processors, and retailers cited the use of smartphones and tablets as examples of digital technology.

Table 4.2.23 Adoption of Digital Technology on Tomato FVC Players (Mexico)

VC Player	Percentage	DX	Digital technology adopts in the future
Input supplier	3/4	Use of Smartphones	Introduction of drones and disease identification apps
Producer	2/2	Use of smartphones and software	-
Processor	1/1	Use of apps and tablets	-
Retailer	1/1	Use of Smartphones	-

注1) For digital technology, the number of players/respondents who indicated that they have implemented the technology.

Source: JICA survey team

The input suppliers cited the introduction of recycling, producers cited the use of composting and recycling, and a processor cited the introduction of solar energy as examples.

Table 4.2.24 Adoption of Green Technology on Tomato FVC Players (Mexico)

VC Player	Percentage	Subsidies	Green Technology	Green technology adopts in the future
Input supplier	1/5	0/3	Recycle	-
Producer	2/2	-	Use of compost, recycling	-
Processor	1/1	-	Introduction of solar energy	-
Retailer	0/1	-	-	-

1) Number of players/respondents who indicated that they have implemented Green Technology

Source: JICA survey team

4) Tuna

(1) FVC Structure

Fisheries experts from the Fideicomisos Instituidos En Relacion Con La Agricultura (FIRA) was interviewed to understand the tuna FVC flow and various challenges in Mexico. FIRA is a government agency with a history of more than 60 years that provides loans for a wide range of agricultural and fishery products, and is one of the organizations with expertise in tuna FVC.

FVC Flow (Category: Mexico)

In tuna FVCs in Mexico, Input suppliers, fishermen (177,000), aggregators (2), processors (3), exporters (2), or retailers (for domestic consumption) are the main players of FVCs. This report describes FVCs for export, which are particularly important to FIRA.

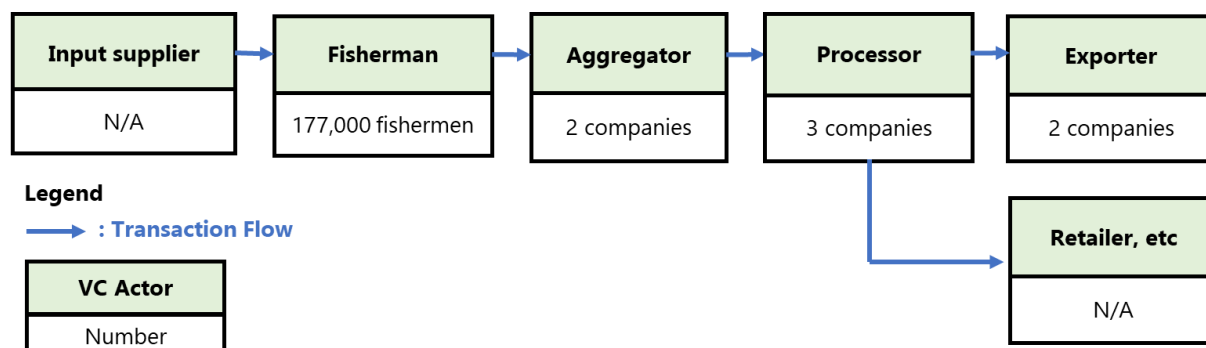


Figure 4.2.14 Tuna FVC Flow (Mexico)

Source: JICA survey team

Exit of Tuna FVC

In Mexico, 72% of tuna is for the domestic market, and the remaining 28% is for export. The breakdown of the domestic market is 20% for modern markets such as supermarkets and hotels, 10% for traditional markets such as private stores, and the remaining 70% is distributed to private companies that manufacture and sell processed products using tuna as raw materials. Exports were identified as the most important FVC exit. The reason for this was that the country's tuna is exported to more than 30 countries and is a major source of export in Spain and the U.S., generating a significant financial impact.

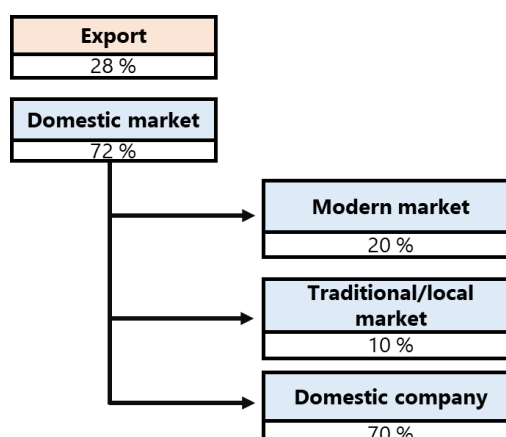


Figure 4.2.15 Percentage of Tuna for Export and Domestic Market (Mexico)

Source: JICA survey team

(2) Challenges for Each Player and Opportunities for Business Expansion

FIRA was interviewed using Questionnaire A regarding the challenges and opportunities for business expansion for each player. The survey using Questionnaire B was not conducted.

Results of Interviews with FIRA

In an interview with FIRA, the entire VC and each player of the challenges and opportunities for business expansion were surveyed. The main challenge is the cold chain of tuna from the fishermen to the aggregator results in a loss of quality, and the main opportunity is the high demand for tuna for export, especially canned tuna.

Table 4.2.25 Challenges and Opportunities for Each Player on the Tuna FVC (Mexico)

Overall VC Challenges and Opportunities	<p><u>Main challenge: Cold chain</u></p> <p>There are challenges on a cold chain from the fisherman to the collector, and in some cases, quality is compromised during this process.</p> <p><u>Main Opportunities: High demand for tuna for export</u></p> <p>The coronavirus outbreak caused tuna for export to slump for a time, but it is now recovering. Demand for canned tuna is significant.</p>
Input supplier	No answer
Fisherman ★★★	Lack of capital does not allow for investment in refrigeration facilities and other businesses.
Aggregator	The purchase price to fishermen is low.
Processors ★★	They have good communication among players with strong connections between upstream and downstream players of VCP.
Exporter ★	The most financial and approachable to other players in order to guarantee tuna quality for export.
Retailer	No answer

Source: JICA survey team

The importance of each player's challenges and potential (severity of the challenge and demand for assistance):

★★★ = most important, ★★ = second most important, ★ = third most important

4.2.3 Guatemala

In Guatemala, field surveys and questionnaire surveys were conducted on three target crops: cardamom, coffee, and broccoli. The results of each survey are summarized below.

1) Cardamom

(1) FVC Structure

Described below are the cardamom FVC flow and each issue identified based on the field survey.

FVC Flow (Category: Alta Verapaz Province)

To investigate cardamom FVCs in Guatemala, interviews were conducted with FEDECOVERA, a processing and exporting company located in Cobán, Alta Verapaz. FEDECOVERA is one of the leading cardamom’s FVCs in Guatemala, with 40% of domestic production and 20% of the world market share. (However, there are some FVCs that have a separate aggregator and flow to other exporters. Cardamom FVCs for export are described in this report.

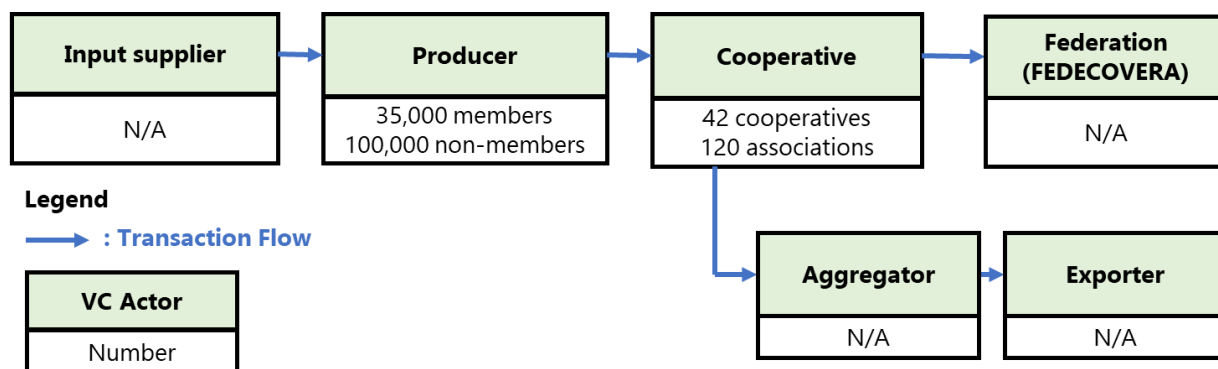


Figure 4.2.16 Cardamom FVC Flow (Guatemala)

Source: JICA survey team

Exit of Cardamom FVC

Almost all of FEDECOVERA's cardamom products that meet quality requirements are for export. In 2021, about 5 million tons of products were exported annually to North America, Europe, the Middle East, and India, with 14% of the total going to Japan. Twenty-seven percent of exported products are certified as organic, although almost all of the products are grown organically, only 27% of the products are certified organic cardamom and can be sold at high prices.

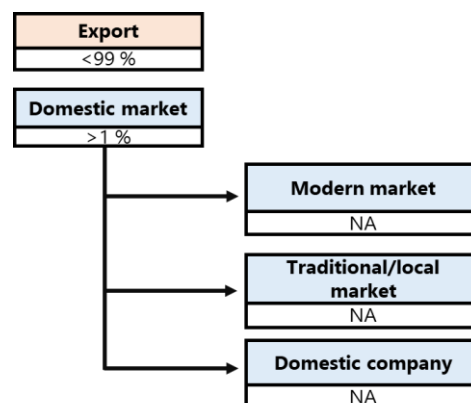


Figure 4.2.17 Percentage of Cardamom for Export and Domestic Market (Guatemala)

Source: JICA survey team

(2) Challenges Faced by Each Player and Opportunities for Business Expansion

The interview was conducted for each of the players in the field and on questionnaire B about the challenges and opportunities for business expansion.

Results of Interviews on Field Survey

In an interview with FEDECOVERA, the entire VC and each player's challenges and opportunities for business expansion were interviewed.

Table 4.2.26 Challenges and Opportunities for Each Player on the Cardamom FVC (Guatemala)

Overall VC Challenges and Opportunities	<p><u>Main issue: Lack of processing facilities</u> FEDECOVERA has a small processing facility compared to the amount purchased, processing only 5% of the total. As mentioned below, while the purchase price is higher than other suppliers, it takes about three months from purchase to payment.</p> <p><u>Main Opportunity: Highly profitable crop, contributes to the income of many small farmers</u> More than 95% of the farmers who grow cardamom in the area are small farmers and it is an important source of income.</p>
Producers ★★	FEDECOVERA provides training in cultivation and loans through the cooperative.
Aggregator (Association)	Some associations sell to other firms that offer immediate payment but low purchase price.
Processing Industry (FEDECOVERA)★★★	Processing has not kept pace compared to the amount of raw materials purchased.
Export (FEDECOVERA)★	It is a major domestic company, boasting 40% of domestic production and 20% of the world market share.

Source: JICA survey team

The importance of each player's challenges and potential (severity of the challenge and demand for assistance):

★★★ = most important, ★★ = second most important, ★ = third most important

Results of Interviews with Each Player

Based on the aforementioned VC flow, interviews were conducted with key players (input suppliers, producers, aggregators, and exporters) using Questionnaire B. The main issues identified as a result of the interviews with each player are summarized below.

Input suppliers

Main challenges: Rising prices of materials, competition from other suppliers, shortage of materials

Financial challenges: N/A

Technical challenges: N/A

Producers

Main challenges: Disease and pests, low production, high material costs, low cardamom prices

Financial challenges: Lack of capital, payment for materials, loans to pay production costs

Technical challenges: Lack of cardamom cultivation techniques

Aggregator

Main challenges: Competition from other aggregators, lower cardamom prices, decrease in the number of workers due to migrant workers

Financial challenges: No response

Technical challenges: No response

Exporter

Main issues: Drop down of international Cardamom price

Financial challenges: N/A

Technical challenges: N/A

A common issue cited by producers, aggregators, and exporters was the decrease in the selling price of cardamom, indicating that the selling price of cardamom for producers has decreased in response to the decrease in international prices. Regarding financial and technical challenges, input suppliers and exporters responded "N/A," while no responses were received from aggregators. For producers, lack of capital was cited as a financial challenge, and lack of technology and capacity related to production was cited as a technical challenge.

Table 4.2.27 Challenges for Each Player on the Cardamom FVC (Guatemala)

		Input supplier	Producer	Aggregator	Exporter
General challenge	1st	• Price increase	• Pest and diseases • Low production • High price of Agri-inputs • Cardamom price drop	• Competition with other aggregators	• Drop in the international price of cardamom
	2nd	• Competition with other suppliers	• Low production • Increase pest and diseases • Cardamom price drop • Increase of price of Agri-inputs	• Price down of cardamom	• Increase in transport prices
	3rd	• Shortage of inputs	• Increase of Agri-inputs • Transport of product	• Migration of cardamom-producing farmers	• Decrease of crop yield
Financial challenge		• No	• Lack of capital • Payment for agri-inputs • Loan for covering production cost	• Not answered	• No
Technical challenge		• No	• Lack of technical capacities for the cardamom	• Not answered	• No

1) Red cells in the table: Financial and Technical challenges are scored with Very serious=3.0, Serious=2.0, Not so serious=1.0, and the total value is divided by the number of respondents as the score.

2) Blue cells in the table: Number of respondents is shown in parentheses.

Source: JICA survey team

Summary of Cardamom FVC Issues and Potential

The results of the field survey and questionnaire survey suggest that FEDECOVERA, the main local processor and exporter, has two issues: 1) the size of its processing facilities is small, and the volume of processing is not keeping pace with the volume of exported products, and 2) payment delay for three months after purchase although they purchase raw materials at a higher price than other companies. These two challenges suggest that there is a great need for funds. In interviews with each player, producers, processors, and exporters alike cited a decrease in the purchase price due to the decline in international prices.

(3) Financing Needs for Each Player

A survey of the future financing plans that each player has identified two producers and one aggregator with plans to obtain financing (Figure 4.2.18). The respective financing needs are shown in Figure 4.2.19. Producers had a financing need of USD 3,274 (n=2, highest value USD 9,823, lowest value USD 6,549) and aggregators had a financing need of USD 26,195 (n=1), with particularly high financing requests confirmed by processors. In terms of past experience with loans, USD 13,098 (n=1)

was identified for input suppliers, USD 8,186 (n=2, highest value USD 9,823, lowest value USD 6,549) for producers, USD 26,195 (n=1) for aggregators and USD 65,489 (n=1) for exporters.

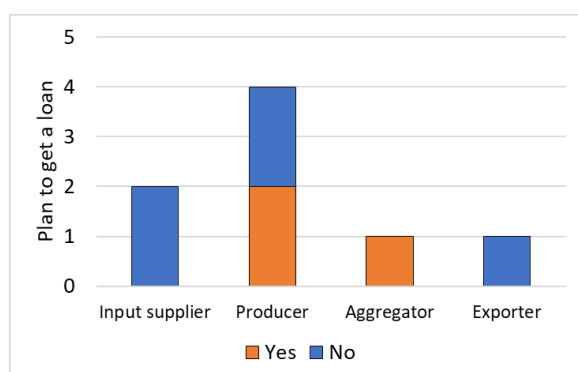


Figure 4.2.18 Cardamom FVC Player's Financing Plan (Guatemala)

Source: JICA survey team

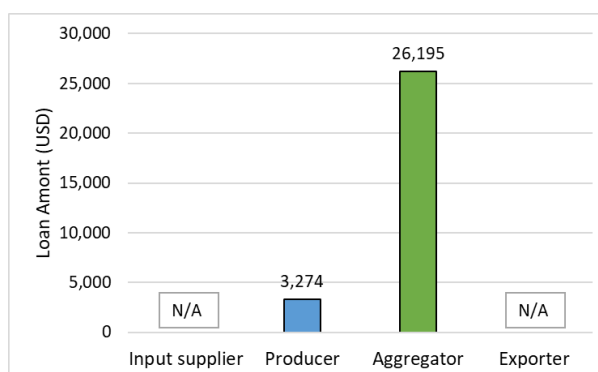


Figure 4.2.19 Cardamom FVC Player's Amount of Loan Requested (USD) (Guatemala)

Table 4.2.28 lists the objectives for the above loans. For producers, the loan objectives were to finance the purchase of materials and fertilizers, to pay workers, for aggregators to finance business expenses, and for processors to finance the purchase of cardamom, suggesting that the two players share a lack of working capital to run their businesses.

Table 4.2.28 Purpose of Loans by Cardamom FVC Players (Guatemala)

VC Player	Purpose of Loan
Input supplier	NA
Producer	Funds to purchase materials and fertilizers, pay workers
Aggregator	Funds to purchase cardamom
Processor	NA

Source: JICA survey team

(4) Existing Support System

As a result of interviewing each player about the existing support of the Cardamom FVC in Guatemala from other countries, their own country, NGOs, etc., the respondents indicated that there is support for training related to business from banks for input suppliers and for training related to business from NGOs for exporters. The results of the survey showed that input suppliers received business training from banks and exporters received business training from NGOs. No existing support system was identified for producers and aggregators.

Table 4.2.29 Support for Cardamom FVC Players (Guatemala)

VC Player	Availability of support	Support organization	Support
Input supplier	1/2	Banks	Training related to business
Producer	0/4	-	-
Aggregator	0/1	-	-
Exporter	1/1	NGO	Training related to business

1) "Number of players who responded that they have support/number of respondents" is indicated in the "support" column.

Source: JICA survey team

(5) Others

Introduction of Digital Technology and Green Technology

Any digital technology adoption was identified among the Guatemalan cardamom FVC players surveyed. No responses were obtained regarding technologies that they would like to introduce in the future.

Table 4.2.30 Adoption of Digital Technology for Cardamom FVC Players (Guatemala)

VC Player	Percentage	DX	Digital technology adopts in the future
Input supplier	0/1	-	No answer
Producer	0/4		No answer
Aggregator	0/1	-	No answer
Exporter	0/1	-	No answer

1) For digital technology, number of players/respondents who indicated that they have implemented the technology.
Source: JICA survey team

In this survey, the introduction of organic farming by producers and the promotion of organic farming by exporters were cited as examples of the introduction of green technology. No responses were received regarding technologies they would like to introduce in the future.

Table 4.2.31 Adoption of Green Technology for Cardamom FVC Players (Guatemala)

VC Player	Percentage	Subsidies	Green Technology	Green technology adopts in the future
Input supplier	0/1	0/1	-	No answer
Producer	3/4	1/4	Introduction of organic farming	No answer
Aggregator	0/1	0/1	-	No answer
Exporter	1/1	0/1	Promotion of organic farming	No answer

1) Number of players/respondents who indicated that they have implemented GreenTechnology.
Source: JICA survey team

2) Coffee

(1) FVC Structure

Described below are the coffee FVC flow and each issue identified during the field survey.

FVC Flow (Category: Guatemala)

The Guatemalan coffee FVC is mainly for export, with input suppliers, producers (125,000), processors, exporters, and retailers (for domestic consumption).

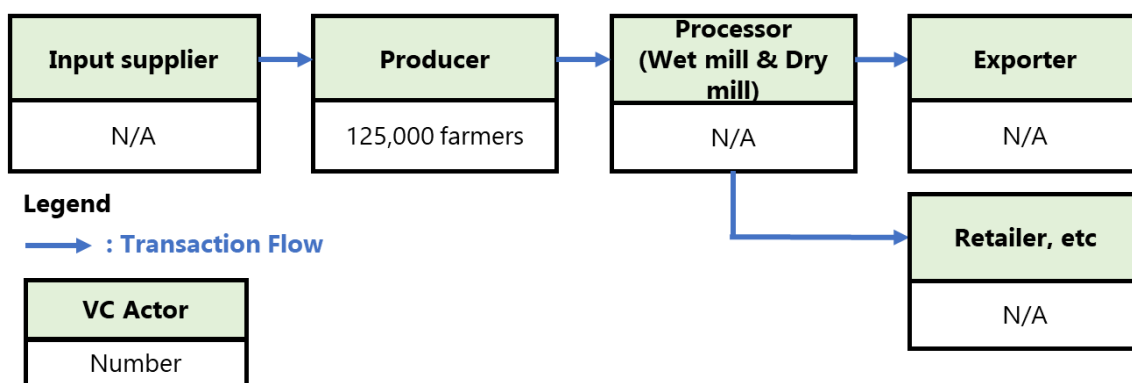


Figure 4.2.20 Coffee VC Flow (Guatemala)

Source: JICA survey team

Exit of Coffee FVC

Almost all coffee produced in Guatemala is for export. According to data from ANACAFE, which is in charge of promoting and selling coffee produced in the country for export, Guatemala is the 8th largest coffee exporter in the world (3% of the total), mainly to North America, but also to Japan (9% of the total).

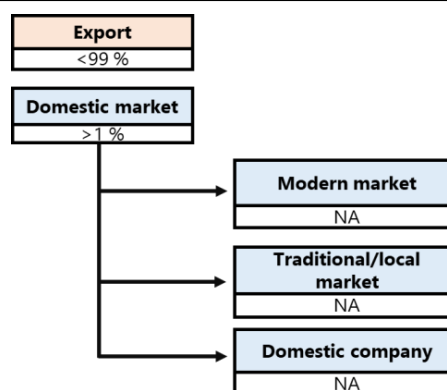


Figure 4.2.21 Percentage of Coffee for Export and Domestic Market (Guatemala)

Source: JICA survey team

(2) Challenges for Each Player and Opportunities for Business Expansion

The following section describes the results of field surveys and questionnaires conducted with each player to interview about the challenges and opportunities for business expansion.

Results of Field Survey

During the interviews, the challenges and opportunities for business expansion of the entire VC and each player were interviewed. The main challenge was that farmers did not have primary processing facilities (wet mills), and the main opportunity was to add value, such as specialty coffees. Processing facilities were identified as an issue by all players: producers, aggregators/processors, and exporters.

Table 4.2.32 Challenges and Opportunities for Each Player on the Coffee FVC (Guatemala)

Overall VC Challenges and Opportunities	<u>Main issues:</u> Farmers do not have primary processing facilities (wet mills), so they must sell coffee as cherry, which poses challenges in terms of selling price and transportation efficiency. <u>Main opportunity:</u> Value-added products, such as specialty coffees, can be sold at higher prices.
Producer ★★	The company does not have a primary processing facility (wet mill) and sells its products as cherries.
Aggregators/Processors ★★★	Concerns about environmental impact due to the large amount of water consumed at the primary processing facility (wet mill).
Exporter ★	Secondary processing (dry milling) may be performed by exporters, but the volume of processing has not kept pace.

Source: JICA survey team

Importance of issues and potentials of each player: ★★★ = most important, ★★ = second most important, ★ = third most important

Results of Interviews with Each Player

Based on the aforementioned FVC flow, interviews were conducted with key players (producers, aggregators, processors, retailers, and exporters) using Questionnaire B. The main issues identified are summarized below.

Producers

Main challenges: Low international prices, lack of capital, pests and diseases

Financial challenges: Insufficient capital for dry mills,

To purchase materials and increase production.

Technical challenges: Lack of new technology

Aggregators

Main challenges: Low production by small- and medium-scale farmers, decrease in the number of producers, rust disease, lack of labor due to migrants.

Financial challenges: N/A

Technical challenges: N/A

Processors

Main challenges: Labor shortages and increased production costs

Financial challenges: Unstable market prices, lack of capital to purchase roasters

Technical challenges: N/A

Retailers

Main challenges: Low production, rust, lack of technical assistance, high brokerage

Financial challenges: Insufficient capital

Technical challenges: N/A

Exporter

Main challenge: Disease and pests are reducing coffee productivity.

Financial challenges: N/A

Technical challenges: Lack of training on organic coffee cultivation

On the financial challenges, producers, processors, and retailers cited a lack of capital to operate and expand their businesses. On the technical challenges, disease (rust) was a common problem for all players: producers, aggregators, retailers, and exporters.

Table 4.2.33 Challenges for Each Player on the Coffee FVC (Guatemala)

		Producer	Aggregator	Processor	Retailer	or	Exporter
General challenge	1st	<ul style="list-style-type: none"> International price is dropped Lack of capital Pests and diseases due to climate change 	<ul style="list-style-type: none"> Little production in recent years of small and medium producers Less coffee growers in the area 	<ul style="list-style-type: none"> Labor shortages and increased production costs 	<ul style="list-style-type: none"> Low production amount Coffee rust 		<ul style="list-style-type: none"> Pests and diseases that affect coffee production
	2nd	<ul style="list-style-type: none"> Lack of capital for investment Pests and diseases Little demand for the product 	<ul style="list-style-type: none"> Coffee rust 	<ul style="list-style-type: none"> Not answered 	<ul style="list-style-type: none"> Lack of technical support 		<ul style="list-style-type: none"> Transport price is high
	3rd	<ul style="list-style-type: none"> Low Prices Pests and diseases Increase of fertilizer price 	<ul style="list-style-type: none"> Migration of farmers 	<ul style="list-style-type: none"> Not answered 	<ul style="list-style-type: none"> Intermediary price is high 		<ul style="list-style-type: none"> Price fluctuation
Financial challenge		<ul style="list-style-type: none"> Lack of capital to buy drying machinery Lack of money to buy inputs / to plant more 	<ul style="list-style-type: none"> No 	<ul style="list-style-type: none"> Unstable market price Lack of capital to buy coffee roaster 	<ul style="list-style-type: none"> Lack of sufficient capital 		<ul style="list-style-type: none"> No
Technical challenge		<ul style="list-style-type: none"> Lack of implementation of new technology 	<ul style="list-style-type: none"> No 	<ul style="list-style-type: none"> No 	<ul style="list-style-type: none"> No 		<ul style="list-style-type: none"> Lack of training for new organic coffee technologies

1) Red cells in the table: Financial and Technical challenges are scored with Very serious=3.0, Serious=2.0, Not so serious=1.0, and the total value is divided by the number of respondents as the score.

2) Blue cells in the table: The number of respondents is shown in parentheses.

Source: JICA survey team

Summary of Challenges and Potential of Coffee FVC

Interviews in the field indicated that producers do not have primary processing facilities (wet mills), so producers need to sell coffee as cherry, which poses challenges in terms of selling price and transportation efficiency, suggesting a bottleneck and financial need for FVC. Wet mills are large facilities that are difficult for individual producers to own, so they must be jointly financed and purchased by cooperatives or clusters. Many players in the questionnaire survey also stated that they have financial needs for the purpose of working capital and scaling up their businesses, and that rusting is a problem shared by all players in terms of technology.

(3) Financing Needs of Each Player

A survey of each player's future financing plans revealed that one producer, one aggregator, two processors, one retailer, and one exporter plan to obtain financing (Figure 4.2.22). For each of the financing needs, financing requests were identified for 15,717 USD (n=1) for producers, 1,965 USD (n=1) for aggregators, 9,168 USD (n=2, both equal amounts) for processors, 1,310 USD (n=1) for retailers, and 130,977 USD (n=1) for exporters. Loan requests were 10 times higher for exporters compared to other players.

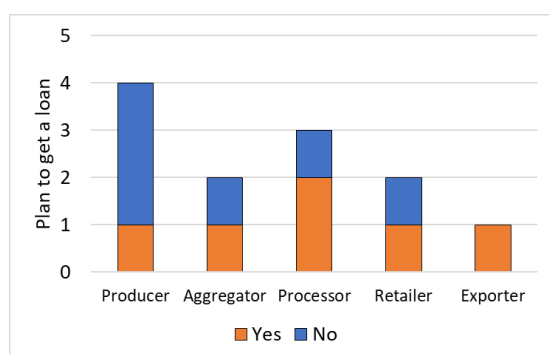


Figure 4.2.22 Coffee FVC Player's Financing Plan (Guatemala)

Source: JICA survey team

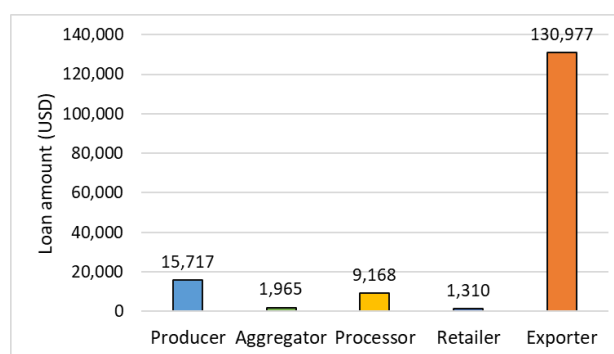


Figure 4.2.23 Coffee FVC Player's Amount of Loan Requested (USD) (Guatemala)

Table 4.2.34 shows the loan objectives for the above loans. For producers, the loan objectives were to improve coffee fields; for aggregators, to finance the purchase of coffee beans; for processors, to repair processing facilities and build warehouses; for retailers, to purchase materials; and for exporters, to purchase machinery and invest in processing technology for organic coffee.

Table 4.2.34 Purpose of Loan on Coffee FVC Players (Guatemala)

VC Player	Purpose of Loan
Producer	Coffee farm maintenance
Aggregator	Funds to purchase coffee
Processor	Restoration of processing facilities, construction of warehouse
Retailer	Purchase of Materials
Exporter	Purchase of machinery and investment in processing technology for organic coffee

Source: JICA survey team

(4) Existing Support System

The existing support structure in the Guatemalan coffee FVC is summarized below. Each player was

interviewed about the existence of support from other countries, their own country, NGOs, etc., and the results indicated that one processor received training on business from one union.

Table 4.2.35 Support for Coffee FVC Players (Guatemala)

VC Player	Availability of support	Support organization	Support
Producer	0/4	-	-
Aggregator	0/1	-	-
Processor	1/3	association	Provide training related to business
Retailer	0/2	-	-
Exporter	0/1	-	-

Note 1) "Number of players who responded that they have support/number of respondents" is indicated in the "support" column.
Source: JICA survey team

(5) Others

Adoption of Digital Technology and Green Technology

No digital technologies were identified by the coffee FVC players surveyed in this study as being implemented or desired to be implemented.

Table 4.2.36 Adoption of Digital Technology in Coffee FVC Players (Guatemala)

VC Player	Percentage	DX	Digital technology adopts in the future
Producer	0/4	-	-
Aggregator	0/2	-	-
Processor	0/3	-	-
Retailer	0/2	-	-
Exporter	0/1	-	-

Note 1) For digital technology, the number of players/respondents who answered that they have adopted the technology.
Source: JICA survey team

In terms of green technology, the use of organic fertilizers was identified as a case study among producers, soil analysis was conducted by processors, organic-derived pipes were used in some of the processing facilities, and exporters promoted the use of organic fertilizers to their producers. One processor indicated that there is a subsidy for the introduction of green technology.

Table 4.2.37 Adoption of Green Technology for Coffee FVC Players (Guatemala)

VC Player	Percentage	Subsidies	Green technology	Green technology adopts in the future
Producer	1/4	0/4	Use of organic fertilizers	Use of organic fertilizers
Aggregator	0/2	0/2	-	-
Processor	3/3	1/2	Conduct soil analysis, use pipes of organic origin in some processing facilities	-
Retailer	0/2	0/2	-	-
Exporter	1/1	0/1	Promoting the use of organic fertilizers	-

1) In Greentech, the number of players/respondents who answered that they have introduced the system.
Source: JICA survey team

3) Broccoli

(1) FVC Structure

The broccoli FVC flow and each issue in Guatemala based on the field survey are described below.

FVC Flow (Category: Chimaltenango)

In Chimaltenango, Guatemala, export is the main focus of broccoli FVCs, with input suppliers, producers, producers' cooperatives (responsible for collecting broccoli from cooperative members), aggregators (transporting broccoli collected by the cooperatives to the exporters), and exporters as the main axis of the FVC. This report describes the most typical FVC for export.

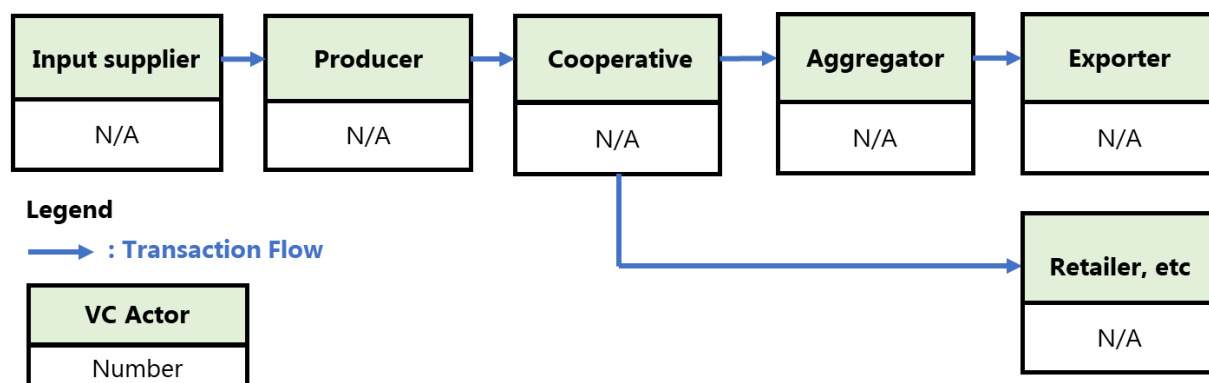


Figure 4.2.24 Broccoli FVC Flow (Guatemala)

Source: JICA survey team

Exit of Broccoli FVC

According to the Chimaltenango branch of the Institute of Agricultural Science and Technology (ICTA), which conducts research on broccoli and other vegetables, as well as grains, 95% of all broccolis in Guatemala is for export, and 5% that does not meet export quality standards is for the domestic market. The 5% that does not meet the quality requirements for export is distributed to the domestic market.

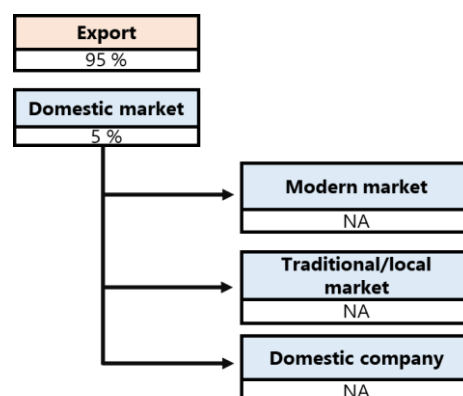


Figure 4.2.25 Percentage of Broccoli for Export and Domestic Market (Guatemala)

Source: JICA survey team

(2) Challenges for Each Player and Opportunities for Business Expansion

The field survey results and interviews with each player regarding the challenges and opportunities for business expansion are described below.

Results of Field Survey

Entire FVCs and each player’s challenges and opportunities for business expansion were interviewed. In the broccoli FVC, challenges were identified as a lack of irrigation facilities and greenhouses, inability to grow in the dry season, and poor cultivation techniques to meet export quality standards. The main opportunity was that broccoli is a low-risk commodity for producer groups with some established sales channels to exporters and is less risky to sell reliably than other crops.

Table 4.2.38 Challenges and Opportunities for Each Player on the Broccoli FVC (Guatemala)

Overall VC Challenges and Opportunities	<u>Major challenges</u> The lack of irrigation facilities and greenhouses prevents cultivation during the dry season. There are issues with cultivation techniques that meet export quality requirements. <u>Main Opportunities</u> For producer groups with some established sales channels to exporters, broccoli is a less risky commodity to sell with certainty than other crops such as tomatoes.
Producers ★★★	Lack of irrigation facilities and greenhouses limit cultivation during the dry season. About 60% of the production does not meet the quality requirements for export (in the case of the cooperatives interviewed).
Cooperative★	The aggregators are dissatisfied with the low purchase price. They offer loans to cooperative members.
Exporter★★	Since broccoli is not produced during the dry season in neighboring areas, it is purchased from another region.

Source: JICA survey team

Importance of issues and potentials of each player: ★★★ = most important, ★★ = second most important, ★ = third most important

Results of Interviews with Each Player

Based on the aforementioned VC flow, interviews were conducted with key players (producers, aggregators, and exporters) using Questionnaire B. The main issues identified as a result of the interviews with the players are summarized below.

Producers

Main challenges: High material prices, lack of capital to increase production, increased production costs

Financial challenge: Lack of capital for investment

Technical challenges: N/A

Producers

Main challenges: Small- and medium-scale producers are stopping production, increased transportation costs, lower demand for exports

Financial challenges: N/A

Technical challenges: N/A

Exporter

Main challenges: Insufficient production, low prices, insufficient supply relative to demand

Financial challenges: N/A

Technical challenges: Lack of production technology

Producers mentioned the lack of working capital for their businesses, and aggregators mentioned that small and medium-sized producers have stopped producing, and the decline in demand for export as a challenge. On the other hand, exporters indicated a lack of production and supply, which partially contradicts what aggregators mentioned.

Table 4.2.39 Challenges for Each Player on the Broccoli FVC (Guatemala)

		Producer	Aggregator	Exporter
General challenge	1st	<ul style="list-style-type: none"> High prices of agricultural inputs Lack of capital to expand production 	<ul style="list-style-type: none"> Small and medium producers are no longer producing 	<ul style="list-style-type: none"> Lack of production
	2nd	<ul style="list-style-type: none"> Lack of irrigation system Production cost increase 	<ul style="list-style-type: none"> The price of transportation has gone up a lot 	<ul style="list-style-type: none"> Low price of product
	3rd	<ul style="list-style-type: none"> Increase in transportation cost Little demand for product 	<ul style="list-style-type: none"> Low demand for export 	<ul style="list-style-type: none"> Little ability to respond to demand
Financial challenge		<ul style="list-style-type: none"> Lack of capital for investment 	<ul style="list-style-type: none"> No 	<ul style="list-style-type: none"> No
Technical challenge		<ul style="list-style-type: none"> No 	<ul style="list-style-type: none"> No 	<ul style="list-style-type: none"> Little technology for production

1) Red cells in the table: Financial and Technical challenges are scored with Very serious=3.0, Serious=2.0, Not so serious=1.0, and the total value is divided by the number of respondents as the score.

2) Blue cells in the table: The number of respondents is shown in parentheses.

Source: JICA survey team

Summary of Challenges and Potential of the Broccoli FVC

The field survey revealed that the lack of irrigation facilities and greenhouses limited cultivation during the dry season and that about 60% of the production did not meet export quality standards. Exporters also mentioned that broccoli was not produced during the dry season in neighboring regions, so need to purchase from other regions. In a questionnaire survey of each player, the following issues were identified as challenges: for producers, the rising cost of agricultural materials; for aggregators, the increasing cost of transportation; and for exporters, the lack of production.

(3) Financing Needs for Each Player

A survey of each player's financing plans identified three producers, three processors, and one exporter have plans to obtain financing (Figure 4.2.26). The respective financing needs are shown in Figure 4.2.27. An average of USD 3,187 (n=3, highest value USD 6,549, lowest value USD 1,048) financing needs were identified for producers and USD 13,098 (n=1) for aggregators. No responses were received from exporters. Regarding past loan experience, 652 USD (n=1) was identified for producers and 4,083,133 USD (n=1) for exporters.

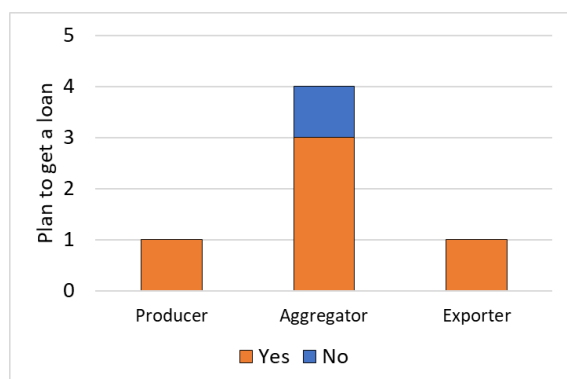


Figure 4.2.26 Broccoli FVC Player's Financing Plan (Guatemala)

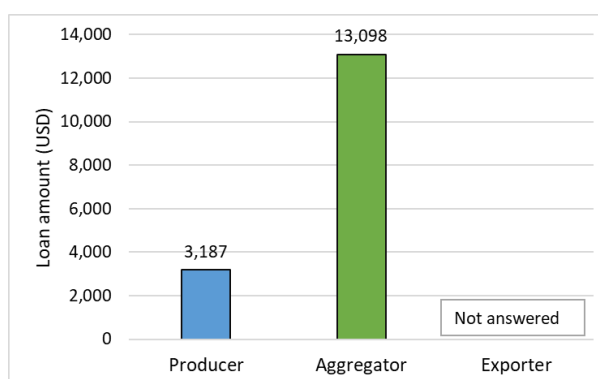


Figure 4.2.27 Broccoli FVC Player's Amount of Loan Requested (USD) (Guatemala)

Source: JICA survey team

Table 4.2.40 lists the financing objectives for the above loans. Producers cited the introduction of new varieties and the purchase of materials, aggregators cited the purchase of broccoli, and exporters cited the purchase of machinery and investment in technology as loan purposes.

Table 4.2.40 Purpose of Loans by Broccoli FVC Players (Guatemala)

VC Player	Purpose of Loan
Producer	Cost of introducing new varieties and purchasing materials
Aggregator	Purchase of Broccoli
Exporter	Investment in the purchase of machinery and technology

Source: JICA survey team

(4) Existing Support System

Existing support in the Guatemalan broccoli FVC is summarized below. Each player was interviewed about the existence of support from other countries, their own country, NGOs, etc., and the results indicated that a producer had received support such as loans and grants from bank, but no support was identified by other players.

Table 4.2.41 Support for Broccoli FVC Players (Guatemala)

VC Player	Availability of support	support organization	Support
Producer	2/5	Banks	Loans, grants, and other support
Aggregator	0/1	-	-
Exporter	0/1	-	-

1) "Number of players who responded that they have support/number of respondents" is indicated in the "support" column.

Source: JICA survey team

(5) Others

Introduction of Digital Technology and Green Technology

No cases of digital technology implementation were identified among the players in the Broccoli FVC in Guatemala where the survey was conducted.

Table 4.2.42 Adoption of Digital Technology in Broccoli FVC Players (Guatemala)

VC Player	Percentage	DX	Digital technology adopts in the future
Producer	0/4	-	-
Aggregator	0/1	-	-
Exporter	0/2	-	-

1) For digital technology, the number of players/respondents who answered that they have adopted the technology.
Source: JICA survey team

In the case of GreenTechnology, four of the five producers who responded to the survey indicated that they were implementing organic farming, but no examples of implementation could be identified among the other players.

Table 4.2.43 Adoption of Green Technology in Broccoli FVC Players (Guatemala)

VC Player	Percentage	Subsidies	Green Technology	Green technology adopts in the future
Producer	4/5	0/5	organic farming	na
Aggregator	0/1	0/1	-	-
Exporter	0/1	0/1	-	na

1) In Greentech, the number of players/respondents who answered that they have introduced the system.
Source: JICA survey team

4.2.4 Honduras

In Honduras, a questionnaire survey was conducted on three target crops: coffee, dairy (dairy products), and lemons. The results of each survey are summarized below.

1) Coffee

(1) FVC Structure

Honduran Coffee Institute (IHCAFE) was interviewed in order to understand the flow of coffee FVCs in Honduras and various issues. IHCAFE is an NGO that provides assistance in production, post-harvest processing, and marketing to improve the quality of coffee in the country and is one of the organizations with overall knowledge of coffee FVC in the country.

FVC Flow (Category: Honduras)

In the Honduran coffee industry, due to the high overall export volume, input suppliers, producers (120,000 households), aggregators (580 companies), and exporters (100 companies) are the mainstays of the FVC. Some VCs do not involve aggregators or exporters, but the majority do, and those included in this report are described as the most typical VCs.

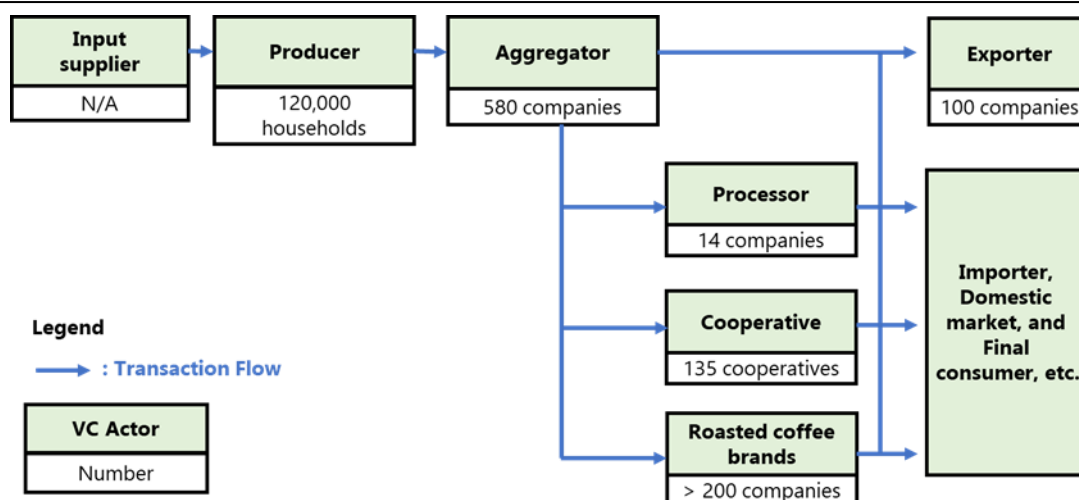


Figure 4.2.28. Coffee FVC Flow (Honduras)

Source: JICA survey team

Exit of Coffee FVC

90% of Honduran coffee is exported, and the remaining 10% is distributed to the domestic market. Within the domestic market, 60% is distributed to modern markets such as supermarkets and hotels, 20% to traditional markets such as private stores, and the remaining 20% to other private companies. The most challenging outlet on the FVC was identified as export, which accounts for 90% of the sales volume. The reason for this is that the unit price of export value is lower than in other countries, and producers have lower profits from this, so solving this issue is of high importance.

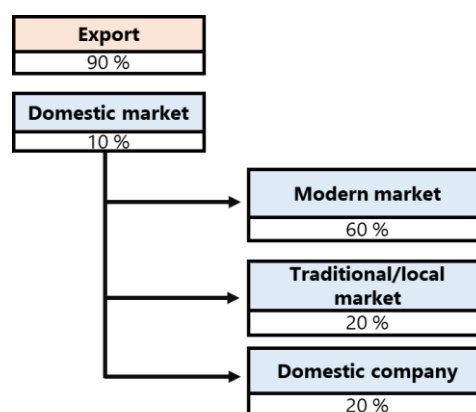


Figure 4.2.29 Percentage of Coffee for Export and Domestic Market (Honduras)

Source: JICA survey team

(2) Challenges for Each Player and Opportunities for Business Expansion

IHCAFE and each FVC player were interviewed to grasp the challenges and opportunities for business expansion.

Results of interviews with IHCAFE

The interview with IHCAFE revealed that the main challenges facing the FVC were price instability and labor shortages. The specialty coffee as a high-value-added product was identified as a potential. Producers were selected as the most challenged players on the FVC due to low selling prices and high production costs. Both aggregators and exporters also pointed out that they could not collect quality coffee beans, which is connected to the challenges in production.

Table 4.2.44 Challenges and Opportunities for Each Player on the Coffee FVC (Honduras)

Overall VC Challenges and Opportunities	<p><u>Main challenges: price instability and labor shortages</u></p> <p>During the harvest season, sales decrease due to increased supply. In addition, labor shortages for harvesting and farm management are becoming more severe each year, and producers are unable to perform farm work at the right time, affecting harvest yields.</p>
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	<p>Main Opportunity: Specialty Coffee</p> <p>Specialty coffee certification would allow producers to sell their coffee at a consistently high price. It also has the potential to commercialize coffee roasted in the traditional domestic market for export.</p>
input supplier	Fertilizers and chemicals are expensive. Maintaining low prices for materials will give small producers more finance and provide them with the funds to expand their businesses. An example of business expansion for producers was the purchase of land, although the monetary scale was large.
Producers ★★	Selling prices are low, and production costs are high. There is a need to rationalize production and develop new markets by adding value to coffee so that it is not overly influenced by market price swings.
Aggregators ★★★	The required quantity of high-quality beans is not being collected.
Exporter ★	Quality coffee beans should be separated and sold at higher prices to return profit to each producer. However, the quantity of quality coffee beans is not enough.

Source: JICA survey team

Importance of issues and potentials of each player: ★★★ = most important, ★★ = second most important, ★ = third most important

Results of Interviews with Each Player

Based on the aforementioned VC flow, interviews were conducted with key players (equipment and input suppliers, producers, aggregators, and exporters) using Questionnaire B. The main issues identified as a result of the interviews with each player are summarized below.

Input suppliers

Main challenges: Market uncertainty, price volatility of materials, lack of cash flow

Financial challenges: Insufficient cash flow

Technical challenges: Need for training for staff and insufficient number of staff

Producers

Main challenges: Low purchase price of coffee beans and labor shortage

Financial challenges: Insufficient cash flow

Technical challenges: No wet/dry mills

Aggregators

Main challenges: High competitiveness, lack of labor, insecure cash management

Financial challenges: Insufficient capital

Technical challenges: Low productivity of beans, no wet or dry milling

Exporter

Main challenges: Typhoons caused roads to collapse, making transportation difficult.

Financial challenges: Rising prices due to inflation

Technical challenges: N/A

Of the target players, only producers selected "very serious" for financial or technical challenges, suggesting a high need for technical and financial support, with low coffee selling price, lack of cash flow (1 out of 3), and lack of technical skills of workers cited as challenges. Similarly, input suppliers and aggregators identified a lack of cash flow as a challenge.

Table 4.2.45 Challenges for Each Player on the Coffee FVC (Honduras)

		Input supplier	Producer	Aggregator	Exporter
General challenge	1st	<ul style="list-style-type: none"> Market uncertainty Price fluctuation Lack of cash flow 	<ul style="list-style-type: none"> Price fluctuation Labor shortage 	<ul style="list-style-type: none"> High competition Lack of workforce To keep cash safely 	<ul style="list-style-type: none"> Damaged roads because of tropical storms
	2nd	<ul style="list-style-type: none"> Trend fluctuation Lack of supplies 	<ul style="list-style-type: none"> Access to better markets Cash flow, Agri inputs, Labor shortage 	<ul style="list-style-type: none"> No equipment to dry coffee High competition Bad road 	<ul style="list-style-type: none"> Lack of government support
	3rd	<ul style="list-style-type: none"> Lack of supplies Lack of technology 	<ul style="list-style-type: none"> Labor shortage Price of coffee Climate change 	<ul style="list-style-type: none"> Lack of capital To keep quality and consistency of coffee 	<ul style="list-style-type: none"> No education support for producers
Financial challenge		<ul style="list-style-type: none"> Lack of cash flow 	<ul style="list-style-type: none"> Cash flow Price of coffee 	<ul style="list-style-type: none"> Lack of Capital Expansion of business 	<ul style="list-style-type: none"> Inflation
Technical challenge		<ul style="list-style-type: none"> Need of Staff training 	<ul style="list-style-type: none"> Wet and dry milling infrastructure 	<ul style="list-style-type: none"> Low productivity of coffee at farm level 	
		<ul style="list-style-type: none"> Lack of staff 	<ul style="list-style-type: none"> Unskilled labors 	<ul style="list-style-type: none"> Lack of technique and staff No wet and dry mill 	<ul style="list-style-type: none"> Nothing

1) Red cells in the table: Financial and Technical challenges are scored with Very serious=3.0, Serious=2.0, Not so serious=1.0, and the total value is divided by the number of respondents as the score.

2) Blue cells in the table: The number of respondents is shown in parentheses.

Source: JICA survey team

Summary of Challenges and Potential of Coffee FVC

In terms of the challenges identified by IHCAFE and the challenges mentioned by each player, the unstable selling price of coffee beans and labor shortage were pointed out both in terms of production. The interviews with each player also indicated that producers highly need financial and technical support. Regarding the low selling price of coffee beans, IHCAFE identified high value-added coffee by promoting specialty coffee and market development as a possible remedy.

(3) Financing Needs for Each Player

A survey of each player's future financing plans revealed that three producers, one aggregator, and one exporter had plans to obtain financing (Figure 4.2.30). The dollar value of their respective financing needs is shown in Figure 4.2.31. Producers had an average financing need of 81,663 USD (n=4, all the same amount) and aggregators had the same amount of financing need of 81,663 USD (n=1), indicating that both producers and aggregators were requesting high amounts of financing. No responses were received from exporters. Producers and aggregators had received loans of 103,000 USD and 244,5000 USD in the past, respectively, indicating a high demand for financing for capital investment and other purposes.

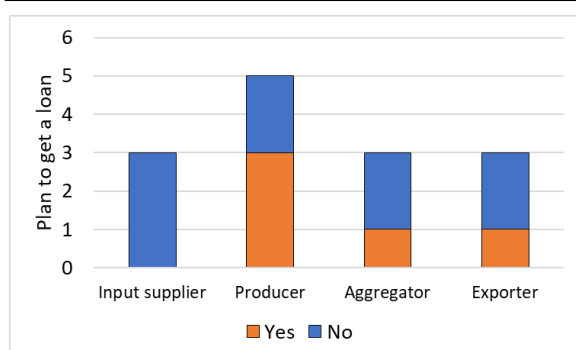


Figure 4.2.30 Coffee FVC Player's Financing Plan (Honduras)

Source: JICA survey team

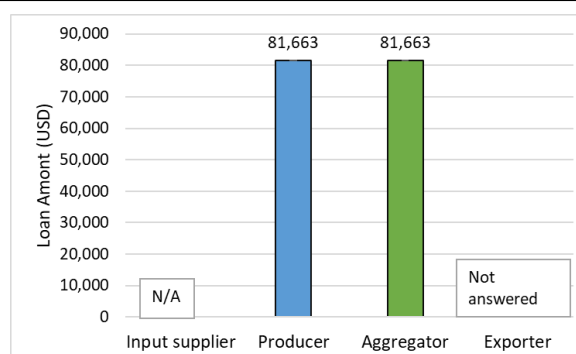


Figure 4.2.31 Coffee FVC Player's Loan Amount Requested (USD) (Honduras)

Table 4.2.46 lists the objectives for the above loans. It is revealed that producers need loans to expand their business in anticipation of tourists, while aggregators need loans to farmers and for capital to purchase coffee beans. The aggregators raised the purpose of loans to farmers and capital to procure coffee beans, indicating that in some cases aggregators have a financing function for farmers. It is assumed that this is due to the fact that farmers are unable to obtain loans due to land ownership issues. In addition, even for exporters for which data on the amount of financing demand was not available, the purpose of financing was to expand warehouses for coffee storage, suggesting the possibility that the financing scale is large.

Table 4.2.46 Coffee FVC Players' Intended Use of Loans (Honduras)

VC Player	Purpose of Loan
Producer	Business expansion and production expansion for tourism purposes (agro tourism)
Aggregator	Loans to producers and funds for procurement of coffee beans
Exporter	Expansion of warehouses for coffee storage

Source: JICA survey team

(4) Existing support system

This section summarizes the existing support in the Honduran coffee FVC. As a result of interviewing each player regarding the existence of support from other countries, their own countries, NGOs, etc., it was found that one out of two input suppliers received financial support such as subsidies and loans, and three out of three exporters received technical training and information support. No producers or aggregators were identified as receiving support.

Table 4.2.47 Support for Coffee FVC Players (Honduras)

VC Player	Availability of support	Support organization	Support
input supplier	1/2	No answer	Financial assistance such as grants and loans
producer	0/5	-	-
aggregator	0/5	-	-
exporter	3/3	Donors from other countries, NGOs	Technical training and provision of useful information in the business

Note 1) "Number of players who responded that they have support/number of respondents" is indicated in the "support" column.
Source: JICA survey team

(5) Other**Adoption of digital technology and green technology**

Among the Honduran coffee FVC players, input suppliers and exporters were implementing digital technology, with input suppliers using drones, smartphones, and tablets for information gathering, SAP systems (Enterprise Resource Planning (ERP)), and exporters Smartphones and tablets were being utilized. In the future, input suppliers expressed interest in using smartphone applications to provide appropriate advice to producers, and producers expressed interest in using drones to manage their fields.

Table 4.2.48 Adoption of Digital Technology on Coffee FVC Players (Honduras)

VC Player	Percentage	DX	Digital technology adopts in the future
Input supplier	2/3	Utilize drones, smartphones, and tablets to gather information; SAP system (Enterprise Resource Planning (ERP))	Use of smartphone applications that provide appropriate advice to producers.
Producer	0/5	-	Field management by drone
Aggregator	0/3	-	-
Exporter	2/3	Use of Smartphones and Tablets	-

注1) For digital technology, the number of players/respondents who responded that they have support.

Source: JICA survey team

Input suppliers, producers, and exporters had implemented green technology and were collecting empty bottles and plastic products. One player was identified among exporters who indicated that they had received subsidies from the introduction of green technology.

Table 4.2.49 Adoption of Green Technology on Coffee FVC Player (Honduras)

VC Player	Percentage	Subsidies	Green Tchnology	Green technology adopts in future
Input supplier	2/3	0/3	Empty bottles, cloth recycling	Increased collection of empty bottles and use of clean energy
Producer	3/5	0/5	Collection of plastic products	-
Aggregator	0/3	-	-	-
Exporter	1/3	1/3	No answer	No answer

注1) For digital technology, the number of players/respondents who responded that they have support.

Source: JICA survey team

2) Dairy Products**(1) FVC Structure**

In order to understand the dairy FVC flow and various issues in Honduras, The Honduran Chamber of Milk (CAHLE), which supports milk production, dairy processing, and marketing was interviewed.

FVC Flow (Category: Honduras)

In Honduras, input suppliers, producers (70,000 households), aggregators (135), processors (approx. 450-600), and retailers are the mainstays of the dairy FVC, and processors can be broadly classified into large commercial and traditional private processors.

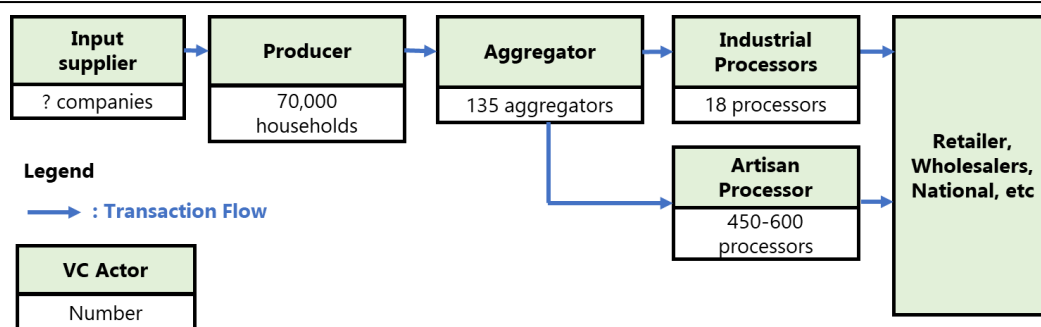


Figure 4.2.32 Dairy VC Flow (Honduras)

Source: JICA survey team

Exit of Dairy FVC

In Honduras, dairy (milk) production is 7% for export and 93% for the domestic market. Within the domestic market, 35% is in traditional markets such as private stores, and 65% is in the private sector. Of these, export was chosen by CAHLE as the most challenging FVC outlet. The reason given was that aiming for quality for export would create an awareness of quality improvement among producers and processors.

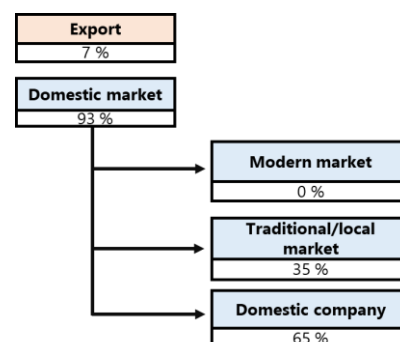


Figure 4.2.33 Percentage of Dairy Products for Export and Domestic Market (Honduras)

Source: JICA survey team

(2) Challenges for Each Player and Opportunities for Business Expansion

Results of Interviews with CAHLE

In interviews with CAHLE, the entire VC and each player’s challenges and opportunities for business expansion were interviewed. The entire FVC identified is a lack of access to credit. Three challenges were identified in the production sector: lack of technology, lack of workers and qualified personnel, and lack of scientific research on applicable technology. Producers were identified as the players with the most challenges on the FVC, and the reasons given were the difficulty in obtaining raw materials (feed) throughout the year and unstable productivity during the summer months when temperatures are higher. Processors cited that "the majority of those responsible for processing plants lack confidence in the quality of their own product (milk)." In addition, many issues were mentioned, such as "lack of sufficient facilities to process products other than milk," and "high production costs (electricity, agricultural materials, and equipment).

Table 4.2.50 Challenges and Opportunities for Each Player on the Dairy FVC (Honduras)

Overall VC Challenges and Opportunities	<p><u>Main challenges: Lack of access to production sites and credit</u></p> <p>Three challenges at the production site are lack of technology, lack of workers and qualified personnel, and lack of scientific research on technology applicable to the site, as well as a lack of access to funds as a challenge for the VC.</p> <p><u>Key Opportunities: Significant room for development</u></p> <p>Like traditional markets in the U.S. and Spain, the Honduran dairy VC is underdeveloped and has high development potential.</p>
Producers ★★★	Raw materials are difficult to obtain throughout the year. Also, productivity is unstable during the summer.
Processors ★★	The majority of processing plant managers are not confident in the quality of their own product

	(milk). Mainly, the high acidity level has the greatest impact on quality. In addition, they do not have sufficient equipment to process products other than milk, and when they do own it, it is broken down, limiting their productivity. Furthermore, production costs (electricity, agricultural materials, equipment) are high.
aggregator	Milk cannot be collected consistently. Also, there are no quality control facilities and functions at the collection points.
wholesaler	The market is being squeezed by imported products, and there are few types of products and no value-added products.
Retailer ★	There is room for improvement in business practices and sales methods. In addition, competition is intense, and the number of family-owned, high-income retailers is declining.

Source: JICA survey team

Issues and potential facing each player: ★★★ = most important, ★★ = second most important, ★ = third most important

Results of Interviews with Each Player

Based on the aforementioned FVC flow, a survey was conducted for input suppliers, producers, processors, and retailers. The main challenges for each player, financial and technical, are summarized below.

Input suppliers

Main challenges: Rising prices of procured materials and small space.

Financial challenge: Low sales

Technical challenge: Lack of supply chain knowledge

Producers

Main challenges: High prices of agricultural equipment and materials, low income, labor shortage

Financial challenge: Low profitability

Technical challenges: Rotational grazing

Processors

Main challenges: Low production and high raw material costs

Financial challenges: Lack of capital and equipment

Technical challenges: Lack of processing skills

Retailer

Main challenges: No response

Financial challenges: High business costs and low sales

Technical challenges: N/A

Of the players, only the input suppliers chose "very serious" for financial or technical challenges, citing "low sales prices of dairy products and lack of technical skills of workers". "Lack of cash flow" was also selected as a highly serious issue, cited by three producers, indicating a high need for technical and financial support. "Lack of cash flow" was also an issue for input suppliers and aggregators.

Table 4.2.51 Challenges for Each Player on the Dairy FVC (Honduras)

		Input supplier	Producer	Processor	Retailer
General challenge	1st	<ul style="list-style-type: none"> Supply prices increased Limited space of the shop 	<ul style="list-style-type: none"> High input costs Technified workforce Low income 	<ul style="list-style-type: none"> Low production and high prices for the raw material 	Not answered
	2nd	<ul style="list-style-type: none"> Competition in the same area 	<ul style="list-style-type: none"> Lack of workforce and capital 	<ul style="list-style-type: none"> Not enough trained staff Price of the raw material 	
	3rd	<ul style="list-style-type: none"> Lack of variety of product 	<ul style="list-style-type: none"> Lack of workforce 	<ul style="list-style-type: none"> Unskilled staff 	
Financial challenge		<ul style="list-style-type: none"> Low sales 	<ul style="list-style-type: none"> Low profitability 	<ul style="list-style-type: none"> Lack of work capital and equipment 	<ul style="list-style-type: none"> Working capital to buy equipment and commodities
		<ul style="list-style-type: none"> Need of more supplies 			<ul style="list-style-type: none"> Rotational grazing
Technical challenge		<ul style="list-style-type: none"> Supply chains 			<ul style="list-style-type: none"> Nothing

1) Red cells in the table: Financial and technological challenges were scored as Very serious=3.0, Serious=2.0, Not so serious=1.0, and the total was divided by the number of respondents.

2) Blue cells in the table: The number of samples obtained is shown in parentheses.

Source: JICA survey team

(3) Financing Needs of Each Player

As each player's future financing plans, two input suppliers, one processor, and one retailer had plans to obtain financing, and producers didn't have plans to obtain financing (Figure 4.2.34). As for the amount of financing requested, no responses were received from processors, but an average of 61,247 USD (n=2, with a maximum value of 102,078 USD and a minimum value of 20,416 USD) was reported by input suppliers, and 4,083 USD (n=1) was reported by retailers, indicating that input suppliers were requesting higher amounts of financing (Figure 4.2.35). In addition, input suppliers had received 4,083 USD, producers 9,036,750 USD, and processors 40,831 USD in loans in the past.

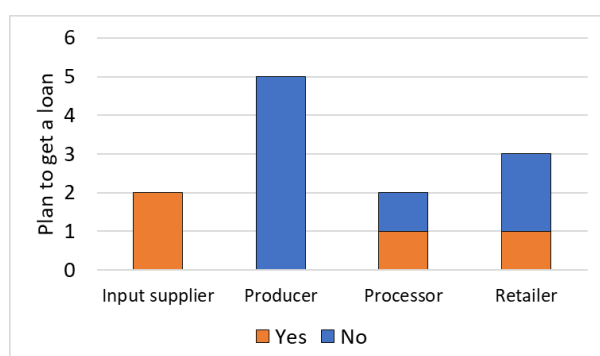


Figure 4.2.34 Dairy FVC Player's Financing Plan (Honduras)

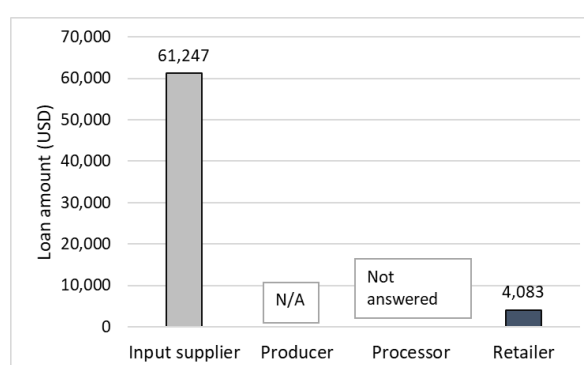


Figure 4.2.35 Dairy FVC Player's Loan Amount Requested (USD) (Honduras)

Source: JICA survey team

The purpose of the loans above is listed in the table below (Table 4.2.52). There were financing needs for business expansion and facility expansion for input suppliers, an increase in processed products for processors, and business expansion among retailers, all of which were related to the expansion of existing facilities and production. This suggests that while the production sector is unable to expand production sufficiently due to labor shortages and other factors, later sectors are facing the need to

expand production capacity to meet demand.

Table 4.2.52 Purpose of Loans on Dairy FVC Players (Honduras)

VC Player	Purpose of Loan
Input supplier	Business expansion and facility expansion
Processor	Increase in production of processed products
Retailer	Business expansion

Source: JICA survey team

(4) Existing Support System

As for the support of each dairy FVC player in Honduras, bank loans were identified for input suppliers, and business management training from financial institutions was identified for producers. Any support was confirmed for processors and retailers.

Table 4.2.53 Support for Dairy FVC Players (Honduras)

VC Player	Availability of support	support organization	Support
Input supplier	1/3	Banks	loan
Producer	1/5	financial institutions	Business Management Training
Processor	0/2	-	-
Retailer	0/3	-	-

1) "Number of players who responded that they have support/number of respondents" is indicated in the "support" column.

Source: JICA survey team

(5) Others

Adoption of Digital Technology and Green Technology

Input suppliers, producers, and retailers are implementing digital technology: input suppliers are using drones, smartphones, and tablets for weather forecasting, drones, and GIS, and for information gathering; producers are using smartphones and PCs to manage cattle growth; retailers are using smartphones and tablets.

Table 4.2.54 Adoption of Digital Technology in Dairy FVC Players (Honduras)

VC Player	Percentage	DX	Digital technology adopts in the future
Input supplier	1/3	Use of weather forecasts, drones, and GIS	-
Producer	2/5	Use of smartphones and computers to manage cattle growth	-
Processor	0/2	-	-
Retailer	2/3	Use of Smartphones and Tablets	Interest in business automation and digital technology in general

注1) For digital technology, the number of players/respondents who responded that they have support.

Source: JICA survey team

Examples of green technology implementation, such as recycling empty bottles, were identified among input suppliers, producers, and retailers. Fuel reduction through grazing among producers and use of biogas among retailers are also confirmed. Processors and retailers showed interest in solar energy.

Table 4.2.55 Adoption of Green Technology in Dairy FVC Players (Honduras)

VC Player	Percentage	Subsidies	Green Technology	Green technology adopts in the future
Input supplier	2/3	0/3	Recycling of empty bottles, promotion of organic farming	Plastic Bottle Recycling
Producer	2/5	1/5	Grazing reduces the amount of fuel needed for feeding, cleaning enclosures, and tractor use required for intensive grazing.	-
Processor	0/2	0/2	-	Solar Energy, Biofertilizers
Retailer	1/3	0/2	Biogas Utilization	solar energy

注1) For green technology, the number of players/respondents who responded that they have support.

Source: JICA survey team

3) Lemon

(1) FVC Structure

In the case of Questionnaire A on Lemon, the interview to specific organizations that would capture the entire FVC was not feasible. A survey for the FVC flow and lemon FVC exits was conducted based on telephone interviews with each player and statistical information.

Lemon FVC Flow (Category: Honduras)

In the lemon VC in Honduras for export, exporters buy directly from producers (>216 producers). On the other hand, for the domestic market, there are two types of FVCs: FVCs that follow the flow of producers, processors (<20 producers), and wholesalers (>150 wholesalers), and FVCs where producers sell lemons as fruit to wholesalers (900 sellers and over 250 stores).

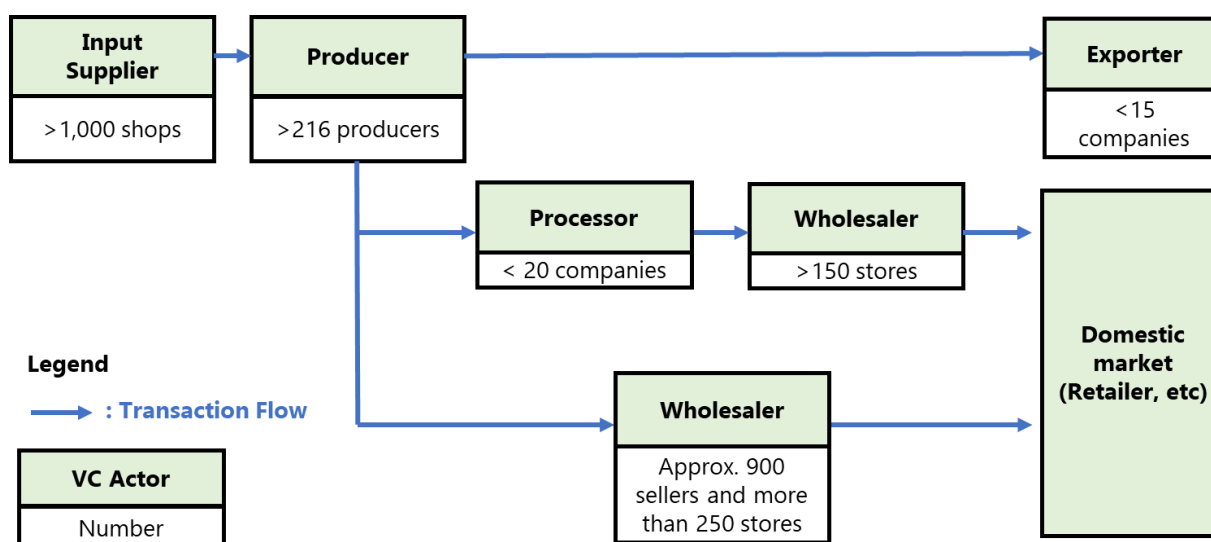


Figure 4.2.36 Lemon VC Flow (Honduras)

Source: JICA survey team

Exit of Lemon FVC

In Honduras, most lemons are consumed domestically, with 2% of the total for export and 98% for the domestic market. The domestic market consists of 51% of the modern market, 33% of the traditional market, and 16% of the domestic private sector. The total export share is very small, but this is reportedly due to a limited number of producers who want to export, as there are few export packing factories in the country, few lemons that meet quality standards for export, and a lack of knowledge about export among producers.

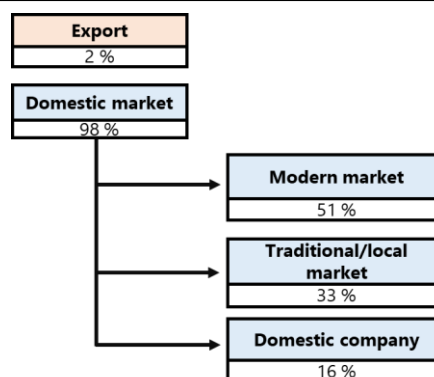


Figure 4.2.37 Percentage of Lemons for Export and Domestic Market (Honduras)

Source: JICA survey team

(2) Challenges for Each Player and Opportunities for Business Expansion

Results of the Survey

The overall challenges on the FVC included higher prices due to rising production costs and high sales volumes for wholesalers. In terms of players on the FVC, producers, processors, and exporters were considered to be important in that order. Among these, the producers' challenges are quality, labor, and developing sales outlets. The processors' challenges are the small size of the market and high investment in facilities, and the exporters' challenges are the lack of transportation from lemon plantations to markets and the lack of packing facilities for exports.

Table 4.2.56 Challenges and Opportunities for Each Player in the Lemon FVC (Honduras)

Overall VC Challenges and Opportunities	<p><u>Main challenges: Price of materials, high selling prices for wholesalers</u></p> <p>Input suppliers purchase and sell materials at high prices, which increases the cost of production for producers and affects the overall FVC. In addition, the price of lemons purchased from wholesalers is high, and many processors purchase lemons directly from producers.</p> <p><u>Main opportunities: expansion of lemons for export and development of major domestic customers</u></p> <p>Lemons for export must meet high-quality standards, increasing demand for agricultural materials and profits for input suppliers and providing producers with a stable source of sales and more lemon packing plants, leading to increased employment. For the domestic market, there are several supermarkets that buy directly from producers, so the challenge is for producers to develop a route to sell their products to major supermarkets. To do this, producers need to be able to clean and pack lemons using a net. In addition, there is potential for processors to develop by-products using lemons.</p>
Input supplier	Family-owned input suppliers cannot compete with large private companies. In addition, Russia's invasion of Ukraine has increased the price of agricultural materials worldwide.
Producer ★★★	The high cost of agricultural materials, especially fertilizers. When going through wholesalers, the selling price of lemons is lower. Many producers want to sell their products directly to supermarkets but do not always meet quality standards. Sometimes producers travel to cities to sell their lemons, increasing their expenditures due to high fuel prices. There is also a demand for technical assistance and a shortage of rural labor due to immigration to the US. Another major challenge is the inability of some producers to develop sales outlets.
Processor ★★	Although there are not many lemon processors, competition is intense. The market for ready-made lemon juice itself is small, as many customers prefer the taste of freshly squeezed juice and make lemon juice at home from the lemon fruit. The investment cost for processing facilities is high, and some processors are unable to obtain financing.
Wholesaler	Competition among wholesalers is intense. High prices for lemons sold in supermarkets. Several wholesalers surveyed stated that they are unable to expand their businesses due to lack of

	financing.
Exporter ★	There are lemons available for export, but there are issues with transportation from lemon plantations to exporters, and there are few packing facilities for export. Mexico is exporting lemons on a large scale, and although highly competitive, there is potential to expand the scale of exports.

Source: JICA survey team

Issues and potential facing each player: ★★★ = most important, ★★ = second most important, ★ = third most important

Results of Interviews with Each Player

Based on the aforementioned FVC flow, a survey was conducted among equipment and input suppliers, producers, processors, and wholesalers using questionnaire B. The main challenges for each player, financial and technical challenges, are summarized below.

Input suppliers

Main challenges: Rising prices of procured materials, insufficient cash flow

Financial challenges: Rising material prices, low sales, and payments to employees

Technical challenges: Insufficient machinery for bio-products

Producers

Main challenges: Low selling prices, labor shortages, expensive materials and pesticides

Financial challenges: High production costs, high fertilizer prices

Technical challenge: Lack of workers' skills

Processors

Main challenges: Management problems

Financial challenges: Rising purchase prices

Technical challenges: N/A

Retailer

Main challenges: Few products, price negotiations with retailers, lack of financing

Financial challenges: Severe Financial Conditions

Technical challenges: N/A

Producers mentioned high agricultural material prices as a challenge, but the input supplier also raised the issue of rising purchase prices. On the financial challenges, input suppliers also cited higher purchase prices and producers cited high production costs as a serious issue. One producer pointed to a lack of employee skills among producers, while no serious technical challenges were found among the other players.

Table 4.2.57 Challenges for Each Lemon FVC Player (Honduras)

		Input supplier	Producer	Processor	Wholesaler
General challenge	1st	• Supply prices increased	• Low selling price(High commission) • Marketing, labor shortage • High price of agri inputs and fertilizers	• Management issue	• Little production • Retailers want to buy our product at lower cost
	2nd	• Rent fee is expensive	• Lack of advice • Transport	• Not answered	• Lack of loan • Low monthly sales
	3rd	• Lack of cash flow	• Maintenance fee • Agri-supplies	• Not answered	• High competition
Financial challenge		• Low sales and employee's payment	• Price of fertilizer	• Cost price increase	• Severe economy
		2.0 (1)	1.7 (3)		
Technical challenge		• Price increases	• High production cost	• Nothing in particular	• Nothing in particular
		3.0 (1)	3.0 (1)		
		• Insufficient of machinery to create bio products	• Low selling price		
		1.0 (1)	2.0 (1)		

1) Red cells in the table: Financial and technical challenges were scored as Very serious=3.0, Serious=2.0, Not so serious=1.0, and the total was divided by the number of respondents.

2) Blue cells in the table: The number of samples obtained is shown in parentheses.

Source: JICA survey team

(3) Financing Needs for Each Player

Regarding future financing plans, only one input supplier had financing plans (Figure 4.2.38). The financing requirement was 40,831 USD (n=1) (Figure 4.2.39). In the past, there was financing experience of USD 16,333 and USD 40,831 for input suppliers and USD 817 for producers, respectively.

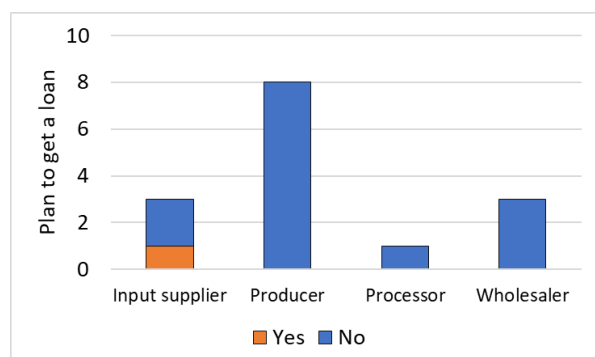


Figure 4.2.38 Lemon FVC Player's Financing Plan (Honduras)

Source: JICA survey team

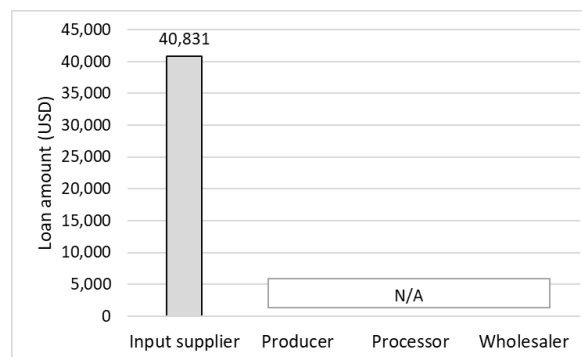


Figure 4.2.39 Lemon FVC Player's Loan Amount Requested (USD) (Honduras)

The purpose of the loans is described in the table below (Table 4.2.58). The purpose of the loans by the input supplier was to finance the purchase of materials. In other words, the purpose of the loans was to finance working capital needs.

Table 4.2.58 Purpose of Loan on Lemon FVC Player (Honduras)

VC Player	Purpose of Loan
Input supplier	Funds for the purchase of materials

Source: JICA survey team

(4) Existing support system

In the lemon FVC, no players were identified who indicated that they had access to assistance except input suppliers.

Table 4.2.59 Support for Lemon FVC Players (Honduras)

VC Player	Availability of support	Support organization	Support
Input supplier	1/3	financial institutions	Loans and other financial support
Producer	0/8	-	-
Processor	0/2	-	-
Wholesaler	0/3	-	-

1) "Number of players who responded that they have support/number of respondents" is indicated in the "support" column.

Source: JICA survey team

(5) Others

Adoption of Digital Technology and Green Technology

In terms of the use of digital technology, the use of smartphones and tablets was confirmed by input suppliers, and the DX for payments was confirmed for processors. No implementation cases were identified in production, and no responses were received from wholesalers.

Table 4.2.60 Adoption of Digital Technology in Lemon FVC Players (Honduras)

VC Player	Percentage	DX	Digital technology adopts in the future
Input supplier	2/3	Smartphone and tablet implementation	Use of business analysis tools
Producer	0/8	-	-
Processor	1/1	DXing of payments	-
Wholesaler	reply	-	-

注1) For digital technology, the number of players/respondents who responded that they have support.

Source: JICA survey team

Green technology implementation was confirmed by input suppliers, producers, and processors, and hydropower was implemented by producers. No responses were received from wholesalers.

Table 4.2.61 Adoption of Green Technology in Lemon FVC Players (Honduras)

VC Player	Percentage	Subsidies	Green Technology	Green technology adopts in the future
Input supplier	2/3	1/2	Sales and recycling of bio-products	Empty Bottle Recycling
Producer	1/6	0/5	Introduction of hydroelectric power generation	-
Processor	1/2	0/1	Empty Bottle Recycling	-
Wholesaler	No answer	No answer	-	-

注1) For digital technology, the number of players/respondents who responded that they have support.

Source: JICA survey team

4.2.5 El Salvador

In El Salvador, a questionnaire survey was conducted for three target crops: coffee, vegetables, and chicken. The results of each survey are summarized below.

1) Coffee

(1) FVC Structure

In order to understand the overall coffee FVC flow in El Salvador and each challenge, interviews were conducted with farmers. In El Salvador, it was impossible to interview government agencies and NGO organizations as in other countries, so interviews were conducted with benevolent farmers who interacted with other players in coffee production.

FVC Flow (Category: El Salvador)

Export is the mainstay of the coffee industry in El Salvador, with input suppliers, producers (20,000 farmers), aggregators, processors, and exporters being the mainstays of FVCs. The most typical export FVCs are described in this report.

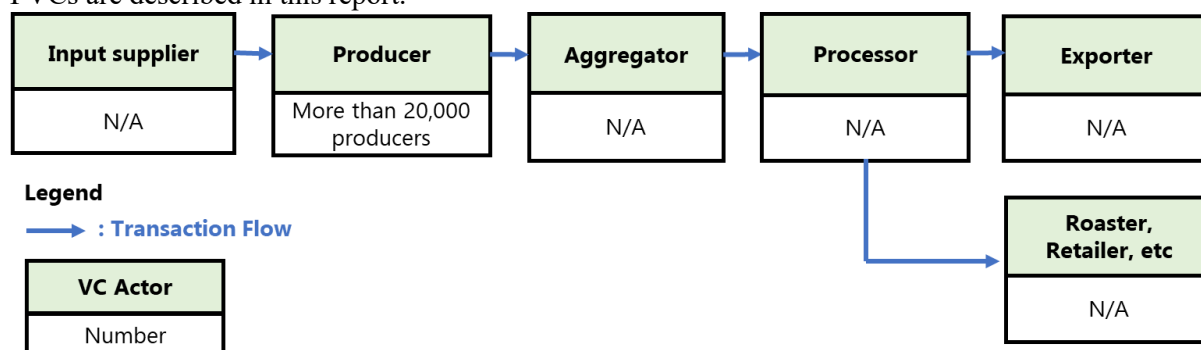


Figure 4.2.40 Coffee FVC Flow (El Salvador)

Source: JICA survey team

Exit of Coffee FVC

El Salvador's coffee is 80% exported, and the remaining 20% is distributed in the domestic market. In the domestic market, 60% is distributed to modern markets such as supermarkets and hotels, 20% to traditional markets such as private stores, and the remaining 20% to other private companies. The most challenging exit on the FVC was identified as export, which accounts for 90% of sales volume. This was because coffee for export has the highest selling price and is expected to improve farmers' livelihoods.

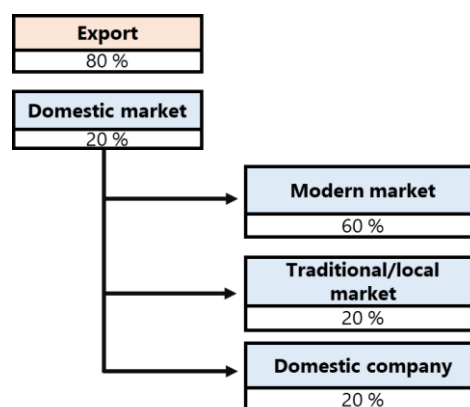


Figure 4.2.41 Percentage of Coffee for Exported and for the Domestic Market (El Salvador)

Source: JICA survey team

(2) Challenges for Each Player and Opportunities for Business Expansion

The interview was conducted based on the aforementioned VC flow and players on the challenges and opportunities for business expansion.

Results of Interviews

The entire FVC and each player were interviewed on challenges and opportunities for business expansion. The interviews revealed that the main challenge for the FVC as a whole is that the processing and roasting processes are dependent on private companies, and the potential for other players, such as farmers, to be able to perform processing and roasting. In addition, implementing agroforestry adds value to the process and was mentioned as an opportunity. Producers were selected as the most challenged players on the FVC due to a lack of knowledge of coffee bean marketing. For the other players, only the challenges of input suppliers were mentioned, and no responses regarding ranking were obtained.

Table 4.2.62 Challenges and Opportunities for Each Player on the Coffee FVC (El Salvador)

Overall VC Challenges and Opportunities	<p><u>Main challenges: Only private companies are involved in the processing and roasting process</u> Only private companies handle the processing and roasting of coffee beans, and producers have no choice but to sell coffee berries or green beans at a low price, resulting in low-profit margins for the producers. Other challenges include seedling aging, inefficient traditional farming methods, and the relatively high price of agricultural materials.</p> <p><u>Main Opportunities: Promotion of processing machinery and implementation of agroforestry</u> The ability of players outside the private sector, such as farmer associations, to perform processing and roasting will add diversity to the industry. Value can also be added through agroforestry practices.</p>
Input supplier	Compared to other commodities, agricultural material costs are high due to the large amount of inputs.
Producers ★★★	Lack of knowledge about coffee bean marketing.

Source: JICA survey team

Importance of challenges and potentials for each player: ★★★ = most important, ★★ = second most important, ★ = third most important (no answer after the second)

Results of Interviews with Each Player

Based on the aforementioned FVC flow, interviews were conducted with key players (producers, aggregators, processors, and exporters) using Questionnaire B. The main challenges identified as a result of the interviews with each player are summarized below.

Producers

Main challenges: Lack of wet mills, lack of labor, high production costs

Financial challenges: Inability to pay for materials, lack of funds

Technical challenge: Lack of market access

Aggregators

Main challenges: Lack of funds for business development

Financial challenges: Lack of access to financing and lack of funds

Technical challenges: N/A

Processors

Main challenges: Meeting customer demand, lack of funds

Financial challenge: Lack of funds for business expansion

Technical challenge: Lack of roasters

Exporter

Main challenges: Lack of containers due to Russia's invasion of Ukraine, lack of funds

Financial challenge: Insufficient funds

Technical challenges: N/A

All players interviewed cited lack of funds as a challenge, suggesting a high demand for funds throughout the coffee FVC in El Salvador. On the technical side, producers felt strongly challenged by the lack of market access. Exporters also cited the lack of containers due to Russia's invasion of Ukraine as a challenge.

Table 4.2.63 Challenges for Each Player on the Coffee FVC (El Salvador)

		Producer	Aggregator	Processor	Exporter
General challenge	1st	<ul style="list-style-type: none"> No coffee mills Lack of Workforce at the field 	<ul style="list-style-type: none"> No fund to investment for the business development 	<ul style="list-style-type: none"> To meet the customer's request Can't reach end customers Lack of financing to grow the business 	<ul style="list-style-type: none"> Exportation limit (Little availability of containers) due to conflict of Ukraine and Russia No funds to expand export
	2nd	<ul style="list-style-type: none"> No regulation on the price of coffee (Fluctuation of International coffee price) Production costs 	<ul style="list-style-type: none"> Not answered 	<ul style="list-style-type: none"> Employee's motivation Price fluctuation of coffee 	<ul style="list-style-type: none"> Shortage of containers to export Very long procedures to obtain export permits
	3rd	<ul style="list-style-type: none"> Lack of knowledge to improve the process Price of fertilizer 	<ul style="list-style-type: none"> Not answered 	<ul style="list-style-type: none"> Not answered 	<ul style="list-style-type: none"> Not answered
Financial challenge		<ul style="list-style-type: none"> Can't cover with the payment for supplies 	<ul style="list-style-type: none"> Lack of access to credit 	<ul style="list-style-type: none"> Need for digitization of the business 	
		<ul style="list-style-type: none"> Lack of financial resources to invest 	<ul style="list-style-type: none"> No capital to be able to expand the places for business 	<ul style="list-style-type: none"> Keep prices in line with production No funds to expand operations 	<ul style="list-style-type: none"> Lack of funds for expansion
Technical challenge		<ul style="list-style-type: none"> Unable to reach end markets 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Have more expandability, lack of roasters 	<ul style="list-style-type: none"> N/A

1) Red cells in the table: Financial and technical challenges are scored with Very serious=3.0, Serious=2.0, Not so serious=1.0, and the total value is divided by the number of respondents as the score.

2) Blue cells in the table: The number of respondents is shown in parentheses.

Source: JICA survey team

Summary of Challenges and Potential of Coffee FVC

Throughout the coffee FVC players, lack of funds and lack of access to financing were mentioned. For producers, technical and financial challenges were observed, including a lack of knowledge of coffee bean marketing and a lack of access to markets.

(3) Financing Needs for Each Player

A survey of each player's future financing plans revealed that one producer, two aggregators, three processors, and one exporter had plans to obtain financing (Figure 4.2.42). The dollar value of their respective financing needs is shown in Figure 4.2.43. Producers had a financing need of 40,000 USD (n=1), aggregators 11,750 USD (n=2, maximum value 20,000 USD, minimum value 3,500 USD), processors 20,000 USD (n=2, same value), and exporters 20,000 USD (n=1), with producers having the highest loan requests in this survey. No responses were received regarding past experience of receiving loans.

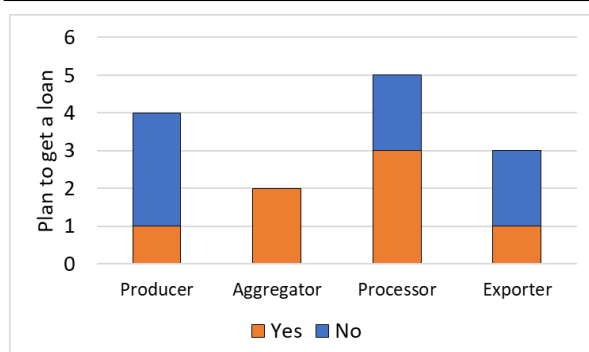


Figure 4.2.42 Coffee FVC Player's Financing Plan (El Salvador)

Source: JICA survey team

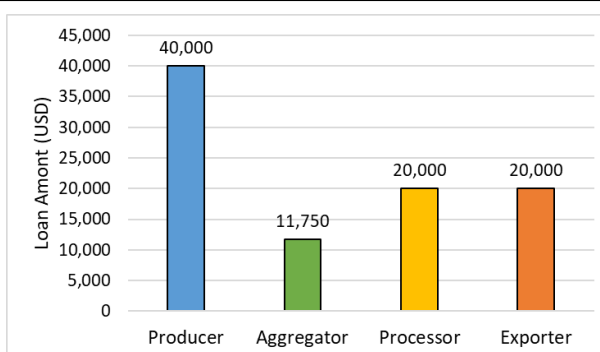


Figure 4.2.43 Coffee FVC Player's Amount of Loan Requested (USD) (El Salvador)

Table 4.2.64 shows the loan objectives for the above loans. The producers' financing needs were for investments to expand coffee production, aggregators to purchase wet and dry mills, processors to upgrade or purchase infrastructure and processing machinery, and exporters to expand export markets and sales volume. Both aggregators and processors cited purchasing processing facilities and machinery, suggesting that mechanization is a challenge and in high demand in the country's coffee FVC.

Table 4.2.64 Purpose of Loans on Coffee FVC Players (El Salvador)

VC Player	Purpose of Loan
Producer	Investment in business
Aggregator	Funds to purchase wet and dry mills
Processor	Improve infrastructure and processing machinery; purchase machinery
Exporter	Expand export markets and sales volume

Source: JICA survey team

(4) Existing Support System

This section summarizes the existing support in the El Salvador Coffee FVC. After interviewing each player about the existence of support from other countries, NGOs, etc., it was confirmed that producers received training from the union in one out of four cases, while the other players received technical and financial training from the government.

Table 4.2.65 Support for Coffee FVC Players (El Salvador)

VC Player	Availability of support	Support organization	Support
Producer	1/4	association	Provide training on business and financial matters
Aggregator	1/2	government	No answer
Processor	2/5	government	Sharing useful information, training on technical challenges
Exporter	2/3	government	Provide business and financial training and compensation for wage increases

1) "Number of players who responded that they have support/number of respondents" is indicated in the "support" column.

Source: JICA survey team

(5) Other

Adoption of Digital Technology and Green Technology

In the El Salvador country coffee FVC players, all producers, aggregators, processors, and exporters

have adopted digital technology, with input suppliers using the Internet to check international coffee prices, communicate with coffee producers around the world through social networking sites, check weather radar information, Smartphones and the Internet were used by aggregators, smartphones and computers were used by processors, smartphones and computers were used by processors, mapping of customers were used by processors, and account systems, drones, smartphones, and computers were used by exporters. The percentage of adoption was high.

Table 4.2.66 Adoption of Digital Technology on Coffee FVC Players (El Salvador)

VC Player	Percentage	DX	Digital technology adopts in the future
Producer	3/4	International coffee prices on the Internet, communication with coffee producers around the world through SNS, and checking weather radar information, smartphones, and the Internet.	-
Aggregator	2/2	Use of Smartphones and Computers	-
Processor	4/5	Smartphone and computer implementation and customer mapping	Account System Integration
Exporter	3/3	Use of account systems, smartphones, and computers	-

1) For digital technology, the number of players/respondents who responded that they have support.
Source: JICA survey team

All players surveyed, including producers, aggregators, processors, and exporters, adopted green technology, and all four of the producers, including those who did not use field burning and organic farming, had some form of green technology. Aggregators and processors used hulls and other materials from coffee as organic fertilizer.

Table 4.2.67 Adoption of Green Technology on Coffee FVC Players (El Salvador)

VC Player	Percentage	Subsidies	Green technology	Green technology adopts in the future
Producer	4/4	0/4	Introduce organic farming without burning the fields,	organic farming
Aggregator	1/2	0/2	Coffee grounds are used as organic fertilizer.	-
Processor	4/5	1/4	Coffee Husks as Organic Fertilizer	-
Exporter	1/3	0/3	Implementing water conservation and reforestation projects	-

1) Number of players/respondents who indicated that they have support for green technology.
Source: JICA survey team

2) Vegetables

(1) FVC Structure

Interviews were conducted with local agricultural engineers to understand the vegetable FVC flow and various challenges in El Salvador.

FVC Flow (Category: El Salvador)

Domestic consumption is the main type of vegetable in El Salvador, with input suppliers, producers, aggregators, wholesalers, and retailers being the mainstays of FVCs. The most typical FVC for domestic consumption is described in this report.

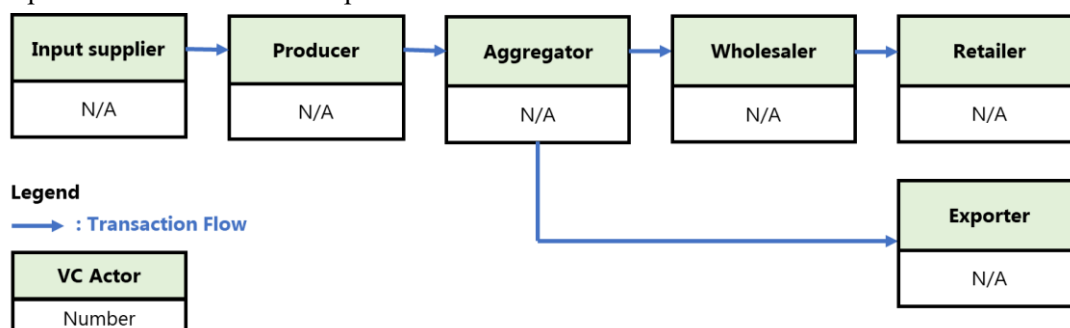


Figure 4.2.44 Vegetable FVC Flow (El Salvador)

Source: JICA survey team

Exit of Vegetable FVC

5% of El Salvador's vegetables are for export, and the remaining 95% are distributed in the domestic market. In the domestic market, 20% is distributed to modern markets such as supermarkets and hotels, and 80% to traditional markets such as private stores. Regarding the outlet on the VC, which is the most challenging of these markets, the respondents indicated that it is difficult to narrow it down to one, as each has different challenges.

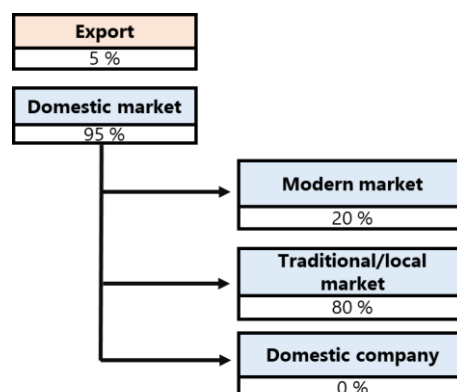


Figure 4.2.45 Percentage of Vegetables for Export and Domestic Market (El Salvador)

Source: JICA survey team

(2) Challenges for Each Player and Opportunities for Business Expansion

The interview was conducted to grasp the challenges and opportunities for business expansion for VC and each player.

Results of Interviews with Agricultural Technicians

The challenges and opportunities for business expansion on FVCs and each player were interviewed. As a result of the interviews, the main challenge for FVC as a whole was the competition with cheap imports due to the elimination of tariffs, and the main opportunity was the availability of vast land for vegetable cultivation and high-production technology, although production costs are high. Producers were selected as the most challenged players on the FVC due to the aforementioned high production costs and increasing competition from imported vegetables. For the other players, only the challenges of input suppliers were mentioned, and responses regarding ranking were not obtained.

Table 4.2.68 Challenges and Opportunities for Each Player on the Vegetable FVC (El Salvador)

Overall VC Challenges and Opportunities	<u>Main challenge: elimination of tariffs on vegetables</u> The elimination of tariffs has brought in cheaper imported products. <u>Main opportunities: land with production potential and production technology</u> Although production costs are high, large tracts of land are available for vegetable cultivation, and production techniques are highly developed.
Producers ★★★	Production costs are also high, and competitiveness has been increased by cheaper imported vegetables.
Aggregator	Unstable pickups
Wholesaler	Border closures have affected logistics.
Retailer	Insecurity of vegetable purchases and supply

Source: JICA survey team

Importance of challenges and potentials for each player: ★★★ = most important, ★★ = second most important, ★ = third most important (no answer after the second)

Results of Interviews with Each Player

Based on the aforementioned FVC flow, interviews were conducted with key players (producers and aggregators) using Questionnaire B. The main challenges identified in the interviews with players are summarized below.

Producers

Main challenges: Lack of capital to invest, cold weather, labor shortage, expensive materials and equipment

Financial challenges: Lack of capital for business investment

Technical challenges: Lack of production knowledge and technology

Aggregators

Main challenges: Lack of funds,
Rising fertilizer and pesticide prices due to Russia's invasion of Ukraine

Financial challenges: Lack of access to financial institutions

Technical challenges: Low quality of tools.

Lack of funds is a challenge for all players interviewed. On the technical side, producers cited a lack of production knowledge and skills, while the main challenge for aggregators was the increase in fertilizer and pesticide prices (and the resulting increase in the purchase price of vegetables) due to Russia's invasion of Ukraine.

Table 4.2.69 Challenges for Each Player on the Vegetable FVC (El Salvador)

		Producer		Aggregator	
General challenge	1st	<ul style="list-style-type: none"> Lack of capital to invest Cold damage during winter Lack of labour and high price of equipment, supplies 		<ul style="list-style-type: none"> Lack of money Due to Covid-19 and Russian invasion of Ukraine, price of fertilizers and insecticides have risen. 	
	2nd	<ul style="list-style-type: none"> Lack of marketing knowledge Pests have increased leading to stronger chemicals Very expensive production inputs 		<ul style="list-style-type: none"> Thief steals harvests Need of organic products Pests and diseases control 	
	3rd	<ul style="list-style-type: none"> No own land No access to loan 		<ul style="list-style-type: none"> Damaged product due to cold damage 	
Financial challenge		<ul style="list-style-type: none"> Lack of capital to invest in the business (production/transport/pest control) 	2.1	(7)	
		<ul style="list-style-type: none"> To improve sales and production 	2.0	(1)	<ul style="list-style-type: none"> Limited capital for the business
		<ul style="list-style-type: none"> Not having incentives for agricultural production 	3.0	(1)	<ul style="list-style-type: none"> Need to access financial institute for business development
Technical challenge		<ul style="list-style-type: none"> Lack of knowledge and technologies about production 	2.0	(1)	
		<ul style="list-style-type: none"> Lack of supervision of agro-services 	2.0	(1)	
		<ul style="list-style-type: none"> To produce for export and to provide employment 	2.0	(1)	<ul style="list-style-type: none"> Not good material of the tools and payment for employment.

1) Red cells in the table: Financial and technical challenges are scored with Very serious=3.0, Serious=2.0, Not so serious=1.0, and the total value is divided by the number of respondents as the score.

2) Blue cells in the table: The number of respondents is shown in parentheses.

Source: JICA survey team

Summary of Challenges and Potential of Vegetable FVC

Lack of financing and access to credit were cited as challenges by producers and aggregators, indicating a high demand for financing among vegetable FVC players. In addition, the rising cost of production due to higher fertilizer and pesticide prices triggered by Russia's invasion of Ukraine and the competition with imported products are serious challenges.

(3) Financing Needs of Each Player

A survey of each player's financing plans revealed that five producers, one collector, and one processor had plans to obtain financing (Figure 4.2.46). The dollar value of their respective financing needs is shown in Figure 4.2.47. Producers had an average financing need of 23,333 USD (n=3, maximum 40,000 USD, minimum 10,000 USD) and aggregators 20,000 USD (n=1), with producers having the highest financing needs in this survey. Regarding past experience with loans, an average of 7,833 USD (n=3, with a maximum value of 10,000 USD and a minimum value of 35,000 USD) was confirmed by producers, and no responses were received from aggregators.

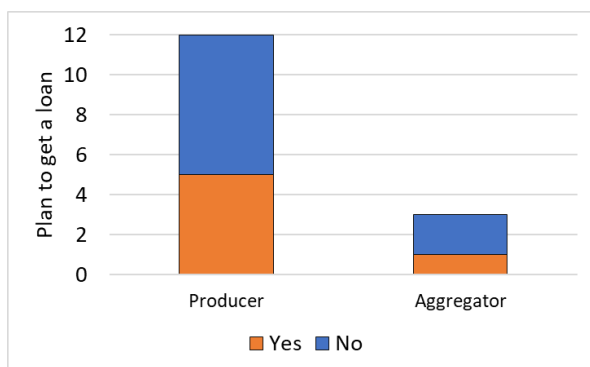


Figure 4.2.46 Vegetable FVC Player’s Financing Plan (El Salvador)

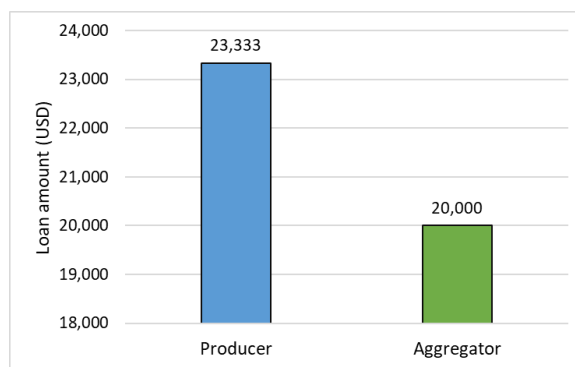


Figure 4.2.47 Vegetable FVC Player’s Amount of Loan Requested (USD) (El Salvador)

Source: JICA survey team

The financing objectives for the above loans are listed in Table 4.2.70. Producers cited the purchase of better agricultural inputs, seeds, and facilities, and aggregators cited the expansion of agricultural products for the purpose of the loans.

Table 4.2.70 Purpose of Loans on Vegetable FVC Players (El Salvador)

VC Player	Purpose of Loan
Producer	Purchase better agricultural materials, seeds, and facilities
Aggregator	Expansion of agricultural products to be sold

Source: JICA survey team

(4) Existing Support System

This section summarizes the existing support for vegetable FVCs in El Salvador. As a result of interviewing each player about the existence of support from other countries, their own countries, NGOs, etc., it was confirmed that 6 out of 12 producers received support from the government, NGOs, or unions for building greenhouses, holding technical training, supplying materials, etc., and 1 out of 4 aggregators received support from an input supplier. One out of four aggregators indicated that they had received support from an input supplier, but no response was provided as to the nature of the support.

Table 4.2.71 Support for Vegetable FVC Players (El Salvador)

VC Player	Availability of support	Support organization	Support
Producer	6/12	Government, NGOs, unions	Construction of greenhouses, organization of technical training, supply of materials
Aggregator	1/4	Input supplier	No answer

1) "Number of players who responded that they have support/number of respondents" is indicated in the "support" column.
Source: JICA survey team

(5) Others

Adoption of Digital Technology and Green technology

Among vegetable FVC players in El Salvador, 5 out of 12 producers have introduced digital technology, including using smartphones and tablets and checking data from websites. The technologies they would like to introduce in the future include computerized automatic control of

irrigation and fertilizer application. No examples were found among aggregators, and they mentioned tablet-based accounting management as a digital technology they would like to introduce in the future.

Table 4.2.72 Adoption of Digital Technology on Vegetable FVC Players (El Salvador)

VC Player	Percentage	DX	Digital technology adopts in the future
Producer	5/12	Utilize smartphones and tablets, check Ministry of Economy data from their website	Automatic computerized control of irrigation and fertilization
Aggregator	0/3	-	Accounting management on tablets

1) For digital technology, the number of players/respondents who responded that they have support.

Source: JICA survey team

All 12 producers interviewed mentioned that they have adopted green technology, including using organic fertilizers, not burning fields, and recycling plastic products. One collector was also identified as collecting plastic products.

Table 4.2.73 Adoption of Green Technology on Vegetable FVC Players (El Salvador)

VC Player	Percentage	Subsidies	Green Technology	Green technology adopts in the future
Producer	12/12	1/12	Introduction of organic fertilizers, no burning of fields, recycling of plastic products	organic farming
Aggregator	1/2	1/2	Recycling of plastic products	-

注1) Number of players/respondents who indicated that they have support in Greentechnology

Source: JICA survey team

3) Chicken

(1) FVC Structure

Saram, SA de CV, a local poultry company was interviewed to understand the chicken FVC flow and various challenges in El Salvador. This FVC flow is not for the country as a whole but for Nahuizalco in the province of Sonsonate, where this company is located.

FVC Flow (Category: Sonsonate Province Nahuizalco)

Sonsonate, Nahuizalco, Saram, and SA de CV are engaged in chicken production, processing, and wholesale.

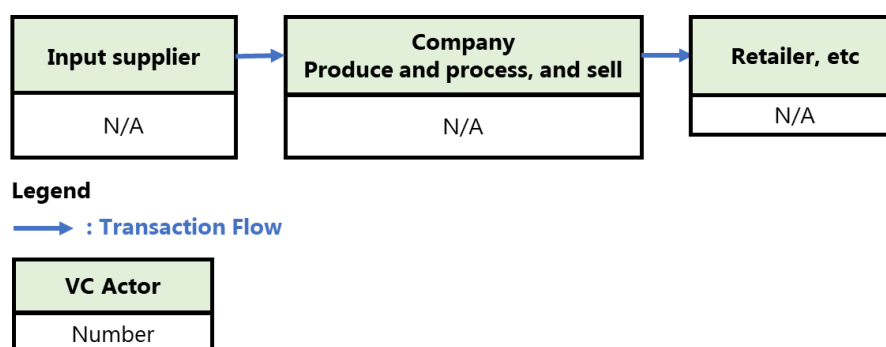


Figure 4.2.48 Chicken FVC Flow (El Salvador)

Source: JICA survey team

Exit of Chicken FVC

Saram, SA de CV does not export, and 100% of the chicken produced is distributed to the domestic market. In addition, 100% of the domestic market is traditional markets such as private stores. Regarding the exit on the VC, which is the most challenging of these markets, the response was that the traditional market accounts for 100% of the exits, and the reason for this was the high demand within the region.

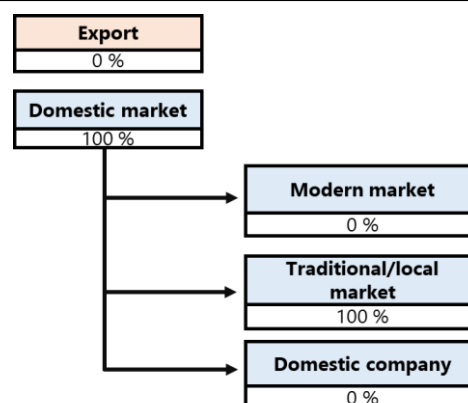


Figure 4.2.49
Percentage of Chicken for Export and Domestic Market on Saram, SA de CV (El Salvador)

Source: JICA survey team

(2) Challenges for Each Player and Opportunities for Business Expansion

The aforementioned Saram, SA de CV, was interviewed, and each player's challenges and opportunities for business expansion.

Results of the Interview with Saram, SA de CV

The challenges and opportunities for business expansion on the FVC and on each player were interviewed. The interviews revealed that the main challenge for the FVC as a whole is competition from large companies entering the market, while the main opportunity is that the market is stable due to high demand in the region. Producers were also selected as the most challenged players on the FVC due to the need to invest in materials and facilities to increase production and quality, and the rising prices of feed and materials. No responses regarding ranking were obtained for the other players.

Table 4.2.74 Challenges and Opportunities for Each Player on the Chicken FVC by Saram, SA de CV (El Salvador)

Overall VC Challenges and Opportunities	<u>Main challenge: Competition with other companies</u> Large companies and small players compete with each other. <u>Key Opportunities: High demand</u> The market is stable due to high demand in the region.
Input supplier	Material prices fluctuate with supply and demand.
Producers ★★★	Need to invest in materials and facilities to increase production and quality; rising prices of feed and materials
Processor	Need to modernize processing facilities
Wholesaler	Improve customer service and ensure quality
Retailer	Improve customer service and ensure quality

Source: JICA survey team

Importance of challenges and potentials for each player: ★★★ = most important, ★★ = second most important, ★ = third most important (no answer after the second)

Results of Interviews with Each Player

Based on the aforementioned FVC flow, interviews were conducted with key players (producers and aggregators) using Questionnaire B. The main challenges identified as a result of the interviews with players are summarized below.

Producers

Main challenges: Low supply relative to increasing demand,
High cost of input and production, sluggish sales

Financial challenges: Need for loans for investments and access to equitable financing

Technical challenges: Lack of technical training, lack of local resistance to disease

Aggregator

Main challenges: Lack of business space, slow sales, low sales prices

Financial challenges: Lack of capital for investment

Technical challenges: Little training on breeding and husbandry techniques
to cope with climate change

Lack of funds was cited as a challenge by all players interviewed. Producers cited the high cost of input and production as a challenge. There was a contradiction regarding demand depending on the surveyed players, which may be due to the difference between FVC players who have access to the market and those who do not. In addition, the lack of technical training and challenges in terms of breeding were cited, suggesting that there is also a high demand for technical support.

Table 4.2.75 Challenges for Each Player on the Chicken FVC (El Salvador)

		Producer	Aggregator				
General challenge	1st	<ul style="list-style-type: none"> Increased demand but lack of supply High price of inputs Not having a place to sell the product (Sales have dropped) 	<ul style="list-style-type: none"> Lack of space for business Sales decreased Selling price is low 				
	2nd	<ul style="list-style-type: none"> High production cost Low selling price Not having machines to pluck the chicken 	<ul style="list-style-type: none"> Lower price due to competition with big companies No support from governments 				
	3rd	<ul style="list-style-type: none"> Increased demand but lack of supply High production cost and sales have fallen 	<ul style="list-style-type: none"> No access to loan 				
Financial challenge		<ul style="list-style-type: none"> A large investment to produce organic chicken 	2.0	(1)	<ul style="list-style-type: none"> Lack of funds to invest 	2.7	(3)
		<ul style="list-style-type: none"> Need of loan for investment and access to fair credits 	2.0	(6)	<ul style="list-style-type: none"> Marketing with rising costs 	-	(1)
Technical challenge		<ul style="list-style-type: none"> Lack of incubator to produce eggs and no electricity 	2.0	(2)	<ul style="list-style-type: none"> Climates and how to prevent this from affecting breeding 	2.0	(1)
		<ul style="list-style-type: none"> No technical training 	2.0	(2)	<ul style="list-style-type: none"> Little training and problem on breeding chicken 	2.0	(1)
		<ul style="list-style-type: none"> Lack of knowledge on diseases, especially those of the respiratory system 	2.0	(1)			

1) Red cells in the table: Financial and technical challenges are scored with Very serious=3.0, Serious=2.0, Not so serious=1.0, and the total value is divided by the number of respondents as the score.

2) Blue cells in the table: The number of respondents is shown in parentheses.

Source: JICA survey team

Summary of Challenges and Potentials of Chicken FVC

Lack of funds and access to financing were cited as challenges by producers and aggregators, indicating a high demand for funds on chicken FVC and a high demand for assistance not only in

financial terms but also in technical aspects such as disease and breeding.

(3) Financing Needs for Each Player

A survey of each player's financing plans revealed that five producers and one collector had plans to obtain financing (Figure 4.2.50). The dollar value of their respective financing needs is shown in Figure 4.2.51. Producers had an average financing need of 24,200 USD (n=6, maximum value 80,000 USD, minimum 1,000 USD) and aggregators 5,000 USD (n=1), with producers having the highest financing requests. Regarding past experience with loans, an average of 34,750 USD (n=2, maximum value 60,000 USD, minimum value 9,500 USD) was identified for producers at and 2,000 USD for aggregators.

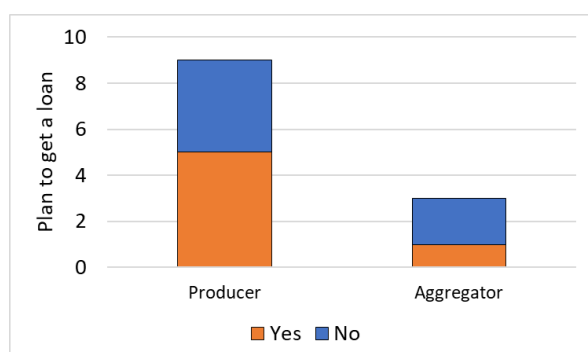


Figure 4.2.50 Chicken FVC Player's Financing Plan (El Salvador)

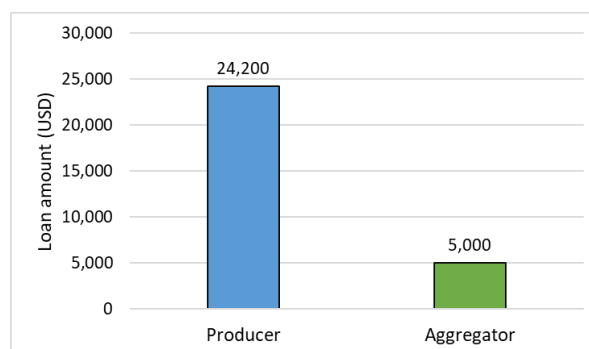


Figure 4.2.51 Chicken FVC Player's Amount of Loan Requested (USD) (El Salvador)

Source: JICA survey team

Table 4.2.76 lists the financing objectives for the above loans. Producers cited the purchase of chicken, materials, and equipment, while aggregators cited the expansion of premises and the purchase of refrigeration facilities to obtain loans.

Table 4.2.76 Purpose of Loans on Chicken FVC Players (El Salvador)

VC Player	Purpose of Loan
Producer	Purchase of chickens, materials, and equipment
Aggregator	Site expansion and purchase of refrigeration facilities

Source: JICA survey team

(4) Existing Support System

This section summarizes the existing support for the chicken FVC in El Salvador. Each player was interviewed about the existence of support from other countries, their own country, NGOs, etc. As a result, 2 out of 9 producers confirmed that they receive support from the government and marketing partners in the form of loans and sharing of useful information, and 1 out of 6 aggregators indicated that they receive support. However, no response was received regarding the details.

Table 4.2.77 Support for Chicken FVC Players (El Salvador)

VC Player	Availability of support	Support organization	Support
Producer	2/9	Associations, Sales Partners	Providing financing and sharing useful information
Aggregator	1/6	-	-

1) "Number of players who responded that they have support/number of respondents" is indicated in the "support" column.

Source: JICA survey team

(5) Others

Adoption of Digital Technology and Green Technology

Among El Salvador's chicken FVC players, 4 out of 8 producers had adopted digital technology, and the use of smartphones and tablets was an example adopted. The aggregators gave the use of smartphones and computers in collection and sales as an example. Specific examples of digital technology that they would like to introduce in the future were not confirmed.

Table 4.2.78 Adoption of Digital Technology on Chicken FVC Players (El Salvador)

VC Player	Percentage	DX	Digital technology adopts in the future
Producer	4/8	Use of smartphones, tablets, and apps	-
Aggregator	3/5	Use of smartphones and computers in pickup and sales	-

1) For digital technology, the number of players/respondents who responded that they have support.

Source: JICA survey team

7 of the 8 producers interviewed indicated that they have adopted GreenTechnology, which includes reusing water resources and using chicken manure as fertilizer. 3 aggregators also sell chicken manure and sort it for recycling.

Table 4.2.79 Adoption of Green Technology on Chicken FVC Players (El Salvador)

VC Player	Percentage	Subsidies	Green technology	Green technology adopts in the future
producer	7/8	1/8	Reuse of water resources and use of chicken manure as fertilizer	-
aggregator	3/5	0/3	Sale of chicken manure, sorting for recycling	-

1) Number of players/respondents who indicated that they have support in Greentech

Source: JICA survey team

4.2.6 Panama

In Panama, a questionnaire survey was conducted on three target crops: rice, dairy, and plantain. The results of each survey are summarized below.

1) Rice

(1) FVC Structure

Since a field survey was conducted in Panama, the rice FVC flow and each challenge identified based on the survey results are described.

FVC Flow (Category: Chiriqui)

Domestic consumption is the mainstay of Panama's rice industry, with input suppliers, agricultural equipment dealers, producers (14,448 farmers nationwide), processors, wholesalers, and retailers being the mainstays of FVCs. The most typical FVC for domestic consumption is described in this report.

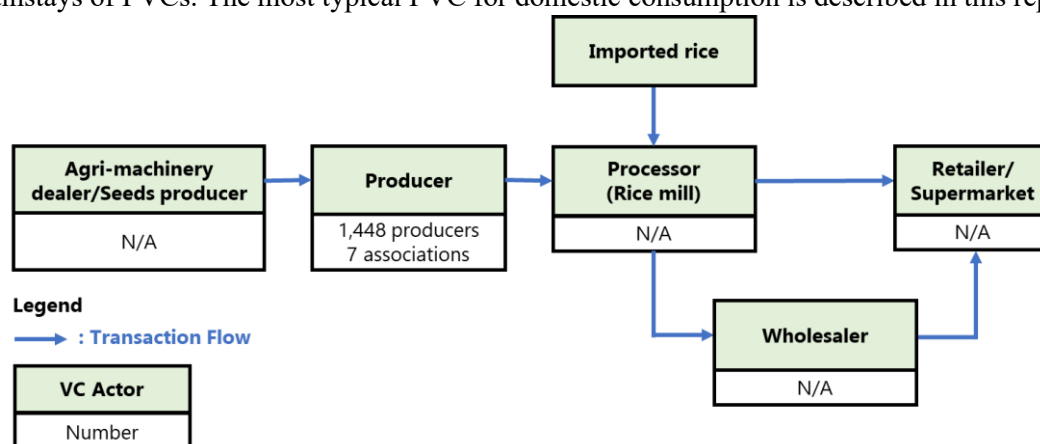


Figure 4.2.52 Rice FVC Flow (Panama)

Source: JICA survey team

Exit of Rice FVC

More than 99% of Panama's rice is for the domestic market, with less than 1% remaining for export. There are concerns that the gradual elimination of tariffs on imported rice under the Dominican Republic–Central America Free Trade Agreement (DR-CAFTA) will lead to the distribution of imported rice in the country, putting pressure on the domestic rice industry.

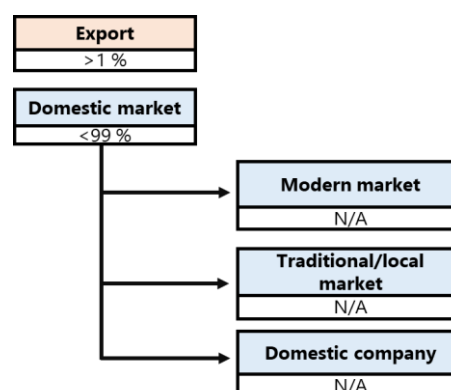


Figure 4.2.53 Percentage of Rice for Export and Domestic Market (Panama)

Source: JICA survey team

(2) Challenges for Each Player and Opportunities for Business Expansion

Challenges and opportunities for business expansion were surveyed by field survey and questionnaire B.

Results of Interviews on the Field Survey

FVC and each player’s challenges and opportunities for business expansion were surveyed.

Table 4.2.80 Challenges and Opportunities for Each Player on the Rice FVC (Panama)

Overall VC Challenges and Opportunities	<p><u>Main Challenges: Gradual elimination of tariffs on imported rice</u> The distribution of inexpensive imported rice will put pressure on the domestic rice industry.</p> <p><u>Main Opportunity: Value-added by selling whole grains.</u> “Special,” which contains more than 90% whole grains (less than 10% broken rice), can be sold at higher prices than “Premier” varieties, which contain 70-90% whole grains.</p>
Input suppliers★	Demand for large agricultural machinery is increasing.
Producers★★★	90% of the farmland is non-irrigated. In order to compete with imported rice, it is necessary to take measures to lower production costs, increase yields, and improve quality.

Processor (Rice mill)★★	Agrosilo is working on value-added products such as fortified rice with enhanced nutritional value.
retailer	Only the above PREMIER will be subsidized by 0.5 USD/lb.

Source: JICA survey team

Importance of challenges and potentials of each player: ★★★ = most important, ★★ = second most important, ★ = third most important

Results of Interviews with Each Player

Based on the aforementioned FVC flow, interviews were conducted with key players (producers, processors, wholesalers, and retailers) using Questionnaire B. The main challenges identified in the interviews with each player are summarized below.

Producers

- Main challenges: High cost of materials and farm machinery; difficulty in obtaining financing
- Financial challenges: Many uncertain factors such as yield, high investment risk, better financing
- Technical challenge: All processes need to be efficient.

Processors

- Main challenges: Imported rice, government adjusts rice price
- Financial challenges: Lack of access to low-interest loans
- Technical challenge: Making operations more efficient

Wholesalers

- Main challenges: Policy, imported rice
- Financial challenges: No response
- Technical challenges: Lack of technical support

Retailer

- Main challenges: Insufficient supply of domestic rice, problems with imported rice
- Financial challenges: No response
- Technical challenges: No response

Many of the players interviewed cited increased competition associated with the distribution of imported rice as a challenge. Producers and processors cited access to financing as a challenge, while on the technical side, producers and processors cited operational efficiency and wholesalers cited lack of technical support as challenges.

Table 4.2.81 Challenges for Each Player on the Rice FVC (Panama)

		Producer	Processor	Wholesaler	Retailer
General challenge	1st	<ul style="list-style-type: none"> High input and machinery costs Plant disease Financing: (Difficult to get credit due to the risk of rice) 	<ul style="list-style-type: none"> Imported rice Price control from government Supply chain interruptions 	<ul style="list-style-type: none"> The government plan for rice. 	<ul style="list-style-type: none"> Lack of supply of national rice (imported rice)
	2nd	<ul style="list-style-type: none"> Climate change and seed varieties with low yield Commercialization system is not efficient Delay of payment 	<ul style="list-style-type: none"> Farmer's motivation for better quality, quantity and costs Higher supplies costs and cost to buy from producers 	<ul style="list-style-type: none"> Imported rice. 	<ul style="list-style-type: none"> High cost to buy rice High competitiveness Trouble between producers and processors
	3rd	<ul style="list-style-type: none"> High cost of irrigation and land leveling Financing is not right timing and short 	<ul style="list-style-type: none"> Lack of certified seed in quality and quantity Unfair competition Operations continuity 	<ul style="list-style-type: none"> Not answered 	<ul style="list-style-type: none"> Not answered
Financial challenge		<ul style="list-style-type: none"> High risk to investment due to uncertainty 			
		<ul style="list-style-type: none"> Access to better financing to invest 	<ul style="list-style-type: none"> Lack of access to lines of credit and/or loans with lower interest rates 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A
		<ul style="list-style-type: none"> Needs to be more profitable and efficient 			
Technical challenge		<ul style="list-style-type: none"> Whole process could be more efficient. 			
		<ul style="list-style-type: none"> Need of resistant seed 	<ul style="list-style-type: none"> To Maximize efficiency in the operation 	<ul style="list-style-type: none"> Lack of access of technical assistance 	<ul style="list-style-type: none"> N/A
		<ul style="list-style-type: none"> Implementation of irrigation 			

1) Red cells in the table: Financial and technical challenges are scored with Very serious=3.0, Serious=2.0, Not so serious=1.0, and the total value is divided by the number of respondents as the score.

2) Blue cells in the table: The number of respondents is shown in parentheses.

Source: JICA survey team

Summary of Challenges and Potentials of Rice FVC

Throughout the rice FVC players, imported rice is a challenge. As a countermeasure, producers have voiced the need to improve the efficiency of the production process (cost reduction). Also, as mentioned above, "Special" rice, in which more than 90% of the whole grain (less than 10% broken), can be sold at a higher price than "Premier" rice, in which 70-90% of the whole grain. However, some respondents said that only "Premier" rice is subsidized by the government, which reduces the motivation to improve the quality of the rice.

(3) Financing Needs of Each Player

A survey of each player's financing plans revealed that one producer, two processors, one collector, and three retailers had plans to obtain financing (Figure 4.2.54). The respective financing needs are shown in Figure 4.2.55. The producers had a financing need of 15,000 USD (n=1) and the processors 40,000,000 USD (n=1), with the processors confirming a high financing request. Wholesalers and retailers did not provide a response regarding the amount. Regarding previous experience, producers had an average of USD 200,000,000 (n=1) and processors an average of USD 20,300,000 (n=2, with a maximum of USD 40,000,000 and a minimum of USD 600,000).

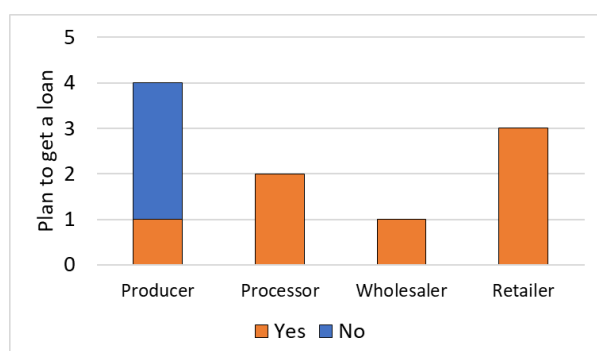


Figure 4.2.54 Rice FVC Player's Financing Plan (Panama)

Source: JICA survey team

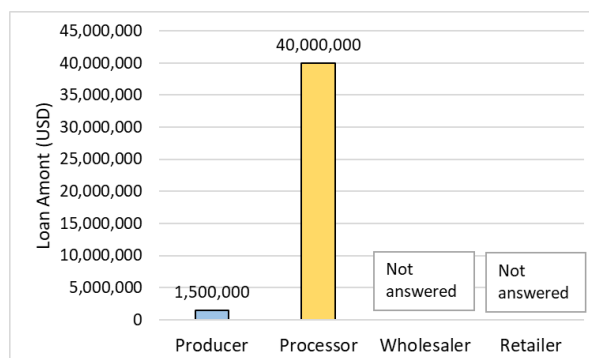


Figure 4.2.55 Rice FVC Player's Loan Amount Requested (USD) (Panama)

The loan objectives for the above loans are listed in Table 2.2.5. For producers, the loan would be used for irrigation facilities. The purpose was the amount of investment in renewable energy, equipment, and the latest technology for processors. Wholesalers and retailers did not indicate the loan amount, but their objectives were to invest in new customers and business expansion, respectively.

Table 4.2.82 Purpose of Loans on Rice FVC Players (Panama)

VC Player	Purpose of Loan
Producer	Costs for irrigation facilities
Processor	Investments in renewable energy, equipment, and the latest technology
Wholesaler	Developing new customers
Retailer	Investment in business expansion

Source: JICA survey team

(4) Existing support system

As a result of interviewing each player regarding existing support from other countries, their own country, and NGOs, etc in rice FVC, producers and processors confirmed that they have received support. Producers received financial support such as subsidies and loans from the government and banks, while processors received financial support the same as producers, as well as support of equipment and other resources.

Table 4.2.83 Support for Rice FVC Players (Panama)

VC Player	Availability of support	Support organization	Support
Producer	3/4	Government, Banks	Financial support such as grants and loans
Processor	2/3	Banks	Financial support such as grants and loans, provision of equipment, etc.
Aggregator	No answer	No answer	No answer
Retailer	0/3	-	-

1) "Number of players who responded that they have support/number of respondents" is indicated in the "support" column.

Source: JICA survey team

(5) Other

Adoption of Digital Technology and Green Technology

Among the rice FVC players in Panama that were surveyed in this study, processors, wholesalers, and retailers have introduced digital technologies. Processors have introduced advanced digital

technologies, such as data management on producers' maps using smartphones and tablets, John Deere's JD Link system (GPS-based operation and management of farm machinery), and yield forecasting with GPS. Electronic payments and e-commerce examples were also observed among wholesalers and retailers.

Table 4.2.84 Adoption of Digital Technology on Rice FVC Players (Panama)

VC Player	Percentage	DX	Digital technology adopts in the future
Producer	0/3	-	-
Processor	3/3	Data management on maps for producers using smartphones and tablets, John Deere's JD Link system, and GPS yield forecasts	Drone imaging of fields and application of fertilizers and pesticides
Wholesaler	1/1	Introduction of electronic payment and data management on PCs	Implement technology to reduce manual work, better tracking systems
Retailer	4/4	E-commerce implementation	Interested in new digital technologies in general

1) For digital technology, the number of players/respondents who responded that they have support.
Source: JICA survey team

In this survey, green technology was confirmed among producers, processors, and retailers, and it involved the use of biomass (renewable energy). Retailers did not provide details, but they mentioned the use of renewable energy as a technology they would like to introduce in the future.

Table 4.2.85 Adoption of Green Technology on Rice FVC Players (Panama)

VC Player	Percentage	Subsidies	Green Technology	Green technology adopts in the future
Producer	2/3	0/4	Use of biomass (renewable energy) and organic farming	Biomass Utilization
Processor	3/3	0/2	Biomass (renewable energy)	-
Wholesaler	No answer	No answer	No answer	No answer
Retailer	2/3	0/3	No answer	Use of renewable energy

1) Number of players/respondents who indicated that they have support in Greentech
Source: JICA survey team

2) Plantain

(1) FVC Structure

Described below are the plantain FVC flow and each challenge identified in the field survey.

FVC Flow (Category: Chiriqui)

Domestic consumption is the main focus of plantain FVCs in Chiriqui, Panama, with input suppliers, producers (5,151 farmers), wholesalers, processors and retailers as the main axis of FVCs. The most typical FVC for domestic consumption is described in this report.

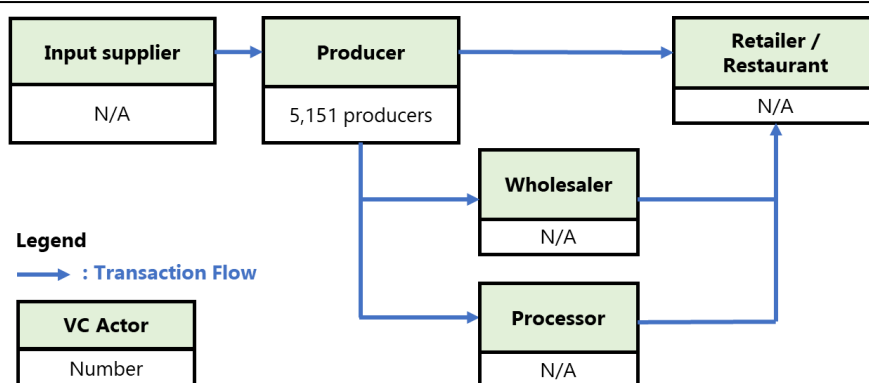


Figure 4.2.56 Plantain FVC Flow (Panama)

Source: JICA survey team

Exit of Plantain FVC

Most plantain in Panama is for domestic consumption; even plantain produced in Chiriqui is distributed to retailers and restaurants in the country. Information on specific percentages was not available.

(2) Challenges for Each Player and Opportunities for Business Expansion

The field survey results and interviews with each player regarding the challenges and opportunities for business expansion are described below.

Results of Field Survey

The challenges and opportunities for business expansion on FVC and each player were interviewed. The main challenge is the lack of domestically processed products (plantain chips), with many imported products. The main opportunity is the introduction of drip irrigation and sprinklers to increase yield and quality.

Table 4.2.86 Challenges and Opportunities for Each Player on the Plantain FVC (Panama)

Overall VC Challenges and Opportunities	<u>Main challenges:</u> There are few domestically processed products (plantain chips) and many are imported. <u>Main Opportunity:</u> Yield and quality can be increased by introducing drip irrigation and sprinklers.
Input supplier	Seedlings and management should be done to cope with Sigatoka disease, Fusarium, and high humidity.
Producers ★★★	There is no active union. Yields are increased by installing drip irrigation and sprinklers.
Processors ★★	Plantain chips are increasingly competitive due to imports from Jamaica and Costa Rica.
Retailer ★	Prices vary with damage and maturity.

Source: JICA survey team

Importance of challenges and potentials of each player: ★★★ = most important, ★★ = second most important, ★ = third most important

Results of Interviews with Each Player

Based on the aforementioned FVC flow, interviews were conducted with key players (producers, wholesalers, and retailers) using Questionnaire B. The main challenges identified are summarized below.

Producers

Main challenges: Prices are determined by weight, not quality, lack of capital, climate change

Financial challenges: Lack of access to financing, low farmland prices, difficulty in obtaining financing

Technical challenge: Lack of knowledge and machinery for value-added processing

Wholesalers

Main challenges: Policy changes with each new administration, lack of digitalization of business

Financial challenges: No answer

Technical challenges: Lack of technical assistance

Retailer

Main challenge: Many small brokers are dealing with multiple vendors to meet demand.

Financial challenges: No answer

Technical challenges: No answer

Many challenges were raised by the players interviewed, especially by producers. Technical assistance and financial needs for plantain chip processing were identified. Retailers cited the low volume handled by aggregators (wholesalers) and the need to deal with many suppliers as a challenge.

Table 4.2.87 Challenges for Each Player on the Plantain FVC (Panama)

		Producer	Wholesaler	Retailer
General challenge	1st	· No incentive to produce better quality product since price is fixed by units, not quality · Lack of capital · Climate change	· Policy change due to change of government	· Intermediaries are not formal, and have to deal with many of them to meet demand
	2nd	· No working associations and no access to processors · Low profitability	· Lack of digitalization	· Lack of variety of plantain
	3rd	· High production cost	· Not answered	· Not answered
Financial challenge		· Low liquidity of product		
		· Lack of access to financing		
		· Investment for infrastructure is high, and difficult to get a loan due to value of the farm is low	· N/A	· N/A
Technical challenge		· Lack of technology or equipment to process plantain for value addition	· Lack of technical assistance	· N/A

1) Red cells in the table: Financial and technical challenges are scored with Very serious=3.0, Serious=2.0, Not so serious=1.0, and the total value is divided by the number of respondents as the score.

2) Blue cells in the table: The number of respondents is shown in parentheses.

Source: JICA survey team

Summary of Challenges and Potential of Plantain FVC

It was suggested that there is a demand for support to increase domestic production of processed

plantain products (plantain chips). For producers, the ability to process and sell plantain chips would add value to the current situation in which prices are determined by weight, not quality.

(3) Financing Needs of Each Player

Regarding each player's financing plans, one producer, one wholesaler, and two retailers had plans to obtain financing (Figure 4.2.57). No responses were received regarding their respective financing needs.

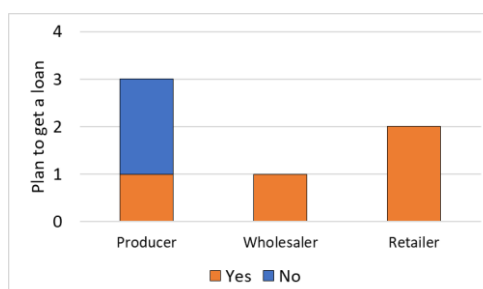


Figure 4.2.57 Plantain FVC Player's Financing Plan (Panama)

Source: JICA survey team

The financing objectives for the above loans are listed in Table 4.2.88. Producers cited investment in infrastructure as an objective, while retailers cited securing working capital as an objective.

Table 4.2.88 Purpose of Loans on Plantain FVC Players (Panama)

VC Player	Purpose of Loan
Producer	Secure investment and working capital for infrastructure
Wholesaler	No answer
Retailer	Business expansion

Source: JICA survey team

(4) Existing Support System

This section summarizes the existing support in the Plantain FVC in Panama. As a result of interviewing each player regarding the existence of support from other countries, their own country, NGOs, etc., one wholesaler was confirmed to have received financial support from the government in grants and loans. Other players were not confirmed support system.

Table 4.2.89 Support to Plantain FVC Players (Panama)

VC Player	Availability of support	Support organization	Support
Producer	0/2	-	-
Wholesaler	1/3	government	Financial support such as grants and loans
Retailer	0/2	-	-

1) "Number of players who responded that they have support/number of respondents" is indicated in the "support" column.

Source: JICA survey team

(5) Others

Adoption of Digital Technology and Green Technology

In the case of Plantain FVC in Panama, one retailer adopted digital technology, but the details were not obtained.

Table 4.2.90 Adoption of Digital Technology on Plantain FVC Players (Panama)

VC Player	Percentage	DX	Digital technology adopts in the future
Producer	0/1	-	-
Wholesaler	No answer	No answer	No answer
Retailer	1/2	No answer	No answer

1) For digital technology, the number of players/respondents who responded that they have support.
Source: JICA survey team

Regarding adopting green technology, reducing gas use, pesticides, and fertilizers were identified for producers. As for technology they would like to adopt in the future, producers answered that profitability is the first priority.

Table 4.2.91 Adoption of Green Technology on Plantain FVC Player (Panama)

VC Player	Percentage	Subsidies	Green Technology	Green technology adopts in the future
Producer	1/1	0/1	Avoid the use of gases, pesticides, and fertilizers	There is interest, but profitability is important first.
Wholesaler	No answer	No answer	No answer	No answer
Retailer	0/1	0/1	-	-

1) For Greentech, the number of players/respondents who responded that they have support.
Source: JICA survey team

3) Dairy farming

(1) FVC Structure

Based on the field survey results, the dairy FVC flow and each challenge in Panama were described below.

FVC Flow (Category: Chiriqui)

Domestic consumption is the main focus of Panama's dairy FVCs, with input suppliers, producers (6,000 farmers), wholesalers, processors, and retailers being the mainstays of the FVCs. The most typical FVC for domestic consumption is described in this report.

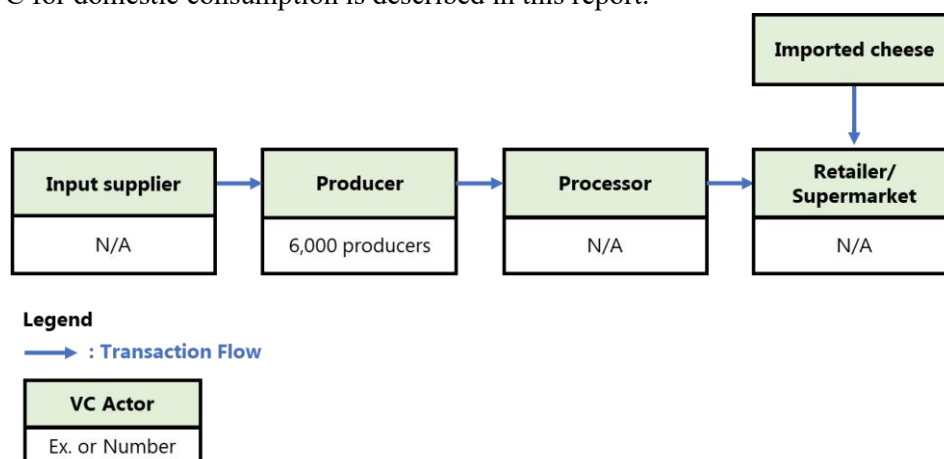


Figure 4.2.58 Dairy FVC Flow (Panama)

Source: JICA survey team

Exit of Dairy FVC

Overall, more than 95% of Panama's dairy products (milk and other dairy products) are for the domestic market, and less than 5% is exported. Many processed products, such as cheese and yogurt, are also imported.

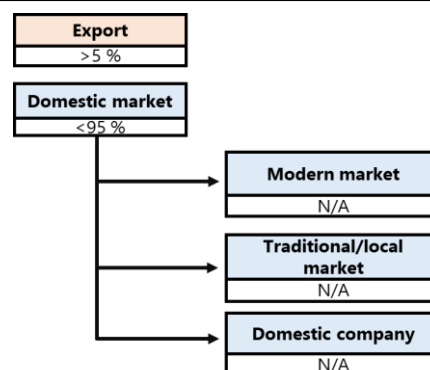


Figure 4.2.59 Percentage of Dairy for Export and Domestic Market (Panama)

Source: JICA survey team

(2) Challenges for Each Player and Opportunities for Business Expansion

The field survey results and interviews with players regarding the challenges and opportunities for business expansion are described below.

Results of Field Interviews

The challenges and opportunities for business expansion on the entire FVC and each player were interviewed. The main challenges are the high market share of foreign companies in milk commercialization and the many imported products such as cheese, yogurt, and other processed products competing with domestically produced processed products. For each player, input suppliers face the challenge of competing with imported feed. For processors, the four main foreign-owned players, Estrella Azul (Honduras), Bonlac (Guatemala), Nevada (Costa Rica), and Chiricana (Costa Rica), make it difficult for new entrants to enter the market.

Another challenge raised by producers was that milk producers producing Grade C milk subsidized 10 cents/L. This leads to a low motivation to increase quality because the cost is not commensurate with the cost of producing Grade B or A milk. The criteria for each grade are as follows.

- Grade A: Contains no antibiotic residues, has a bacterial count of less than 200,000 per ml, and the temperature does not rise above 10 degrees Celsius during transportation before being pasteurized in a pasteurization plant.
- Grade B: Bacteria count less than 1 million per ml at delivery to the processing plant and free of antibiotic residues.
- Grade C: Contains no antibiotic residues, but does not meet the requirements of either Grade A or Grade B.

Table 4.2.92 Challenges and Opportunities for Each Player on the Dairy FVC (Panama)

Overall VC Challenges and Opportunities	<p><u>Main challenge: Competition with imports</u> Foreign companies have a high share of the milk commercialization market, and for processed products such as cheese and yogurt, many imported products are competing with domestically produced processed products.</p> <p><u>Main Opportunities: High demand for dairy products</u> Demand for dairy products, including processed products, is high and there is investment potential for domestic players.</p>
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Input supplier ★	There is competition with imported feed.
Producers ★★★	Farmers producing Grade C milk are subsidized 10 cents/L and have no incentive to increase quality because the cost of producing Grade B or A milk is not worth the cost
Processors ★★	In milk, the four main foreign players Estrella Azul (Honduras), Bonlac (Guatemala), Nevada (Costa Rica), and Chiricana (Costa Rica) have a high market share, making it difficult for new players to enter the market
Retailer	High demand for milk and dairy products

Source: JICA survey team

Importance of challenges and potentials for each player: ★★★ = most important, ★★ = second most important, ★ = third most important (no answer after the second)

Results of Interviews with Each Player

Based on the aforementioned FVC flow, interviews were conducted with key players (producers and retailers) using Questionnaire B. The main challenges identified as a result of the interviews with players are summarized below.

Producers

Main challenges: High production costs, transportation road conditions, high investment costs

Financial challenges: Insufficient funds due to late payments, etc.

Technical challenges: Lack of engineers who can repair power generation facilities,
Lack of technical support

Retailer

Main challenges: Insufficient supply of domestically produced milk,
Low Grade A production due to production costs and subsidies.

Financial challenges: No answer

Technical challenges: No answer

Producers reported a lack of working capital for their businesses due to delays in payments to their sales partners. Retailers mentioned challenges with insufficient supply of domestically produced milk and low-Grade A production due to production costs and subsidies (the benefits of producing are not there for the producers).

Table 4.2.93 Challenges for Each Player on the Dairy FVC (Panama)

		Producer	Retailer				
General challenge	1st	<ul style="list-style-type: none"> High cost of production Condition of road to transport High cost to invest in technologies and machines 	<ul style="list-style-type: none"> Lack of supply of national fresh milk Prohibition to import fresh milk 				
	2nd	<ul style="list-style-type: none"> Climate change No electricity for the business High cost of operation 	<ul style="list-style-type: none"> Lower quality milk is more profitable for producers, so fresh milk grade A is reducing supply 				
	3rd	<ul style="list-style-type: none"> High gas price Energy costs increasing 	<ul style="list-style-type: none"> Not answered 				
Financial challenge		<ul style="list-style-type: none"> Lack of cash for working capital due in the various cases of late payments throughout year 	2.0	(1)	<ul style="list-style-type: none"> No data 	N/A	(1)
Technical challenge		<ul style="list-style-type: none"> Lack of basic electrician knowledge to repair power plants 	2.0	(1)	<ul style="list-style-type: none"> No data 	N/A	(1)
		<ul style="list-style-type: none"> Seminars or conventions to learn better milk farming is very expensive and lack access to technical assistance. 	1.0	(1)			

1) Red cells in the table: Financial and technical challenges are scored with Very serious=3.0, Serious=2.0, Not so serious=1.0, and the total value is divided by the number of respondents as the score.

2) Blue cells in the table: The number of respondents is shown in parentheses.

Source: JICA survey team

Summary of Challenges and Potentials of Dairy FVC

Foreign companies have a large share of the milk processing, including pasteurization and packaging, and competition with imported products was seen as a challenge for cheese and yogurt. A survey of retailers also cited the lack of domestically produced milk as a challenge and the need to strengthen dairy FVC. There is also the challenge that production costs and subsidies make it less meaningful to produce high-quality Grade A milk, and value addition can be achieved by strengthening domestic production of processed products.

(3) Financing Needs for Each Player

Regarding each player's financing plans, all players who responded, three producers and two retailers, had plans to obtain financing (Figure 4.2.60). The respective financing needs are shown in Figure 4.2.61. There was a financing need of 30,000 USD (n=1) for producers, the highest financing request for producers in this survey. Regarding previous loan experience, 10,000 USD (n=1) was identified for producers.

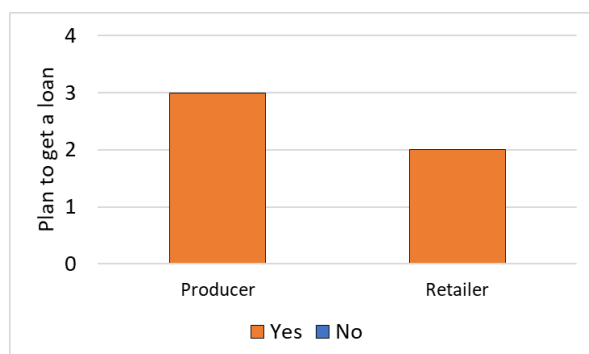


Figure 4.2.60 Dairy FVC Player’s Financing Plan (Panama)

Source: JICA survey team

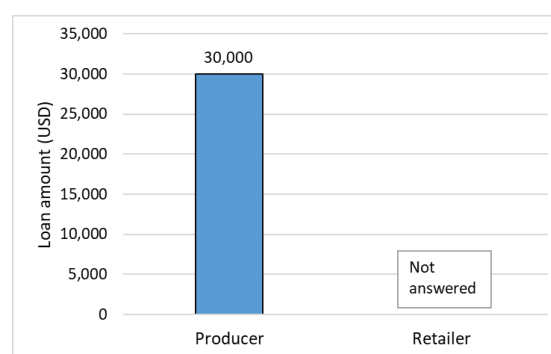


Figure 4.2.61 Dairy FVC Player’s Loan Amount Requested (USD) (Panama)

The financing objectives for the above loans are listed in Table 4.2.94. Producers cited increased production, purchase of a milking machine, and solar power installation as loan objectives. Retailers did not provide a response regarding the amount of loan requested but cited business expansion, such as increased sales volume and space, as loan objectives.

Table 4.2.94 Purpose of Loans by Dairy FVC Players (Panama)

VC Player	Purpose of Loan
Producer	Increase production, purchase milking machines, install solar energy
Retailer	Business expansion, including increased sales volume and space

Source: JICA survey team

(4) Existing Support System

This section summarizes the existing support in the Panamanian dairy FVC. Regarding each player about the existence of support from other countries, their own country, NGOs, etc., two of the three producers confirmed that they receive subsidies and loans from the government and associations, while the retailers do not receive any support.

Table 4.2.95 Support for Dairy FVC Players (Panama)

VC Player	Availability of support	Support organization	Support
Producer	2/3	Financial institutions, associations	Financial support such as grants and loans
Retailer	0/2	-	-

1) "Number of players who responded that they have support/number of respondents" is indicated in the "support" column.
Source: JICA survey team

(5) Others

Adoption of Digital Technology and Green Technology

Regarding the dairy FVC players, no examples of digital technology adoption were identified among producers, and there were concerns about the cost of future implementation. 2 out of 3 retailers had implemented smartphones and tablets in data collection and business management.

Table 4.2.96 Adoption of Digital Technology in Dairy FVC Players (Panama)

VC Player	Percentage	DX	Digital technology adopts in the future
Producer	0/2	-	interested but concerned that the cost may be too high and there is no access
Retailer	2/3	Smartphones and tablets in data collection and business management	-

1) For digital technology, the number of players/respondents who responded that they have support

Source: JICA survey team

Among producers, 1 interviewee mentioned solar panels and renewable energy. 1 retailer had also adopted green technology but did not provide the details. However, one of them mentioned renewable energy as they would like to adopt in the future.

Table 4.2.97 Adoption of Green Technology in Dairy FVC Players (Panama)

VC Player	Percentage	Subsidies	Green technology	Green technology adopts in the future
Producer	1/1	1/1	Solar panels, renewable energy	Want to install more solar panels and renewable energy
Retailer	1/1	0/3	No answer	Use of renewable energy

1) For Greentech, the number of players/respondents who responded that they have support.

Source: JICA survey team

4.2.7 Dominican Republic

In the Dominican Republic, field surveys and questionnaire surveys were conducted for three target commodities: rice, fisheries, and cacao. The results of each survey are summarized below.

1) Rice

(1) FVC Structure

The following are the rice FVC flow, and the challenges identified based on the survey.

FVC Flow (Category: Dominican Republic)

Domestic consumption is the mainstay of the Dominican Republic's rice industry, with input suppliers, producers (30,000 producers), aggregators, processors (7 registered cooperatives), and retailers as the mainstays of FVCs (although there are FVCs in which Aggregators do not intervene). The most typical FVC for domestic consumption is described in this report.

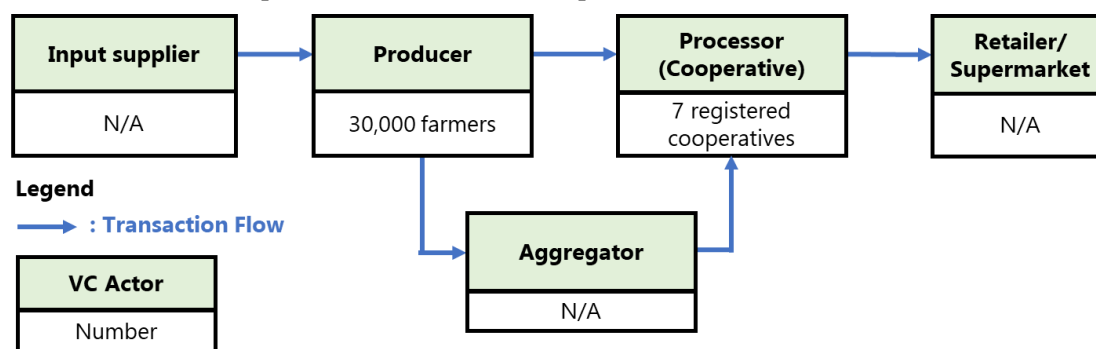


Figure 4.2.62 Rice FVC Flow (Dominican Republic)

Source: JICA survey team

Exit of Rice FVC

More than 99% of the rice produced in the Dominican Republic is for the domestic market, and less than 1% is for export. Under the DR-CAFTA (The Dominican Republic–Central America–United States Free Trade Agreement), tariffs on imported rice are scheduled to be completely eliminated in January 2025, and there are concerns that inexpensive imported rice will compete with domestic rice.

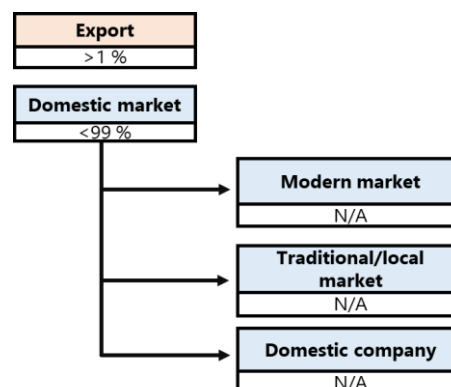


Figure 4.2.63 Percentage of Rice for Export and Domestic Market (Dominican Republic)

Source: JICA survey team

(2) Challenges for Each Player and Opportunities for Business Expansion

The interview was conducted for each player by field survey and questionnaire survey to grasp the challenges and opportunities for business expansion.

Results of Interviews on the Field Survey

The challenges and opportunities for business expansion on the FVC were surveyed. The main challenge for rice is the elimination of tariffs from January 2025 under the DR-CAFTA. In terms of

major opportunities, domestic rice consumption per person is about 50 kg per year, making it one of the highest-consuming countries in the Central American and Caribbean region, and there is a high demand.

Table 4.2.98 Challenges and Opportunities for Each Player on the Rice FVC (Dominican Republic)

Overall VC Challenges and Opportunities	<p><u>Main Challenges: Gradual elimination of tariffs on imported rice</u> The elimination of tariffs from January 2025 under the DR-CAFTA.</p> <p><u>Main Opportunity: High demand for rice</u> The staple food is rice, and with an annual per capita consumption of approximately 50 kg, it is one of the highest-consuming countries in the Central American and Caribbean region.</p>
INDRHI and water users' associations	In irrigation management, the government (INDRHI) is responsible for the maintenance of the main canals, while the water users' association is responsible for the maintenance of the secondary and tertiary canals. Water is not distributed efficiently due to the deterioration of water facilities and lack of linings.
Producers ★★★	The average yield is 3.4 t/ha, not very productive, and has a high production cost.
Processors (Association)★★	The cooperative is responsible for transporting, drying, milling, packaging, and selling the rice to retailers.
Retailer ★	No branding by variety or production area

Source: JICA survey team

The importance of each player's challenges and potential (severity of the challenge and demand for assistance):

★★★ = most important, ★★ = second most important, ★ = third most important

Results of Interviews with Each Player

Based on the aforementioned FVC flow, interviews were conducted with key players (input suppliers, producers, aggregators, and processors) using Questionnaire B. The main challenges identified in the interviews with each player are summarized below.

Input suppliers

Main challenge: Competition with large input suppliers

Financial challenges: Financing for business expansion (lack of knowledge)

Technical challenges: Lack of technical advisors

Producers

Main challenges: Damage by storms and drought,

High cost of materials and labor, drought in dry season

Financial challenges: Agricultural banks take a long time to get loans and

loans are obtained from financial institutions with higher interest rates.

Technical challenges: Lack of technical assistance, fluctuations in irrigation water availability

Aggregators

Main challenges: High-interest rates on loans

Financial challenges: High-interest rates and limited loan amounts

Technical challenges: No answer

Processors

Main challenges: High interest on loans,

Lower rice quality during the rainy season (post-harvest challenges)

Financial challenges: High interest on loans, limited access to financing, and short duration

Technical challenges: Lack of technical support, appropriate materials, and high project costs

Producers, aggregators, and processors cited high interest rates as a financial challenge in obtaining

loans. Producers indicated that agricultural banks take a long time to process loans, so they need to obtain loans from financial institutions that offer faster loans but higher interest rates. Regarding technical challenges, producers cited a lack of irrigation water, and aggregators and processors cited lower rice quality during the rainy season. Regarding challenges related to rice quality, they may refer to soil contamination and inadequate drying of the paddy due to harvesting in the rain.

Table 4.2.99 Challenges for Each Player on the Rice FVC (Dominican Republic)

		Input supplier	Producer	Aggregator	Processor
General challenge	1st	• Competition on prices with Large Input providers	• Storm and droughts damage • Inputs and labour cost is high • Lack of water during dry season • Drainage insufficiency	• High interest rate	• High cost of loan • Low quality of rice during rainy season
	2nd	• Limited capital for building larger facility	• Diseases, Insects, Weeds • Selling price is very unfair • Cost for pumping water is high • Payment delay	• High transportation cost	• High cost of Labor and Fuel • Market change due to Trade Agreement (DR-CAFTA)
	3rd	• The coop is not yet registered	• Weighing of paddy is unclear • Drainage insufficiency	• Low quality of rice from farmers during the rainy season	• Lack necessary equipment • Imported rice due to Trade Agreement
Financial challenge		• How to obtain loan for business expansion. 2.0 (1)	• Need to get a loan from lenders at high interest rate because Agricultural Bank's loan is late 2.0 (1) • High cost of loan 2.0 (1)	• Limited capacity for lending amount (High Interest rate) 2.0 (1)	• High Interest of loan 3.0 (1) • Limited access to the loan; High-Interest rate and Short Maturity 3.0 (1)
			• Lack of technical assistance 2.1 (7) • Fluctuation on the availability of irrigation water 2.0 (2)	• Not answered N/A (1)	• No technical Assistance. 3.0 (1) • Not adequate equipments and high costs of the business 2.0 (2)
Technical challenge		• No technical advisors 2.0 (1)			

1) Red cells in the table: Financial and technical challenges are scored with Very serious=3.0, Serious=2.0, Not so serious=1.0, and the total value is divided by the number of respondents as the score.

2) Blue cells in the table: The number of respondents is shown in parentheses.

Source: JICA survey team

Summary of Challenges and Potentials of Rice FVC

In the field survey and questionnaire survey, some respondents were concerned about the elimination of tariffs by the DR-CAFTA and the full elimination of tariffs in January 2025. However, rice is the staple food in the country and is one of the most consumed commodities in the Central American and Caribbean region, with an annual per capita consumption of approximately 50 kg, making it an important commodity from the perspective of food security. Reducing production costs by improving the efficiency of cultivation and irrigation is needed, and it is necessary to work on value-adding through the branding of varieties and production areas.

(3) Financing Needs of Each Player

A survey of each player's financing plans revealed that one producer, nine growers, one aggregator, and two processors had plans to obtain financing (Figure 4.2.64). The respective financing needs are shown in Figure 4.2.65. 465,724 USD (n=1) for input suppliers, An average of 31,876 USD (n=9, highest value 93,145 USD, minimum 3,353 USD) for producers, 279,435 USD (n=1) for aggregators, 7,591,305 USD (n=2, highest value 12,108,830 USD, minimum value 3,073,780 USD) for processors were confirmed. The processor was identified as requesting a higher loan amount. Regarding past

experience with loans, input suppliers received an average of 37,258 USD (n=1), producers an average of 21,896 USD (n=10, highest value 55,887 USD, lowest value 3,167 USD), aggregators 279,435 USD (n=1), processors 6,414,575 USD (n=3, highest value 12,108,830 USD, minimum value 2,477,653 USD) were confirmed.

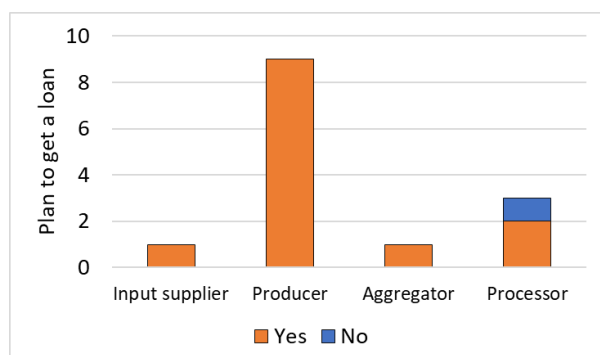


Figure 4.2.64 Rice FVC Player's Financing Plan (Dominican Republic)

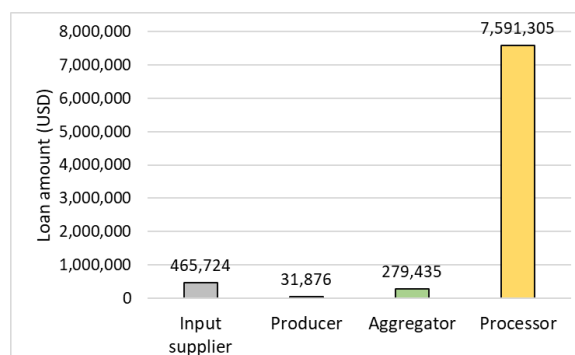


Figure 4.2.65 Rice FVC Player's Loan Amount Requested (USD) (Dominican Republic)

Source: JICA survey team

Table 4.2.100 lists the financing objectives for the above loans. For input suppliers, loan purposes encompassed building warehouses, establishing branch offices, and extending loans to producers. Producers utilized loans for rice planting and other cultivation expenses, as well as for acquiring or leasing land and purchasing tractors. Aggregators sought loans for general business expenses. Processors, on the other hand, directed their loans towards business expansion, such as acquiring silos, dryers, and rice milling machines. Notably, processors requested the highest loan amounts, reflecting substantial expansions of their facilities.

Table 4.2.100 Purpose of Loans by Rice FVC Players (Dominican Republic)

VC Player	Purpose of Loan
Input supplier	Building warehouses, constructing branches, and providing loans to producers
Producer	Expenses for rice planting and other cultivation, borrowing or purchasing land, and purchasing a tractor
Aggregator	Project cost
Processor	To expand business by purchasing silos, dryers, rice mills, etc.

Source: JICA survey team

(4) Existing Support System

The interview was conducted with each player to grasp the existing support for rice FVC in the Dominican Republic. The respondents were asked about the existence of support from other countries, their own countries, NGOs, etc. Regarding input suppliers, valuable information was obtained from the suppliers from whom materials are purchased. Producers receive government financial support, including subsidies and loans. Similarly, processors also benefit from government support in the form of subsidies and loans. While producers receive financial assistance and useful information from input suppliers, processors similarly receive government support, including subsidies and loans. No existing support systems were identified for Aggregators.

Table 4.2.101 Support for Rice FVC Players (Dominican Republic)

VC Player	Availability of support	Support organization	Support
Input supplier	1/1	Input suppliers	Providing useful information
Producer	8/10	Government, input suppliers	Providing financial support and useful information such as grants and loans
Aggregator	0/1	-	-
Processor	2/3	government	Financial support such as grants and loans

1) "Number of players who responded that they have support/number of respondents" is indicated in the "support" column.

Source: JICA survey team

(5) Others

Adoption of Digital Technology and Green Technology

Among the rice producers in the Dominican Republic surveyed, one producer highlighted the use of drones for pesticide application and advanced digital technology. Additionally, input suppliers and producers expressed interest in smartphone-based technical assistance and market information.

Table 4.2.102 Adoption of Digital Technology on Rice FVC Players (Dominican Republic)

VC Player	Percentage	DX	Digital technology adopts in the future
Input supplier	0/1	-	Providing technical assistance on smartphones
Producer	1/10	Pesticide application by drone	Grasping market information on your smartphone
Aggregator	0/1	-	-
Processor	2/3	Rice gravimeters and moisture content meters	Modernization of rice moisture content regulation control

1) For digital technology, the number of players/respondents indicated that they implemented the technology.

Source: JICA survey team

The survey did not identify any cases of green technology adoption among input suppliers, producers, aggregators, and processors. Regarding green technology they would like to adopt in the future, one producer expressed interest in the effective use of water resources, such as water-saving rice cultivation.

Table 4.2.103 Adoption of Green Technology on Rice FVC Players (Dominican Republic)

VC Player	Percentage	Subsidies	Green Technology	Green technology adopts in the future
Input supplier	0/1	0/1	-	-
Producer	0/10	0/8	-	Effective use of water resources such as water-saving rice cultivation
Aggregator	0/1	0/1	-	-
Processor	0/1	0/1	-	-

1) Number of players/respondents who indicated that they have implemented Green Technology.

Source: JICA survey team

2) Fishery

(1) FVC Structure

The fishery FVC flow and challenges identified during the field survey are listed below.

FVC Flow (Category: La Romana, Boca Chica)

In the Dominican Republic, both domestic consumption FVCs and export FVCs exist, but based on the results of interviews with CODOPESCA (Dominican Council of Fisheries and Aquaculture), which is under the Ministry of Agriculture, the government is interested in increasing the income of small-scale fishermen by strengthening domestic consumption FVCs for the tourism industry. This report also focuses on FVC for domestic consumption, especially for small-scale fishermen. The results of the field survey showed that the main actors in FVCs for domestic consumption were boat owners (who rent boats to fishermen), fishermen, brokers/stock Aggregators (the same as boat owners in upstream FVCs), and restaurants and retailers.

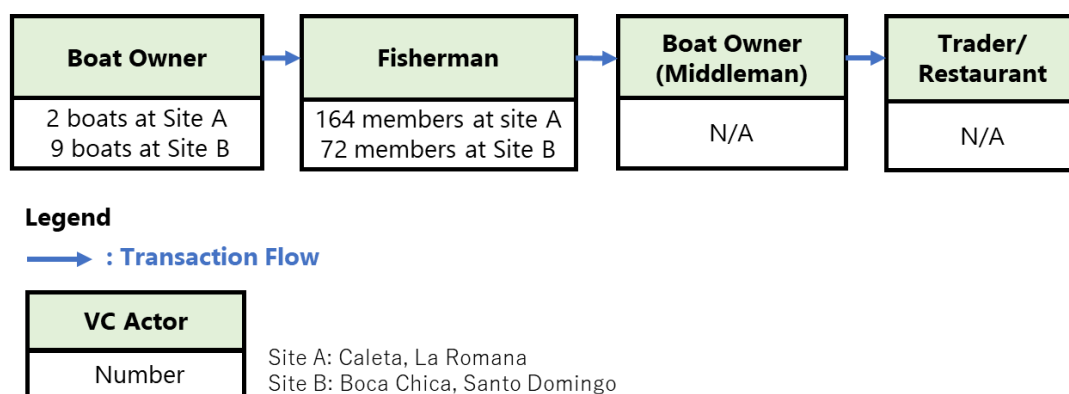


Figure 4.2.66 Fishery Flow (Dominican Republic)

Source: JICA survey team

Exit of Fishery FVC

In the fishery FVCs where field surveys were conducted, sea bream, mackerel, sardines, and dolphinfish are caught by diving and cast-net fishing with small boats. The fish are then distributed to restaurants and other customers through the owners of the rented boats.

(2) Challenges for Each Player and Opportunities for Business Expansion

The following are the results obtained from the field survey and questionnaire survey regarding the challenges for each player and opportunities for business expansion.

Results of Field Survey Interviews

The entire FVC and each player's challenges and opportunities for business expansion were surveyed through the interviews. The primary challenges identified include the scarcity of boats for small-scale fishermen and an underdeveloped cold chain. While there is potential for increased income through sales to the tourism industry, including local high-end hotels and restaurants, the current scenario reveals a predominant reliance on imported (frozen) seafood. Fishermen highlighted the impact of factors such as the establishment of no-take periods and a shortage of materials like boats, limiting the quantity of fish caught. Furthermore, the absence of a robust cold chain poses a significant bottleneck in selling to hotels and restaurants.

Table 4.2.104 Challenges and Opportunities for Each Player on the Fisheries FVC (Dominican Republic)

Overall VC Challenges and Opportunities	<u>Main challenges:</u> Lack of boats for small-scale fishermen, underdeveloped cold chain, and heavy dependence on imports for tourism
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	Primary Opportunity: Selling to the tourism industry (local upscale hotels and restaurants) at a stable, high price
Boat Owner ★	Rent a boat and collect 300-1,000 DOP/fish or 12.5% of catch from fishermen.
Fisherman ★★★	The catch is limited due to the establishment of closed seasons and a lack of technology and materials.
Aggregators ★★	Lack of cold chain and food safety concerns due to deterioration of seafood.
importer and exporter	Frozen seafood is imported for high-end restaurants and hotels in Japan

Source: JICA survey team

Importance of challenges and potentials of each player: ★★★ = most important, ★★ = second most important, ★ = third most important

Results of Interviews with Each Player

Based on the aforementioned FVC flow, interviews were conducted with key players (fishermen and Aggregators) using Questionnaire B. The main challenges identified are summarized below.

Fisherman

Main challenges: No access to good financial institutions, small boat and engine

Financial challenges: Lack of collateral, inability to obtain loans, lack of funds

Technical challenges: No answer

Aggregators

Main challenge: Lack of access to financing

Financial challenges: High transportation costs and low profits

Technical challenges: No response

The players interviewed, both fishermen and Aggregators, raised challenges related to access to finance. In particular, the fishermen surveyed in this study cited their inability to obtain loans due to a lack of collateral, such as boats, as a challenge.

Table 4.2.105 Challenges for Each Player on the Fisheries FVC (Dominican Republic)

		Fisher man	➤		Aggregator		
General challenge	1st	<ul style="list-style-type: none"> No access to financing under favorable conditions No own fishing boat and equipment 			<ul style="list-style-type: none"> Limited access to financing 		
	2nd	<ul style="list-style-type: none"> Small Fishing Boat and Engine Inflation in Fuel price 			<ul style="list-style-type: none"> High transportation cost 		
	3rd	<ul style="list-style-type: none"> No Fishing / landing port in my place 			<ul style="list-style-type: none"> High Competitions 		
Financial challenge		<ul style="list-style-type: none"> No enough capital for Operation 	2.0	(1)	<ul style="list-style-type: none"> Small profit due to high transportation cost 	2.0	(1)
		<ul style="list-style-type: none"> No access to loan and no collateral 	3.0	(2)			
Technical challenge		<ul style="list-style-type: none"> Not answered 	N/A	(3)	<ul style="list-style-type: none"> Not answered 	N/A	(1)

1) Red cells in the table: Financial and technical challenges are scored with Very serious=3.0, Serious=2.0, Not so serious=1.0, and the total value is divided by the number of respondents as the score.

2) Blue cells in the table: The number of respondents is shown in parentheses.

Source: JICA survey team

Summary of Challenges and Potentials of Fisheries FVC

CODOPESCA, under the Ministry of Agriculture, is interested in improving the income of small-scale fishermen by strengthening FVCs that are sold to the country's high-end restaurants and hotels, but small-scale fishermen do not own boats, and size limits their catch, and the lack of a cold chain and high transportation costs are bottlenecks.

(3) Financing Needs for Each Player

As for each player's financing plans, three fishermen and one aggregator had plans to obtain loans (Figure 4.2.67). Regarding their respective financing needs, an average of 2,407 USD (n=2, highest value 4,657 USD, lowest value 156 USD) was identified for the producers and USD 55,887 for the Aggregators (Figure 4.2.68).

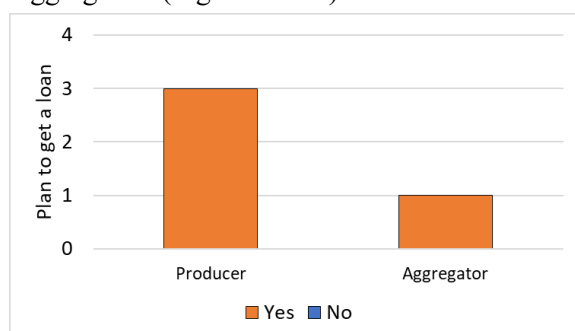


Figure 4.2.67 Fishery FVC Player's Financing Plan (Dominican Republic)

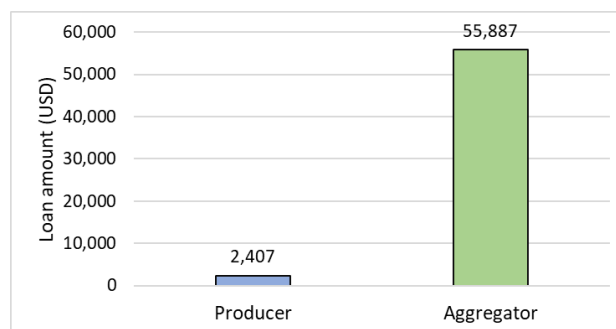


Figure 4.2.68 Fishery FVC Player's Loan Amount Requested (USD) (Dominican Republic)

Source: JICA survey team

The financing objectives for the above loans are shown in Table 4.2.106. As mentioned in the assignment, fishermen cited the purchase of a larger-sized boat (or the boat itself) as a loan purpose, while Aggregators cited the expansion of refrigeration facilities as a purpose.

Table 4.2.106 Purpose of Loans on Fisheries FVC Players (Dominican Republic)

VC Player	Purpose of Loan
Fisherman	Purchase of larger-sized boats and materials needed for boating and fishing
Aggregator	Expansion of refrigeration facilities

Source: JICA survey team

(4) Existing support system

The existing support in the Dominican Republic fisheries FVC is summarized below. No support structures were identified among fishermen, whereas Aggregators mentioned receiving facilities and equipment from other donors, specifically Spain.

Table 4.2.107 Support for Fishery FVC Players (Dominican Republic)

VC Player	Availability of support	Support organization	Support
Fisherman	0/3	-	-
Aggregator	1/1	Foreign donor (Spain)	Provision of facilities, equipment and materials

1) "Number of players who responded that they have support/number of respondents" is indicated in the "support" column.

Source: JICA survey team

(5) Others

Adoption of Digital Technology and Green Technology

Neither fishermen nor Aggregators were identified as having implemented or wishing to implement digital technology among the fisheries FVC players surveyed in this study.

Table 4.2.108 Adoption of Digital Technology on Fishery FVC Players (Dominican Republic)

VC Player	Percentage	DX	Digital technology adopts in the future
Fisherman	0/3	-	-
Aggregator	0/1	-	-

1) For digital technology, the number of players/respondents indicated that they implemented the technology.
Source: JICA survey team

Regarding green technology, no examples of digital technology or technologies that both fishermen and Aggregators would like to adopt in the future were identified.

Table 4.2.109 Adoption of Green Technology on Fishery FVC Player (Dominican Republic)

VC Player	Percentage	Subsidies	Green Technology	Green technology adopts in the future
Producer	0/3	0/3	-	-
Retailer	0/1	0/1	-	-

1) Number of players/respondents who indicated that they have implemented Green Technology
Source: JICA survey team

3) Cacao

(1) FVC Structure

The following are the cacao FVC flow, and each player’s challenge in the Dominican Republic based on the field survey results.

FVC Flow (Category: 1 exporter, 1 cooperative)

Exports are the main focus of cocoa FVCs in the Dominican Republic, with input suppliers, producers, aggregators, and exporters being the mainstays of the FVCs. This report describes the most typical export FVCs. Figure 4.2.68 shows the FVC flow for one exporter (A in the table) and one cooperative (B in the table) that were surveyed.

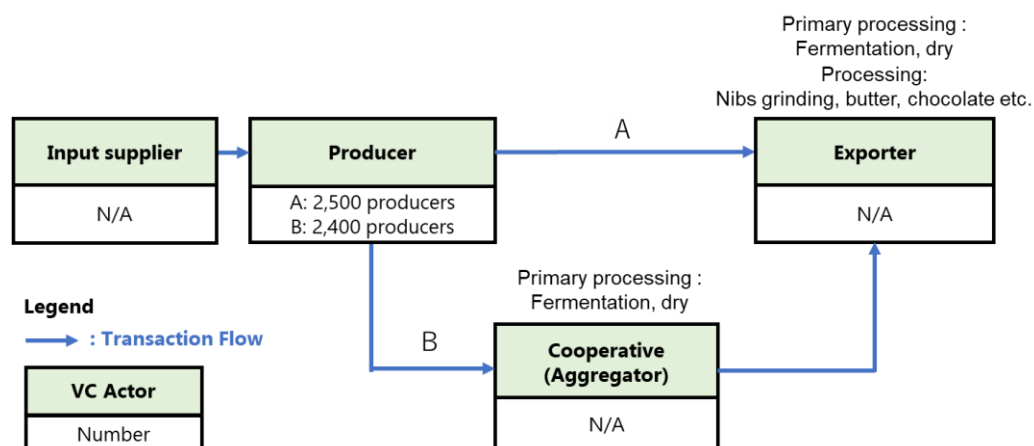


Figure 4.2.69 Cacao FVC Flow (Dominican Republic)

Source: JICA survey team

Exit of Cacao FVC

More than 90% of Dominican Republic cacao is destined for export, with less than 10% remaining for the domestic market. Export destinations include Japan. Even the exporters surveyed do business with Japanese companies.

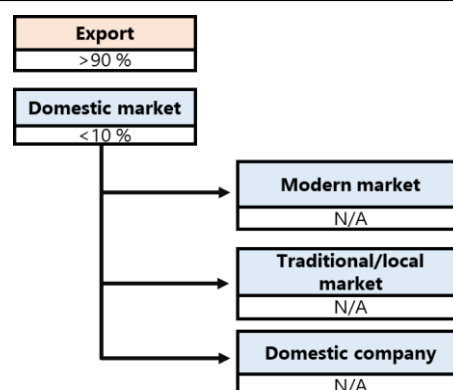


Figure 4.2.70 Percentage of Cacao for Export and Domestic Market (Dominican Republic)

Source: JICA survey team

(2) Challenges for Each Player and Opportunities for Business Expansion

The following are the field survey results and interviews with each player regarding the challenges and opportunities for business expansion.

Results of Field Interviews

The challenges and opportunities for business expansion on FVC and each player were surveyed. The challenges faced by cacao FVCs in terms of cultivation include low productivity, attributed to the age of many trees, which have been planted for over 50 years. The primary opportunity is to invest in processing and inspection facilities for cacao mass production.

Table 4.2.110 Challenges and Opportunities for Each Player on the Cacao FVC (Dominican Republic)

Overall VC Challenges and Opportunities	<p><u>Main challenge: Low productivity of cocoa trees</u> Cacao trees are aging and have low productivity.</p> <p><u>Main opportunities: investment in processing and inspection facilities</u> Expanding processing facilities for cacao (refining cacao mass) and establishing a laboratory for pesticide testing will allow us to bring in-house tasks that were previously performed partially or entirely in foreign country. This initiative will contribute to the strengthening of domestic FVC.</p>
Producers ★★★	Many of the trees are over 50 years old since planting, resulting in low productivity. To enhance productivity, renewing varieties at suitable planting densities is advisable. Notably, fermented beans (Española) exhibit a sugar content of 13 higher, while unfermented beans (Sanchez) have a sugar content of 13 lower. Fermented beans are associated with higher quality and command a better price.
Aggregator (union) ★	Primary processing of fermentation and drying is also done, and some cooperatives provide training and financing
Exporter ★★	No laboratories in Japan test for pesticides for export, so it is necessary to confirm samples in the U.S. at present.

Source: JICA survey team

Importance of challenges and potentials of each player: ★★★ = most important, ★★ = second most important, ★ = third most important

Results of Interviews with Each Player

Based on the aforementioned VC flow, interviews were conducted with key players (input suppliers, producers, Aggregators, and exporters) using Questionnaire B. The main challenges identified in the interviews with players are summarized below.

Input suppliers

Main challenges: Price volatility and low quality of materials, high financing interest,
Fluctuation in prices of imported materials due to exchange rate fluctuations

Financial challenges: Fluctuating prices of imported materials due to exchange rate fluctuations,
Lack of funds

Technical challenges: Input (Products) does not come with instructions

Producers

Main challenges: Aging cocoa trees, poor access to fields, hurricane damage

Financial challenges: Lack of access to financing to expand cultivated area

Technical challenges: Lack of technical support

Aggregators

Main challenges: Insufficient production to meet demand,
High competition, poor road conditions during the rainy season

Financial challenges: N/A

Technical challenges: N/A

Exporter

Main challenges: Lack of laboratories for pesticide testing, high-interest rates on loans

Financial challenge: High-interest rates on loans

Technical challenges: Training for producers to increase production quantity and quality

High interest rates and access to loans were cited as challenges by input suppliers, producers, and exporters. Lack of technical assistance was cited as a challenge by producers and exporters as well.

Table 4.2.111 Challenges for Each Player on the Cacao FVC (Dominican Republic)

		Input supplier	Producer	Aggregator	Exporter
General challenge	1st	· Price fluctuations on input price	· Very old plantation · Bad conditions of farm access roads · Damage by Hurricanes	· Low product quantity do not satisfy demand	· Lack of local testing lab for organic shipments · Competitors in the business
	2nd	· Low quality of products · High interest rate of loan	· Lack of Technical Assistance · Variation in rainfall amount and temperature	· High competition	· Subproducts Demand has Increased but our Factory Capacity is Limited · High interest rate of loans
	3rd	· Variation on exchange rate	· Cost for Organic Certification is expensive · Old plantation, low yield	· Bad roads condition during rainy season	· Price fluctuation
Financial challenge		· Variation of exchange rate	· Access to Financing for expanding plantation	· N/A	· High Interest rate
		· Limited capital		N/A (1)	1.0 (1)
Technical challenge		· Majority of products do not explain how to use it	· Lack of Technical Assistance	· N/A	· Lack of technical assistance to farmers to improve productivity and quality
		2.0 (1)	2.0 (3)	N/A (1)	2.0 (1)

1) Red cells in the table: Financial and technical challenges are scored with Very serious=3.0, Serious=2.0, Not so serious=1.0, and the total value is divided by the number of respondents as the score.

2) Blue cells in the table: The number of respondents is shown in parentheses.

Source: JICA survey team

Summary of Challenges and Potentials of Cacao FVC

In terms of production, the aging of cacao trees is a problem, highlighting the need for technical assistance in cultivation and loans to renew varieties. Regarding processing, expanding facilities for cacao processing (producing cacao mass) and establishing a laboratory for pesticide testing will enable the company to perform in-house tasks that were previously done partially or entirely overseas, thereby strengthening domestic FVC.

(3) Financing Needs for Each Player

A survey of the financing plans of each player revealed that three producers and two exporters had plans to obtain financing (Figure 4.2.71). The respective financing needs are shown in Figure 4.2.72. The average financial need is 2,407 USD (n=2, highest value 4,657 USD, lowest value 156 USD) for producers and 15,931,448 USD (n=2, highest value 30,000,000 USD, lowest value 1,862,897 USD) for exporters. The past experience of receiving loans was identified as 652 USD (n=1) for producers and 4,083,133 USD (n=1) for exporters.

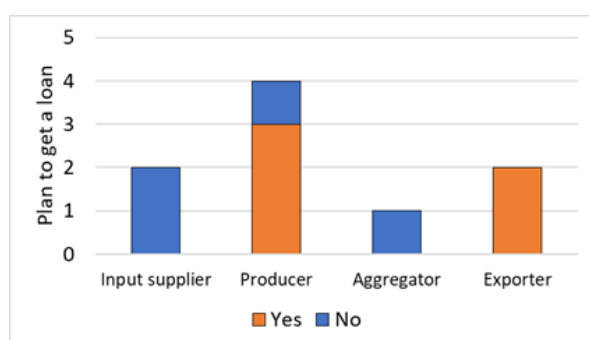


Figure 4.2.71 Cacao FVC Player's Financing Plan (Dominican Republic)

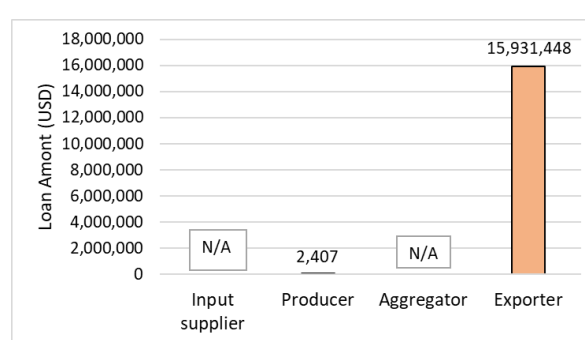


Figure 4.2.72 Cacao FVC Player's Loan Amount Requested (USD) (Dominican Republic)

Source: JICA survey team

Table 4.2.112 lists the financing objectives for the above loans. Producers cited the purchase of land and cocoa seedlings and investment in cultivation technology, while exporters cited the construction of a chocolate factory and financing the procurement of raw materials. For exporters, a high loan request of 30,000,000 USD was observed, which refers to the costs required for the construction of a chocolate factory.

Table 4.2.112 Purpose of Loans on Cacao FVC Players (Dominican Republic)

VC Player	Purpose of Loan
Producer	Purchase of land and cocoa seedlings, investment in cultivation technology
Exporter	Funds for the construction of the chocolate factory and procurement of raw materials

Source: JICA survey team

(4) Existing Support System

Existing support in the Dominican Republic cocoa FVC is summarized below. It was confirmed that input suppliers receive training from NGOs on business and financial aspects, the government provides financial assistance in the form of grants and loans, producers receive technical training from the government, and exporters receive support from investors as joint ventures.

Table 4.2.113 Support for Cacao FVC Players (Dominican Republic)

VC Player	Availability of support	Support organization	Support
Input supplier	2/3	NGOs, government	Training related to business and financial aspects, grants, loans, and other financial assistance
Producer	1/4	government	Provide training in technical aspects
Aggregator	0/1	-	-
Exporter	1/2	Investor	joint venture

1) "Number of players who responded that they have support/number of respondents" is indicated in the "support" column.

Source: JICA survey team

(5) Others

Adoption of Digital Technology and Green Technology

No cases of digital technology implementation were identified in this study.

Table 4.2.114 Adoption of Digital Technology on Cacao FVC Players (Dominican Republic)

VC Player	Percentage	DX	Digital technology adopts in the future
Input supplier	0/2	-	-
Producer	0/4	-	-
Aggregator	0/1	-	-
Exporter	0/2	-	-

1) For digital technology, the number of players/respondents who answered that they have adopted the technology.

Source: JICA survey team

Among the producers, all four respondents mentioned soil conservation through the use of cover plants and abstaining from pesticides or chemical fertilizers as a green technology. The exporter had implemented Rainforest Certification (a designation objectively evaluating products as having been produced in a socially, financially, and environmentally responsible manner) for its products and was contemplating offering training in sustainable agriculture to its producers in the future.

Table 4.2.115 Adoption of Green Technology on cocoa FVC players (Dominican Republic)

VC Player	Percentage	Subsidies	Green Technology	Green technology adopts in the future
Input supplier	0/2	1/2	-	-
Producer	4/4	0/4	Soil conservation through the use of cover plants, without the use of pesticides or chemical fertilizers	Organic Farming Practices
Aggregator	0/1	0/1	-	-
Exporter	1/1	No answer	Obtaining Rainforest Alliance Certification	Provide training in sustainable agriculture for producers.

1) For Green technology, the number of players/respondents who responded that they have introduced

Source: JICA survey team

4.3. Overview of the FVC Analysis

This questionnaire survey for the FVC analysis focused on understanding FVC flows, the ratio of exports to domestic consumption, and the technical and financial challenges faced by each FVC player in Mexico, Guatemala, Honduras, El Salvador, Panama, and the Dominican Republic in the Central American and Caribbean region. Basically, three commodities were covered in each country, of which coffee is common to three countries (Guatemala, Honduras, and El Salvador), rice to two countries (Panama and the Dominican Republic), and dairy farming to two countries (Honduras and Panama).

With those exceptions, different commodities were selected in each country.

In the coffee FVC, all countries had exports exceeding 80% of the total, with FVC challenges and financial needs for processing facilities such as wet mills, and Guatemala and Honduras saw potential for value addition such as specialty coffees. In rice FVCs, both Panama and the Dominican Republic consume almost all of their rice domestically, but tariffs will be eliminated in January 2025 under the DR-CAFTA, and there are concerns that the domestic rice industry will be squeezed by the distribution of imported rice. As for dairy FVCs both in Honduras and Panama, those are mainly for domestic consumption, and competition with imported processed products such as cheese was cited as a common issue.

In terms of the exit of FVCs, cardamom, coffee, and broccoli from Guatemala, coffee from Honduras and El Salvador, and cacao from the Dominican Republic were the most exported commodities, while domestic consumption was the main focus for the other commodities. According to a survey of coffee associations and other organizations that know FVCs by commodity, almost all commodities are focused on export-oriented FVCs, with only chicken from El Salvador (100% domestic consumption) and rice from Panama and the Dominican Republic (99% domestic consumption) being focused on FVCs for domestic consumption. (Figure 4.3.1)

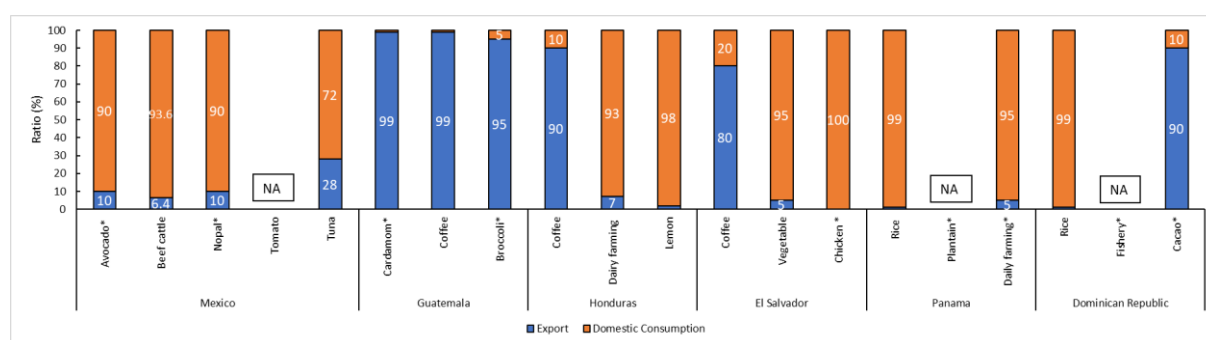


Figure 4.3.1 Ratio of Export / Domestic Consumption for Each Commodity (%)

Source: JICA survey team

1) If the data is not for the entire country but for a specific region, "*" is added after the name of the commodity.

According to the financing needs reported by the FVC players interviewed for each commodity, the requested amounts varied widely across countries, commodities, and players. The average financing needs for the six countries was 1,668,738 USD (with a median of 45,480 USD). Notably, a cocoa exporter in the Dominican Republic, seeking funds for the construction of a chocolate processing facility, and rice millers in Panama and the Dominican Republic, aiming to expand silos and dryers, confirmed higher loan requests compared to other commodities, as the loans were specifically tied to facility construction.

Table 4.3.1 illustrates the loan requests and purposes of the players who requested the highest loan amounts on the FVC for each country and commodity on average. Apart from the aforementioned players, avocados, tomatoes in Mexico, dairy and lemons in Honduras had the highest loan requests among input suppliers. The purposes of these loans varied, ranging from the procurement of materials, purchase of trucks, and expansion of facilities. The amount and purpose of loans for producers also exhibited wide variation depending on the characteristics of each commodity. However, Aggregators,

except for the fisheries in the Dominican Republic, uniformly expressed a need for working capital, especially for the crucial aspect of collection in their business.

Table 4.3.1 Players with the Highest Loan Requests on Average for Each Country/ Commodity, and the Loan Purpose

County	Commodity	Highest loan amount required		
		USD(Ave.)	Player	Purpose
Mexico	Avocado	45,480	Input supplier	To purchase supplies, facilities and promotion fee
	Beef cattle	NA	NA	NA
	Nopal	265,305	Producer	To build collection center
	Tomato	7,580	Input supplier	To purchase trucks
	Tuna	NA	NA	NA
Guatemala	Cardamom	26,195	Aggregator	To purchase cardamom
	Coffee	130,977	Exporter	To purchase machinery and invest for organic coffee
	Broccoli	13,098	Aggregator	To purchase broccoli
Honduras	Coffee	81,663	Producer/ Aggregator	To invest truism and plant more coffee/To buy coffee
	Dairy farming	61,247	Input supplier	To enlarge the business and expand the space
	Lemon	40,831	Input supplier	To buy more supplies
El Salvador	Coffee	40,000	Producer	To invest the business
	Vegetable	23,333	Producer	To purchase agricultural materials, invest in equipment
	Chicken	24,200	Producer	To purchase chicken, input, facility
Panama	Rice	4,000,000	Processor	To investment in renewable energy, facilities, etc
	Plantain	NA	NA	NA
	Daily farming	30,000	Producer	To increase in production, purchase of milking machines
Dominican Republic	Rice	7,591,305	Processor	To purchase silos, drying machines, rice milling machines
	Fishery	55,887	Aggregator	To expand refrigeration facilities
	Cacao	15,931,448	Exporter	To build processing facility

Source: JICA survey team

The interviews with each organization revealed that the most frequently cited bottleneck players in FVCs were producers (8), processors/gatherers (3), input suppliers (2), and retailers/exporters (1) in order, and there was a tendency that the upstream of FVCs was selected as the main challenges. The challenges faced by each player varied by country and commodity. For instance, producers faced not only cultivation-related challenges such as pests, diseases, and irrigation but also post-harvest handling, processing facilities, lack of labor, and other diverse challenges.

On the other hand, aggregators commonly cited a lack of facilities, such as warehouses and cold chains, as a main challenge. In the case of coffee in Guatemala and El Salvador, there was an emphasis on the importance of producers having processing facilities, including wet mills. For rice in Panama and the Dominican Republic, and vegetables in El Salvador, the elimination of tariffs emerged as a common challenge among all FVC players. This underscores the threat posed by the substantial transformation of the business environment.

The players cited as having the most potential were producers/exporters (8), followed by processors (2). While only one exporter was mentioned in the interviews for bottlenecks, exporters were most frequently mentioned for potential, along with producers, indicating that each organization is focusing on exports. This includes some items for which a high percentage of exports are already established through channels that allow them to sell at a higher price than for domestic consumption, while others, such as avocados and beef cattle from Morelos, Mexico, and lemons from Honduras, currently have a

low percentage of exports but are hoping to increase export volumes in the future.

Furthermore, coffee FVCs consistently identified potential for value addition through specialty coffee and agroforestry in each country. Conversely, the previously mentioned commodities, with domestic consumption accounting for 99% or more, concentrated on meeting high domestic demand and enhancing value according to domestic standards. Therefore, it is crucial to recognize that the nature and objective of support will vary based on the final exit point of the FVC for that specific commodity.

Table 4.3.2 Main Challenges (Bottlenecks) and Opportunities on FVC

County	Commodity	Main Challenge		Main opportunity	
		Challenge	Player	Opportunity	Player
Mexico	Avocado	Lack of post harvesting knowledge and ware house	Producer Aggregator	Exporting potential is high	Exporter
	Beef cattle	Competition with imported beef	Input supplier Producer	Increase of consumption in the world	Exporter
	Nopal	Low quality and lack of advertisement for export	Producer Exporter	Demand increase in the country	Producer
	Tomato	NA	NA	NA	NA
	Tuna	Cold Chain	Aggregator	High demand for export	Exporter
Guatemala	Cardamom	Lack of process facility	Processor	High price of export product	Exporter
	Coffee	Wet mill for farmers	Producer	Specialty coffee	Producer Exporter
	Broccoli	Lack of irrigation and green house	Producer	Low risk to sell	Producer
Honduras	Coffee	Unstable price and lack of labor	Producer	Specialty coffee	Producer Exporter
	Dairy farming	Lack of access to loan	All players	Large room for development	All players
	Lemon	Increase of input	Input supplier	Expand export	Exporter
El Salvador	Coffee	Lack of process facility for farmers	Producer	Add value by Agro-forestry	Producer
	Vegetable	Elimination of tariffs	All players	Large land and high skills of farmers	Producer
	Chicken	Competition with other firm	Retailer	High demand in domestic	All players
Panama	Rice	Elimination of tariffs	All players	Full grain rice can be sold at higher price	Producer Processor
	Plantain	Lack of processed product	Processor	Increase production by installing of Irrigation	Producer
	Daily farming	Competition with imported cheese and yogurt	Processor	High demand of processed product	Processor
Dominican Republic	Rice	Elimination of tariffs	All players	High demand in domestic	All players
	Fishery	Lack of boat Lack of cold chain	Fisher man Aggregator	To sell restaurant at higher price	Fisher man
	Cacao	The trees are old, and productivity is low	Producer	Construction of the laboratory for export	Exporter

Source: JICA survey team

This FVC analysis survey covered a wide range of topics, covering three commodities/countries in six countries. As mentioned above, coffee, which is greatly influenced by international market prices and needs, is influenced by trends in the international market. For instance, the recent popularity of specialty coffee, the environmental conservation movement through agroforestry, and respect for workers' rights. It is clear that there are many similarities among the countries. As for challenges, it is commonly pointed out that the ownership of processing facilities by production cooperatives not only increases producers' income but also leads to more efficient transportation and reduced fuel consumption (carbon dioxide reduction) by eliminating the need to transport coffee cherries over long distances in

their raw state.

In terms of domestic consumption, the issue of eliminating tariffs under DR-CAFTA is commonly mentioned in the rice FVCs of the two target countries. This elimination of tariffs, not limited to rice, is a common challenge for the member countries Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and the Dominican Republic. In addition, a common challenge in dairy farming in Honduras and Panama was the loss of opportunities for value addition due to the oligopoly of imported processed products such as cheese. On the other hand, other survey items such as FVC flows, number of players, export/domestic consumption ratio, and technical and financial needs all varied, and little can be said about commonalities.

PART II: STUDY ON SUPPORT MEASURES BY JAPAN

Based on the basic information compiled in Part I, three candidate countries were selected for implementation of loan projects, and field surveys were conducted (Mexico was added to be a total of four). Part II focuses on the results of Japan's consideration of support measures in the four target countries based on the results of these field surveys. First, an overview of the process of selecting the countries for the field survey is presented. Then, the results of the FVC in-depth analysis conducted in each country are summarized, and finally, a development scenario is presented.

CHAPTER 1 SELECTION OF COUNTRIES FOR FIELD SURVEY (4 COUNTRIES)

The following steps were taken to organize and analyze the information for the selection of countries for the detailed FVC and financial surveys. First, based on the results of the desk review conducted up to August 2022, the characteristics of agriculture and finance in the six target countries were comprehensively reviewed and the issues to be considered were organized. The characteristics of each country are listed at the end of this chapter as "Table 1.1.4 Basic Indicators for Selecting Field Survey Countries," and "Table 1.1.5 Evaluation Summary for Selection of Countries for the Field Survey," shows the characteristics/ potentials and issues in agriculture and finance identified.

As shown in Table 1.1.5, the feasibility of implementing loan project for Honduras and El Salvador is judged low at this time, especially from the perspective of financial eligibility. Therefore, two or three countries from the remaining four countries are considered based on the following two selection policies: to select countries that are considered to have relatively high potential for project formulation, and to provide diversity in the assistance themes and possible assistance schemes. The countries considered under each selection criterion are listed below.

Principle 1: Selection of Countries with Relatively High Potential for the Formation of Loan Project

Since the purpose of this survey is to formulate a support plan with a view to providing loan project (TSL, project loans, and PSIF), countries that are considered to have higher potential for project formulation will be selected, taking into consideration loan eligibility, support needs, and other factors that have been identified. Based on this principle, the following three countries were tentatively selected. For these target countries, a diversity of possible support schemes can be secured.

Table 1.1.1 Candidate Countries with High Potential for Project Formulation (3 Countries)

No.	Country	Reasons for Selection
1	Dominican Republic <TSL/Project Loan>	<ul style="list-style-type: none"> • The existence of the TSL plan by the IDB indicates the potential for TSL implementation through donor coordination. The eligibility of the associated banks is also the most promising at this time. • There is an extensive record of support by Japan, including promotion of rice.
2	Mexico <PSIF>	<ul style="list-style-type: none"> • Many past projects in PSIF exist. There is a high demand for investment in vegetables and fruits. • There is a need to confirm the target companies for loans and the expected benefits to FVC from PSIF. →Consider the existence of promising companies and the size of the beneficiaries, etc.
3	Panama <Project Loan, TSL, PSIF>	<ul style="list-style-type: none"> • The potential for support for women is relatively high due to the high percentage of women in agricultural labor and the high percentage of land ownership by women. • Rice is the staple food of the country, and rice is grown in hilly areas and river basins, so there is potential to take advantage of Japanese technology (rice cultivation and irrigation technology, water use, and strengthening the capacity of cooperatives, etc.).

Principle 2: Ensure Diversity of Support Themes

In considering future support by JICA, it is suggested that themes similar to those in JICA's "Cluster Strategy" be prioritized. To this end, selection shall be made, ensuring as much diversity as possible in

terms of support themes. Based on this principle, the following three countries were considered.

Table 1.1.2 Combination of Candidate Countries with Different Themes of Support (3 Countries)

No.	Country	Reasons for selection
1	Dominican Republic <Organic products VC/ support for rice>	<ul style="list-style-type: none"> The country is a major exporter of organic agricultural products (bananas and cacao), and it could serve as a model case for strengthening of niche agricultural product VC. Japan has provided multiple supports, including for rice.
2	Guatemala <Small farmer support>	<ul style="list-style-type: none"> Support for mitigating migrant workers through promotion of domestic agriculture, cardamom cultivation by indigenous people, etc. Coordination with the coffee VC enhancement technical cooperation project could be a candidate. Agricultural insurance (including index insurance) as a measure against climate change can be considered.
3	Mexico < FVC Support for Corporate Management >	<ul style="list-style-type: none"> In recent years, there have been reports of high investment needs in horticultural crops by medium-sized farmers/management entities. There is a movement to promote rice cultivation in the southern region due to water shortage in the northern region.

Note: In the case of support for small-scale farmers, attention should be paid to securing the scale of the project as loan project.

Based on the above two selection criteria, following four countries were selected for field survey. Originally, Mexico, the fourth country, was positioned as an "optional" but information on companies that could be recognized as having potential for PSIF was accumulated during the period of field survey in other countries, and it was decided to include Mexico in the second round of field survey conducted in January 2023.

Table 1.1.3 Countries Targeted for Field Survey and Direction of Support

No.	Country	Reasons for Selection/Direction of Support
1	Dominican Republic <TSL/Project Loan>	<ul style="list-style-type: none"> The existence of the TSL plan by the IDB indicates the potential for TSL implementation through donor coordination. The eligibility of the associated banks is also the most promising at this time. There is an accumulated record of support by Japan, including ones for rice production. Given the recent increase in loans by the IDB to the rice sector, it is conceivable that the country's rice value chain, including precision agriculture, could be strengthened through a TSL co-financed with the IDB. However, the TSL does not need to be limited to specific commodities but supporting a wide range of FVCs in the country.
2	Guatemala <Small farmer support>	<ul style="list-style-type: none"> Support for mitigating migrant workers through promotion of domestic agriculture, cardamom cultivation by indigenous people, etc. Coordination with the Coffee VC Enhancement TCP could be a candidate. Agricultural insurance (including index insurance) as a measure against climate change can be considered. For some of the items mentioned above, it is conceivable to form a support scheme that can benefit even smallholders, based on support provided in coordination with experts, especially when the existence of companies, etc. eligible for PSIF is recognized.
3	Panama <Project Loan, TSL, PSIF>	<ul style="list-style-type: none"> The potential for support for women is relatively high due to the high percentage of women in agricultural labor and the high percentage of land ownership by women. Rice is the staple food of the country, and rice is grown in hilly areas and river basins, so there is potential to take advantage of Japanese technology (rice cultivation and irrigation technology, water use, and strengthening the capacity of cooperatives). Considering the relatively rapid economic development of the country in the region, support for innovative agricultural development such as smart agriculture and precision agriculture may be considered.
4	Mexico <PSIF>	<ul style="list-style-type: none"> The country has a multiple record in PSIF. In particular, there is a high demand for investment in vegetables and fruits. There is a need to confirm the target companies for loans and the expected benefits to FVC from such loans, with PSIF in mind. Regardless of the product line, PSIF may be made to companies that plan to develop business in the broad agricultural sector.

Table 1.1.4 Basic Indicators for Selecting Field Survey Countries <Related to Agriculture, Finance, Gender, and Donor Cooperation>

Criteria	Mexico	Guatemala	Honduras	El Salvador	Panama	Dominican Republic	summary
Agricultural Potential							
Water resources	Large water use in the agricultural sector (76%) and low water resources per capita	N/A	Large water use in the agricultural sector (73%)	N/A	Small water use in the agricultural sector (37%), abundant water resources	Large water use in the agricultural sector (83%) and low water resources per capita	In the Dominican Republic and Mexico, the amount of water resources per capita is low and the share of water use by the agricultural sector is high. Therefore, measures to effectively utilize water resources by upgrading agricultural water use (irrigation improvement, water conservation, reuse, etc.) are necessary.
Agricultural land	Agricultural land area is about half of the country's total land area, with a large area of grazing land	Agricultural land area is about 30% of the country's total land area, with a large area under perennial crops such as fruit trees.	Agricultural land area is about 30% of the national land area	Agricultural land area is about half of the country's total land area	Agricultural land area is about 30% of the country's total land area, with a large area of grazing land	Agricultural land area is about half of the country's total land area	Mexico and Panama have large pastureland areas and potential for livestock and dairy farming.
Irrigation rate (%)	31	17	6	5	4	25	Mexico and the Dominican Republic have high irrigation rates.
Agricultural Characteristics	North: Irrigation is essential in arid and semi-arid areas. Many large, enterprise-like operations with investment in water use. Livestock, maize, and tomato production are thriving. Central: warm and humid due to its high altitude. The Bajío region northwest of Mexico City has a complex topography and diverse agricultural patterns while fertile agricultural lands are	High expectations for job creation through agricultural and rural development. Cardamom, an important export crop, is grown by indigenous people, but this value chain is said to be extremely unfair to producers, and there is a high social need for FVC improvement.	Major grains, export crops, livestock, and farmed shrimp. There are only about 80,000 hectares of irrigated land, most of which is arable land for traditional crop producers (melon, pineapple, watermelon, etc.). There is a focus on the production of agricultural products with regional characteristics. Susceptible to hurricane damage.	Coffee is the main agricultural product, and sugarcane and corn are also important. The majority of farmers are small-scale family farmers, but in recent years, the outflow of population to urban areas has become an issue.	Rice is the staple food, with an annual consumption of 71 kg/person. The majority of the country is mountainous, with flat areas such as river basins where large scale cultivation of sugar, millet, rice, bananas, pineapples, etc. is common. Medium-scale operation: Owns several hectares of land in a mountainous area, growing rice, corn, plantain, beans, vegetables, and fruit trees.	One of the world's leading exporters of niche agricultural products (fair trade, organic, high quality); with 14,000 organic producers, one of the largest organic sectors in Latin America. The challenge is how to make this market opportunity benefit small-scale farmers as well.	Coffee and bananas are generally the main crops in all countries, and fruit trees, vegetables, and craft crops are grown on top of these crops. Selecting a country that produces unique agricultural products (Honduras: melons, Guatemala: cardamom, Dominican Republic: organic agricultural products, etc.) is also a consideration. However, be mindful of the size of the investment.

Data Collection Survey on Food Value Chain Strengthening and Agricultural Finance in Central America and the Caribbean

Criteria	Mexico	Guatemala	Honduras	El Salvador	Panama	Dominican Republic	summary
Agriculture GDP share (%)	widespread. 4	10	11	5	3	6	For Guatemala and Honduras, the share of agriculture GDP is around 10%, which remains an important industrial sector, especially in rural areas
Rural Population Percentage (%)	20	49	43	28	32	19	High in Guatemala and Honduras
Percentage of agricultural workforce (%)	13	31	30	16	14	9	High in Guatemala and Honduras
Agricultural Labor Employment Status	Equal number of self-employed and employees	Equal number of self-employed and employees	Roughly double the number of self-employed (many small and medium sized businesses)	Equal number of self-employed and employees	Roughly three times as many self-employed people (many small and medium sized businesses)	Roughly three times as many self-employed people (many small and medium sized businesses)	Many small and medium-sized entities in Honduras, Panama, and the Dominican Republic.
gender							
Percentage of women in agricultural labor force (%)	11.5	10.3	10.5	8.6	24.4	6.7	High in Panama
Percentage of firms with women as CEOs (%)	14.6	18.5	28.0	28.0	23.5	21.2	The data are not specific to agriculture-related firms. El Salvador and Honduras are high, but not by much.
Percentage of women landowners (%)	15.7	7.8	14.4	11.5	29.3	10.2	Overall, women's access to land ownership is low and financing is difficult to obtain. In terms of ease of gender mainstreaming, higher countries such as Panama have an easier time, but countries such as Guatemala, where women's land ownership is lower, can be said to have a greater need.
Governments' gender initiatives (related to agriculture and financial inclusion)	A National Financial Inclusion Strategy has been developed by the government, which emphasizes the financial inclusion of women. The Agricultural	A Presidential Women's Office has been established, and furthermore, the development plan "K'atun 2032" calls for the achievement of gender equality.	Although the government launched the National Financial Inclusion Strategy in 2015, its effectiveness was a discursive enemy due to the inadequate	The National Council for Financial Inclusion and Education is in charge of implementing the financial inclusion policy, and the Central Bank, which	The Panamanian government is committed to implementing public policies for equal opportunities for women, and the Action Plan for	Although there are no direct government policies or programs on agriculture or financial inclusion, the Central Bank of the Dominican Republic has	In the Central American region, women's involvement in agricultural production activities is limited, and government support for women focuses on responding to violence and supporting women's access to education and health care. On the

Criteria	Mexico	Guatemala	Honduras	El Salvador	Panama	Dominican Republic	summary
	Trust Bank (FIRA), a government-affiliated financial institution, has issued 3 billion pesos of social and gender bonds in 2020.	There is a gender unit within the Ministry of Agriculture and Pasture, but the number is small, ranging from 2 to 6 people, who work concurrently.	A gender policy for the Ministry of Agriculture and Pasture is being developed, and a gender unit has been established in the Livestock Secretariat, but the number of people is two to six, working concurrently.	is the coordinator of this council. It promotes the implementation of the policy. The government has initiated a program to increase digital payment opportunities to improve access to financing by women, especially rural women	Equal Opportunities for Women 2014-2024 has been developed.	developed a National Strategy for Financial Inclusion 2022-2030.	other hand, financial inclusion is a national strategy in Mexico, the Dominican Republic, and Honduras. In addition, the importance of women's access to finance is recognized in many countries, such as in El Salvador, where the central bank promotes financial inclusion.
Financial							
Possibility of TSL with yen loans	Fair Loans to farmers through FIRA or FND	Fair Loans to farmers through BANRURAL	Low Currently difficult to implement yen loan projects with BANADESA as the implementing agency	Fair Loans to farmers through BFA or BH	Fair Loans to farmers through Banco Nacional de Panamá	High Loans to farmers through BAGRICOLA	Currently, only the Dominican Republic is recognized as a possible TSL. From the perspective of the Bank's implementation capacity, the possibility of TSL is also considered for Panama.
Possibility of yen loan support through co-financing with other donors	Fair There is an existing TSL project at the World Bank (FND is the executing agency); there is no IDB.	Low No World Bank or IDB projects that could be co-financed have been identified.	--	Low Neither the World Bank nor IDB can confirm any existing TSL projects.	Low Neither the World Bank nor IDB can confirm any existing TSL projects.	High IDB is preparing a new TSL project.	Currently, only the Dominican Republic has the possibility of other donor coordination.
Financial health of the Agricultural Development Bank* * Including banks with similar functions	High (FIRA) Low (FND)	Fair (BANRURAL)	Low BANADESA is financially insolvent.	Fair (BFA) High (BH)	Fair (BNP) Financial condition is generally sound, but background of increasing NPLs must be confirmed	High (BAGRICOLA)	Currently, the Agricultural Development Banks of Mexico, Dominican Republic, and El Salvador are sound.
Possibility of PSIF	Fair There are many projects by the IDB for the agricultural sector. It depends on whether we can find	Low The IDB's projects for the agricultural sector in the past 10 years have been limited to only two projects.	Low There have been no agricultural sector projects by international organizations in the	Low The IDB's projects for the agricultural sector in the past 10 years have been limited to sugar mills.	Low No projects for agriculture by international organizations have been implemented to	Low There has not been a project for the agricultural sector by an international organization in the	In Mexico, there are many projects by IDB for the agricultural sector. Otherwise, there are relatively few or none.

Data Collection Survey on Food Value Chain Strengthening and Agricultural Finance in Central America and the Caribbean

Criteria	Mexico	Guatemala	Honduras	El Salvador	Panama	Dominican Republic	summary
	investment projects.	Fair If funding is to be provided to BANRURAL, investment and loan funds will be considered.	last 10 years.	Fair If funding is to be provided to BH, investment and loan funds will be considered.	date. Fair Private financial institutions have provided investment and loan funds to finance the agricultural sector. IDB is currently implementing a loan program to support small family farmers.	last 20 years.	
Other	--	--	IDB is providing loans for hurricane and corona damage recovery	The economic situation has deteriorated significantly since 2020, and support through yen loans, etc. may be difficult to obtain in the immediate future.		--	
support coordination							
Support from other donors	Many overseas investments and loans by IDBs. (Direct loans of several billion yen for the development of greenhouses (farms), distribution centers, processing facilities, etc. by large companies, targeting vegetables, fruits, etc.). Meanwhile, projects are being implemented for small farmers, indigenous peoples, and women to mitigate their vulnerability due to climate change.	IDB: Support for climate-friendly agricultural technologies for smallholder entrepreneurs and farmers (loans), and for improving the competitiveness and financing of coffee cultivation (technical cooperation) BCIE: Agricultural Insurance Feasibility Study Support (Technical Assistance) *There is a plan for JICA's technical assistance program to strengthen coffee VC.	IDB: Coffee Chain Digitalization for Strengthening Resilience of Specialty Coffee Producers (Technical Cooperation), Value Chain and Rural Business Support (Loan)	IDB: Technology introduction and innovation for small farmers (investment incentives), support for development of information systems for coffee forests (technical cooperation) *Vegetable SHEP projects by JICA available	IDB: Sustainable and Inclusive Agricultural Innovation Project (loan); Support for post-COVID economic recovery for indigenous coffee producers (technical cooperation)	IFAD: Promoting small farmers' access to markets and partnerships with businesses. Currently assisting small farmers to implement climate change-adaptive agricultural technologies and market-needs-based agriculture. IDB: Financed agricultural and nutrition innovation projects. Also provided technical assistance to coffee growers.	Loans from other donors (e.g., IDB) make co-financing easier, but the issue is how to allocate quota shares. Mexico provides relatively large scale support, while other donors provide loans and technical cooperation to producers.

Source: Organized by JICA survey team based on information from various statistics and reports.

Note: Based on information gained by August 2022. Information obtained from field surveys is reflected in each chapter.

Table 1.1.5 Evaluation Summary for Selection of Countries for the Field Survey

Country	Evaluation from Agricultural Perspective (incl. gender)	Evaluation from a Financial Perspective (incl. supporting schemes and donor coordination)	Comprehensive evaluation	Countries for survey
Mexico	<p><Characteristics and Potential></p> <ul style="list-style-type: none"> Large pasture area (livestock and dairy farming) High irrigation rate (31%) There is an agricultural development plan in the south (especially rice) There is a lot of agricultural corporations, and there is momentum to introduce agri-tech. <p><Issues></p> <ul style="list-style-type: none"> Low water resources (especially noticeable in the north → moved to the south) 	<p><Characteristics and Potential></p> <ul style="list-style-type: none"> FIRA is financially sound (PFI candidate) Numerous foreign investments and loans by IDB (vegetables and fruits). Climate change vulnerability mitigation projects are being implemented for small farmers, indigenous peoples, and women. <p><Issues></p> <ul style="list-style-type: none"> FND's financial health is poor (FIRA only) 	<ul style="list-style-type: none"> The country has a strong record in PSIF. In particular, there is a high need for investment in vegetables and fruits. There is a need to confirm the target companies for loans and the expected benefits to FVC from such loans, with PSIF. →Consider the existence of promising companies and the size of the beneficiaries, etc. 	Recommended
Guatemala	<p><Characteristics and Potential></p> <ul style="list-style-type: none"> Large area under perennial crops such as fruit trees Cardamom, a major export crop, is grown primarily by indigenous peoples. Important industrial sector with high GDP in agriculture Percentage of rural population and agricultural labor population is high <p><Issues></p> <ul style="list-style-type: none"> Low percentage of women landowners (7.8%), making it difficult to obtain loans Indigenous people not incorporated into FVC business 	<p><Characteristics and Potential></p> <ul style="list-style-type: none"> Potential remains for loans to farmers (TSL) through BANRURAL IDB: support for small entrepreneurs and farmers (loans), strengthening competitiveness of coffee cultivation (technical cooperation) BCIE: agricultural insurance FS (Technical Assistance) <p><Issues></p> <ul style="list-style-type: none"> World Bank and IDB projects that can be co-financed are not found. There are potential that funding from BANRURAL and government programs is adequate 	<ul style="list-style-type: none"> High need for research on FVC for fruit trees Agricultural insurance FS is being implemented and there are needs related to agricultural insurance TSL could be a potential 	Recommended
Honduras	<p><Characteristics and Potential></p> <ul style="list-style-type: none"> Non-traditional crops are widely grown on irrigated land (melons, etc.) Percentage of rural population and agricultural labor population is high Many small and medium-sized farmers <p><Issues></p> <ul style="list-style-type: none"> Susceptible to hurricane damage 	<p><Characteristics and Potential></p> <ul style="list-style-type: none"> Specialty coffee support by IDB available (digitalization technical cooperation, rural business loans) <p><Issues></p> <ul style="list-style-type: none"> BANADESA is financially insolvent. 	<ul style="list-style-type: none"> There is a need for VC development assistance for non-traditional crops on limited irrigated cropland. However, BANADESA, an agricultural development bank, is financially insolvent, and it is currently difficult to carry out yen loan projects with BANADESA as the implementing agency. 	Fair
El Salvador	<p><Characteristics and Potential></p> <ul style="list-style-type: none"> By far the largest producer of sugarcane and the number one exporter of raw sugar Vegetable SHEP case by JICA available <p><Issues></p> <ul style="list-style-type: none"> Percentage of women in agricultural labor is relatively low. 	<p><Characteristics and Potential></p> <ul style="list-style-type: none"> IDB support for small farmers (coffee) Vegetable SHEP projects by JICA <p><Issues></p> <ul style="list-style-type: none"> Worsening economic conditions after 2020 Existing TSL projects from other donors cannot be confirmed. 	<ul style="list-style-type: none"> While sugarcane production is the key industry, JICA is implementing a SHEP project for vegetable cultivation and there is potential for cooperation. However, the country ranks first in the world in the risk of national debt default in 2022 and its eligibility for implementing loan projects is significantly low. 	Fair
Panama	<p><Characteristics and Potential></p> <ul style="list-style-type: none"> Large pasture area (livestock and dairy farming) 	<p><Characteristics and Potential></p> <ul style="list-style-type: none"> IDB is currently implementing a loan program to 	<ul style="list-style-type: none"> The potential for support for women is relatively high due to the high percentage of women in 	Recommended

Data Collection Survey on Food Value Chain Strengthening and Agricultural Finance in Central America and the Caribbean

Country	Evaluation from Agricultural Perspective (incl. gender)	Evaluation from a Financial Perspective (incl. supporting schemes and donor coordination)	Comprehensive evaluation	Countries for survey
	<ul style="list-style-type: none"> Many small and medium-sized farmers Rice is the staple food, but it is also heavily imported. <p><Issues></p> <ul style="list-style-type: none"> High percentage of women in agricultural labor force (24%) Higher percentage of women landowners (29%) 	<ul style="list-style-type: none"> support small family farmers. The same, providing economic support for indigenous coffee production and post-COVID 19 (technical cooperation) <p><Issues></p> <ul style="list-style-type: none"> Existing TSL deals from other donors cannot be confirmed. No projects for agriculture by international organizations have been implemented to date. 	<p>agricultural labor and the high percentage of land ownership by women.</p> <ul style="list-style-type: none"> Rice is the staple food of the region, and rice cultivation is conducted in hilly areas and river basins, so there is a possibility that Japanese technology can be utilized. If there is a need for funds on the part of the bank, TSL could be considered. If there are appropriate projects, the possibility of PSIF could be considered. 	
Dominican Republic	<p><Characteristics and Potential></p> <ul style="list-style-type: none"> High irrigation rate (25%) Organic farming initiatives exist (bananas, cacao) Many small and medium-sized farmers <p><Issues></p> <ul style="list-style-type: none"> Insufficient amount of water resources (need to improve efficiency) 	<p><Characteristics and Potential></p> <ul style="list-style-type: none"> Existence of TSL plan by IDB (existence of lending banks) Loans and technical assistance being provided by IFAD and IDB (small farmers, climate change related, coffee) <p><Issues></p> <ul style="list-style-type: none"> There has not been a project for the agricultural sector by an international organization in the last 20 years. 	<ul style="list-style-type: none"> The existence of the TSL plan by the IDB shows the potential for TSL through donor coordination. The eligibility of the associated banks is also the most promising at the moment. JICA has provided support for irrigation development through yen loans in the past. Organic agricultural products (banana and cacao) exports are thriving and could serve as a model case for support to strengthen niche agricultural product FVCs. There is an extensive record of support by Japan, including on rice. 	Very Much Recommended

Source: JICA survey team, based on information in the previous table and other sources.

Chapter 2 FOOD VALUE CHAIN ANALYSIS

2.1 Current Status and Issues of FVC in the Countries Surveyed

This section summarizes the FVC status of each country and commodity based on the results of interviews with key players in FVC, site visits, and discussions with administrative agencies supporting FVC for each of the three commodities (Table 2.1.1) in the four countries where field surveys were conducted (Mexico, Guatemala, Panama, and the Dominican Republic). The following table summarizes the status of FVCs in each of the four countries.

Table 2.1.1 Items Surveyed in the Four Countries Covered by the Field Survey

Country	Target Commodity			
	Avocado	rice	Nopal.	tomato
Mexico				
Guatemala	Coffee	Cardamone	Vegetable (Broccoli)i	
Panama	rice	Dairy Products (Milk)	Plantain	
Dominican Republic	rice	Cacao	Fishery	

Source: JICA Survey Team (2022), Note: Due to the limited survey period in Mexico, four products concentrated in specific regions were selected.

2.1.1 Mexico

Considering the limited time available for field research in Mexico, we concentrated on Mexico City and the neighboring state of Morelos, focusing on the commodities that could be surveyed there. This section provides an overview of FVC production and the current status and issues facing the major players in FVC, focusing on avocados, rice, cactus, and tomatoes, which were the target commodities of the survey.

1) Avocado (*Persea americana*)

(1) Outline of production

Mexico is the world's number one avocado producer and exporter, and many of the country's avocados are exported to Japan. Avocados are also a very important commodity in Mexican agriculture, and the country currently ranks first in the value of its agricultural exports.

Table 2.1.2 Avocado Harvested Area in Mexico and Yield (2021)

State	Area Harvested	Production	Production Share
Michoacán	166,851	1,826,416	75% of
Jalisco.	21,414	256,021	10% (%)
México	10,270	123,464	5% (of the total)
Nayarit.	6,945	75,013	3
Morelos	5,585	52,454	2% (of the total)
Guerrero	2,913	21,464	1
Puebla	2,412	18,165	1
Chiapas	2,288	14,395	1
Oaxaca	2,663	13,899	1
Other 18 States	4,930	39,061	2% (of the total)
Total	226,272	2,440,351	100%.

Source: SAICON 2021

The main avocado production areas are located in the southern Pacific region, of which Michoacán is the largest producer, accounting for 75% of total production (Table 2.1.2). Due to the high recognition of Michoacán avocados in export markets, it has been reported in recent years that avocados produced in other states, such as Morelos, are exported through Michoacán (as if from Michoacán) to compensate for the shortage of supply to meet the growth in exports.

There are many varieties of avocados produced in Mexico, including Fuerte, Bacon, and Criollojo, and many different varieties are distributed, especially for the domestic market. Most of the avocados exported to Japan are the creamy "Hass" variety, which the Japanese prefer. The small size of the Hass variety, and its relatively low susceptibility to cargo damage, are also reasons why it is favored for export.

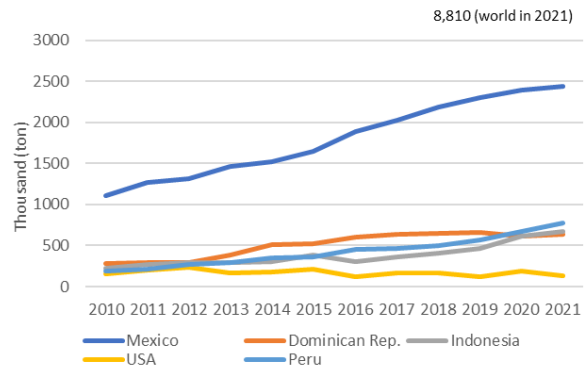


Figure 2.1.1 Global Avocado Production Trends (Top 5 countries in 2021)

Source: FAOSTAT (2023)

Note that avocado production is on the rise worldwide, and new plantings are increasing in the Dominican Republic and other countries in the Central American and Caribbean regions covered in this study (Figure 2.1.2). Against this backdrop, there are reports that the high profitability of the crop has exposed farmers to security problems in Mexico. ¹

(ii) Major players on the FVC

In the state of Morelos, where the field survey was conducted, agricultural cooperatives procure avocados from their members or non-members, which are then brushed, sorted, packed in boxes, pre-cooled, and shipped to supermarkets. Thus, in Mexico, it is common for agricultural cooperatives or companies to be established, and for such corporations to invest funds to build processing facilities.

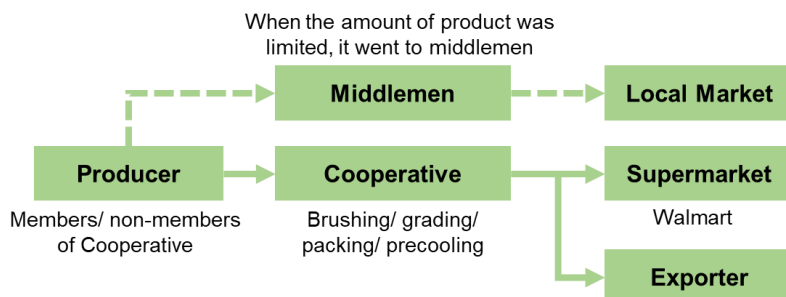


Figure 2.1.2 FVC of Avocado in Mexico

Source: JICA Survey Team (2023)



A technician uses a hardness tester to check the ripeness of avocados before shipping. The poster in the background shows the standards required by Walmart, the company to which the avocados are shipped.

¹ Are Avocados the "Devil's Fruit"? --The Boom's Environmental Destruction and Refugee Crisis <https://news.yahoo.co.jp/byline/mutsujishoji/20210621-00243982>

Of these, Aguacateros Tetela Del Volcan S.P.R. de R.L., which was the subject of the survey, deals directly with Walmart and is able to ship at stable prices. Prior to the formation of the cooperative, the products were mainly sold to an intermediary called Coyote, and the local market was the main destination. After the cooperative took off, direct sales to supermarkets were realized, resulting in a 40% increase in sales prices.

The destinations for shipments from these cooperatives sell directly to different supermarkets according to different standards for products that meet those standards. For example, Walmart has four different standards for different sizes, and the products are shipped only after confirming that they meet the standards for hardness, etc. The cooperative does business with three supermarkets. The cooperative does business with three supermarkets, and since different supermarkets have different buyers and require different quality and standards, most of the avocados produced are shipped to one of the supermarkets, while those that do not meet those standards are sold to the local market.

(iii) Issues for each player

- Combination of disease and pest control and pesticide residue control

In general, pests and diseases are a major problem, and pesticide application is necessary as a countermeasure. However, procedures such as not bringing pesticides into the collection area for three weeks after application have been established, and thorough compliance with these rules is a challenge. While damage caused by pests and diseases can be confirmed by visually inspecting avocado fruit, it is difficult to confirm whether pesticide residues are being properly managed because they cannot be determined without a chemical test. It is important to be thorough, especially when shipping as an organization, as this can lead to reputational risk.



Avocados sorted by size. Brush polishing is done automatically in the lane at the back right, and the fruit is sorted in the front portion.

- Certification (especially for export)

In most cases, farmers are required to obtain some type of certification for modern markets such as supermarkets, and especially for exports, they are often required to obtain Global GAP certification. Certification is costly and labor-intensive, and maintaining this certification is a major burden for farmers. In order to obtain and maintain certification, farmers are required to record harvest yields, conduct regular soil and water quality inspections, and use compost to keep the amount of chemical fertilizer applied below a certain level.

- Land ownership patterns and organization

In south-central Mexico, farmers' land holdings are relatively small due to the historical background of the region, and the actual ownership often belongs to cooperatives. As a result, this form of land ownership (lack of formal ownership) can be an issue when obtaining loans from banks (in some cases,

FIRA serves as a guarantor for cooperatives). In addition, the limited production per farmer requires organization in order to be able to sell directly to the market at a reasonable price, without using a middleman.

2) Comment

① Production Overview

The total harvested area of rice in Mexico is 40,000 ha, and approximately 257,000 tons of rice is produced annually. Originally, rice production in Mexico was widely practiced in large-scale irrigated areas in the northern part of the country, but in recent years, the main production areas have shifted to the central and southern parts of the country, where water resources are relatively abundant, partly due to the decline in river flow rates. Although the agricultural area in the central and southern regions is relatively small, the top four states of Campeche, Nayarit, Michoacan, and Veracruz account for approximately 70% of the national production (in 2021).

Table 2.1.3 Rice Harvested Area and Yield in Mexico (2021)

State	Area Harvested	Production	Production Share
Campeche	14,915	72,084	28%
Nayarit	7,356	52,803	21%
Michoacán	3,948	33,958	13%
Veracruz	2,902	26,703	10%
Colima	3,400	19,258	7%
Jalisco	2,960	18,307	7%
Tamaulipas	1,914	13,800	5% (of the total)
Morelos	872	9,120	4%
Tabasco	1,228	7,722	3
Guerrero	387	2,387	1
Chiapas	344	564	0
México	55	336	0
Total	40,280	257,041	100%

Source: SAICON 2021

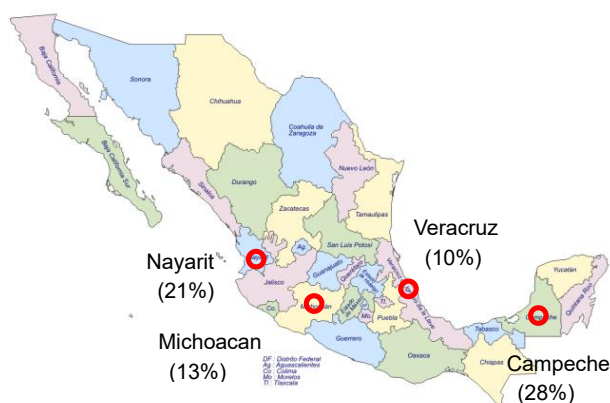


Figure 2.1.3 Major Rice Producing Regions in Mexico

Source: SAICON (2021)

In Mexico, rice is largely grown in two crops per year on the Atlantic side where irrigation is available, and only one crop per year in the rainy season on the Pacific side. As a national average, approximately 80% of the area is irrigated and 20% is rainfed (Table 2.1.4). The "fall and winter season" (a classification commonly applied to all crops), which is the dry season, accounts for less than 40% of the total cultivated area, while the "spring and summer season", which is the rainy season, accounts for over 60% (both in 2021).

Table 2.1.4 Rice Harvested Area in Mexico by Season and Irrigation (2021)

Season	Irrigated	Seasonal	Total	Share
Autumn-Winter	94,697	1,053	95,750	37%
Spring-Summer	115,458	45,833	161,291	63%
Total	210,156	46,886	257,041	100%
Share	82%	18%	100%	

Source: SAICON 2021

(ii) Major players on the FVC

The major players in the Mexican rice sector are farmers, rice mills, and distributors/supermarkets. In the state of Morelos (the 8th largest rice producer in the country), which we visited during our field research, farmers can grow either rice or sugarcane, and farmers who grow sugarcane as their main crop usually grow rice once every three to five years when they renew their sugarcane (one season crop). This is because the fertilizer applied to sugarcane and the plant residues after harvest can be effectively used for rice cultivation. However, due to the rising price of sugarcane as of 2022, many farmers have decided to switch to sugarcane immediately instead of growing rice. According to Arroceros De Morelos, a rice mill visited during the survey, of the 230 farmers who do business with the company, half are engaged in both sugarcane and rice farming, and half are dedicated to rice farming.

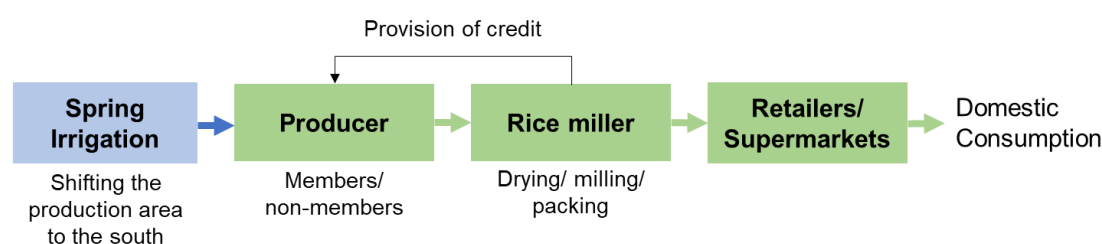


Figure 2.1.4 FVC of Rice in Mexico

Source: JICA Survey Team (2023)



Milled rice packaged in small portions. Varieties that are easy to cook are preferred.

Table 2.1.5 Average Rice Unit Yield in Mexico by State and Season (2021)

State	Autumn-Winter	Spring-Summer	Average
Campeche	5.9	3.6	4.4
Chiapas		1.7	1.7
Colima		5.7	5.7
Guerrero		3.8	3.8
Jalisco.	3.9	5.8	5.6
Morelos		10.4	10.4
Nayarit.	7.5	5.6	6.0
Tabasco		2.8	2.8
Tamaulipas	7.2		7.2
Veracruz.		6.4	6.4
México		6.9	6.9
Michoacán	8.8	8.6	8.7
Average	7.2	5.9	6.1

Source: SAICON 2021

The yield potential of rice cultivation in this region is very high, with an expected unit yield of about 10 tons per ha. As shown in Table 2.1.5, the state of Morelos achieves the highest average yield of 10.4 tons/ha, compared to the average unit yield of 6.1 tons/ha for Mexico as a whole in 2021. This is due, in part, to the availability of irrigated agriculture and the use of high-yielding varieties, although not necessarily high quality, of heart white rice.

The next major player on the FVC is the rice mill. The above rice mill was established as a cooperative, but is operated by 10 shareholders who contribute funds to the mill. The milling capacity is 90 tons/day on an input basis, which is defined by the capacity of the dryer. After harvest, rice is brought in bulk immediately from the field, and its moisture content is high (28%-30%). This needs to be lowered to around 14% before milling, which takes two to three days. In recent years, many rice mills have been milling rice in-house and packaging it for retail use. This mill also packs rice into various sizes for

shipment. The rice is shipped to supermarkets and other retail outlets.

One of the most notable functions of the rice mills is the provision of loan guarantees to farmers who have committed to sell their rice; when a farmer receives a loan with a FIRA loan guarantee, the farmer is required to self-bond at least 10% of the loan, which the rice mill guarantees on his/her behalf.

The Instituto Nacional de Investigaciones Agropecuarias (INIFAP) is a research institute focusing on rice and vegetables. tolerant, flood tolerant, and disease tolerant varieties), red rice control, and selective herbicides.



A dryer installed in a rice mill. Since the rice is not dried in the field, it must be dried early and over a long period of time after harvest to ensure that quality is not compromised.

(iii) Issues for each player

- Promotion of Research and Development

Against the backdrop of climate change, the rice sector is facing an urgent need for technological development in the production sector. In response, INIFAP, the country's agricultural research institute, has been making various efforts. Some of these include the above-mentioned variety improvement, while others include the use of ICT to predict the occurrence of pests and diseases over a wide area. According to INIFAP, the most important issue is to share knowledge and the latest information through collaboration among research institutes in each country, including genetic information from genebanks, and there is a great need for the creation and operation of such platforms. There is a great need for the creation and operation of such a platform.

- Maintain and improve crop acreage

When cultivated commodities can be easily changed, as is the case with sugarcane and rice in the state of Morelos, farmers select commodities based on the trend of sales prices, making it a challenge for rice millers to secure a certain amount of raw material each year. In recent years, in particular, the price of sugarcane has risen sharply, and the area under rice cultivation has been declining.

- Climate change applications and securing niche markets

In response to the above situation, the Morelos Rice Growers Association, which includes Japanese immigrants, plans to start producing sushi rice (a variety developed by crossing Japanese rice with Morelos rice) in response to the recent sushi boom. Morelos has abundant spring water, which is expected to be used for irrigation. The project will start production of Sushi rice, taking into consideration the market trend and the direction to drastically change the production area, which is difficult to apply to rice cultivation in the northern region due to the climate change. The plan is in the process of being realized with technical support from the Zacatepec Agricultural Experiment Station of INIFAP, a research institute, and a loan from a bank with FIRA as a guarantor.

3) *Meliosma Rigida* (Species of Flowering Plant)

(1) Outline of production

Nopal is a crop traditionally grown and consumed in Mexico. It is sold in the vegetable section of major supermarkets, and is also a popular ingredient on hotel breakfast menus. In recent years, it has been identified as a crop with high potential, such as in a United Nations report that cited it as one of the foodstuffs that could save the country from a food crisis in the future.

Table 2.1.6 Area and Yield of Uche Cactus Harvested in Mexico (2021)

State	Area Harvested (ha)	Production (ton)	Production Share
Morelos	4,217	405,581	47%
Ciudad de México	2,252	194,751	22%
México	1,001	86,399	10% (%)
Jalisco	739	35,482	4%
Puebla	406	31,693	4%
Michoacán	693	29,651	3
Other 22 states	3,142	85,399	10% (%)
Total	12,450	868,956	100%

Source: SAICON 2021 Nopalitos



Figure 2.1.5 Major Production Areas of the Cactus in Mexico

Source: SAICON (2021)

Of the edible stem and fruit of the *Ucimum* cactus, 870,000 tons per year (440,000 tons of fruit) will be produced in 2021 for the stem and leaf parts. The main production area is in the state of Morelos, which was visited in this study, and accounts for 47% of the national production. Other regions, such as Mexico City and Mexico State, are concentrated in the arid regions centered on Morelos State, with these three states accounting for nearly 80% of the total (in 2021).

(ii) Major players on the FVC

This study was conducted on a family enterprise, Nopimor, located in the state of Morenos. The company is engaged in the entire process of production, collection, processing, and export, and in addition to its own 40 ha plot, it also contracts with neighboring farmers to produce on a total of about 100 ha. The harvest of Uchiwa cactus can begin 3 to 4 years after planting, and from there it can be harvested continuously for 10 to 20 years. The harvested Uchiwa cactus is sometimes shorn of its thorns for domestic distribution, but for export, the thorns are left intact and shipped in boxes to prevent deterioration. In addition, they are also processed into salted, pickled, and jam products, which are exported to Asia and other countries. In Mexico, small-scale processing plants that handle everything from production to processing and distribution are scattered throughout the main production areas.

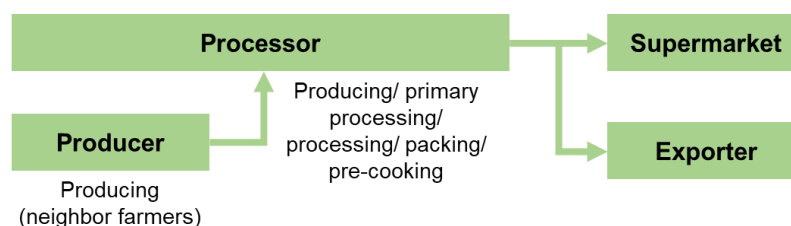


Figure 2.1.6 FVC of the Uchellea cactus in Mexico

Source: JICA Survey Team (2023)



Uchellea cactus is planted relatively densely for high yields. Frost can be a problem at high altitudes.



Stem and leaf parts of a Uchiwa cactus prior to shipment. To prevent wilting, thick-fleshed plants are selected for export, and the spines are not removed.

(iii) Issues for each player

- Pest Control and Certification

While the strength of the Uchiwa cactus is that it can be grown even in relatively dry climates, it is particularly prone to mites called cochineal, making pest control a major issue. In addition, the company exports to North America and is often required to obtain Global GAP and other certifications to prove proper management when exporting to those countries, and obtaining such certifications is a challenge. Nopimor, which we visited, has been inspected by SENASICA (Servicio Nacional de Sanidad, Inocuidad y Calidad Agroalimentaria), a government quarantine office, and obtained Good Practice certification. However, they have yet to acquire Global GAP certification. Furthermore, the high altitude of the highlands in central Mexico also poses a challenge due to hail and frost.

- High costs (electricity) and market development in processing and sales

However, for exports, the company has to prevent shriveling by selecting thick-walled plants and pre-cooling them before shipping. Nopimor has obtained an export license to Japan, but the Asian market is still not that familiar with the Uchiwa cactus, and exports to North America are expected to continue for the time being.

4) Tomato

(1) Outline of production

Tomatoes, which originated in the Andes and are believed to have been cultivated in Mexico, are one of Mexico's major agricultural products, ranking third after avocados and berries in terms of export value. Tomatoes are grown extensively in Mexico, especially in the states of Sinaloa, San Luis Potosi, and Michoacán on the Pacific coast, including the central plateau. Sinaloa dominates the other states in terms of harvested area (Table 2.1.7), and accounts for about 20% of the total production in the country. The state of Morelos, where the field survey was conducted for this study, ranks seventh in

Table 2.1.7 Tomato Harvested Area and Yield in Mexico (2021)

States	Area Harvested (ha)	Production (ton)	Production Share
Sinaloa	21,860	911,269	22%.
San Luis Potos	3,799	449,037	11%.
Michoacán	8,918	325,817	8%
Jalisco.	7,221	284,063	7%
Zacatecas	5,564	251,642	6%
Puebla	5,352	193,794	5% (of the total)
Morelos	4,227	187,603	5% (of the total)
Baja California Sur	2,990	177,086	4%
Sonora	4,016	173,049	4%
Other 23 states	26,358	1,195,882	29%
Total	90,306	4,149,241	100%.

Source: SAICON 2021 Tomate Verde and Rojo totals

terms of production volume.

(ii) Major players on the FVC

Tomato VC can take many forms, including open field cultivation and greenhouse cultivation, but Grupo Impactum in the state of Morelos, the subject of this survey, is a business enterprise with an agropark, a facility for cultivation and processing. Like the avocado production and processing cooperative, the company is vertically integrated, with each of its greenhouses covering an area of about 1.5 ha, and it carries out automatic controlled cultivation, fruit selection and packing, cold storage, and export. Production is concentrated solely on tomatoes in greenhouses totaling 30 ha, but the company also procures avocados, vegetables, figs, and other products from neighboring farmers, which are processed and exported to Europe and China as well.

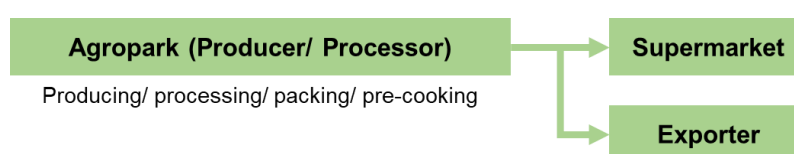


Figure 2.1.7 FVC of Tomatoes in Mexico

Source: JICA Survey Team (2023)

In exporting, the company has obtained various certifications, including Global GAP, and manages certified and non-certified products separately. In some cases, an intermediary is used to collect the produce from the farmers and sell it to exporters. Of the 600 employees at the factory, 85% are women, and the company actively promotes women as section leaders. The factory is also characterized by a high level of interest in social responsibility, such as making donations to a food bank.

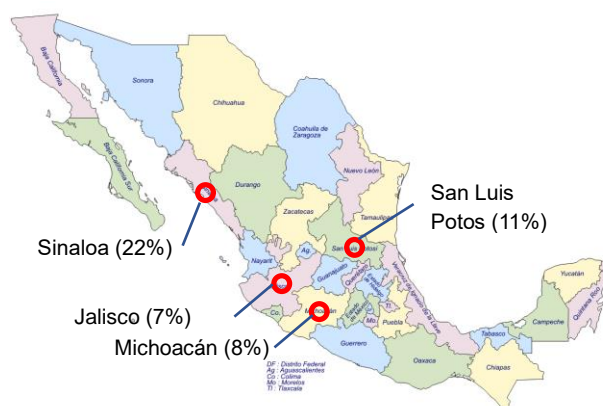


Figure 2.1.8 Major Tomato Production Areas in Mexico

Source: SAICON (2021)

In addition, agricultural technology extension is an important theme in the practice of modern agriculture. In Mexico, since the 1990s, local governments, agricultural producer associations, and agricultural companies have taken the lead in agricultural extension activities, thus forming a private-sector-led agricultural extension system. In line with this trend, the company also directly hires technicians for agricultural extension, and FIRA provides subsidies for their labor costs (basically one technician per 250 ha).

(iii) Issues for each player

- increased investment

Grupo Impactum had received a loan guarantee from FIRA and a 25 million peso loan from a private bank for the establishment of the agro-park. The Ministry of Agriculture also provided 25 million pesos in support of the project, which is in line with the national policy of export expansion through the promotion of modern agriculture. The challenge for the future is to secure additional financing for the installation of 70 ha of greenhouses and production systems, as the country does not have the production capacity to match its processing capacity. Although this is only one example of an agro-park, similar agro-parks have been constructed in northern Mexico, indicating that the development of vertically integrated modern enterprises downstream of the FVC and the accompanying employment promotion are major issues for Mexico in order to expand its status as an agricultural country.



Vinyl greenhouses are deployed on a 30 ha site. The system is automatically controlled according to the indoor environment.



An employee weighing cherry tomatoes. More than 80% of the employees, including section chiefs, are women.

2.1.2 Guatemala

In Guatemala, this section provides an overview of FVC production and the current status and challenges of the major players in FVC, with coffee, cardamom, and vegetables (broccoli) as the target commodities.

1) Coffee

(1) Outline of production

Guatemala is blessed with 300 unique microclimates (severe temperature differences and abundant rainfall) and volcanic ash soil, making it a suitable place for coffee cultivation.

Coffee grown at altitudes above 1,350 meters (4,500 feet) is classified as the highest variety, SHB (Strictly Hard Bean), and many coffee-growing regions in the country are considered to be in locations where high quality beans are easily obtained. In addition, different regions have the advantage of producing a variety of coffee flavors due to differences in soil and weather conditions as well as

elevation.

As shown in Figure 2.1.9, coffee is grown in many areas, including the western highlands and the eastern highlands, in 20 of the country's 22 departments. In particular, eight regions are widely known for their high quality beans. The names of these regions are listed below.

Antigua (Sacatepequez department), Acatenango (Chimaltenango department), Atitlán (Solola department), Cobán (Alta Verapaz department), Fraijanes (Guatemala department), Huehuetenango (Huehuetenango department), Nuevo Oriente (Chiquimula department), San Marcos (San Marcos department)

Coffee cultivation covers an area of 290,000 ha nationwide, with 90,000 farmers engaged in coffee cultivation and annual production reaching 220,000 tons (Table 2.1.8). Almost all of the coffee produced is Arabica, with a high percentage of Bourbon varieties. In order to reduce leaf scorch caused by strong direct sunlight, which is characteristic of highland areas, tall shade trees are planted in the coffee fields.

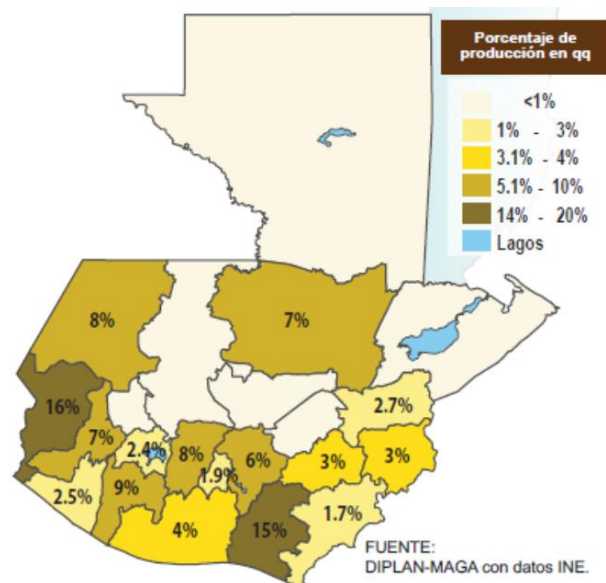


Figure 2.1.9 Coffee Production Regions in Guatemala

Source: Agriculture in numbers 2016, MAGA

Table 2.1.8 Coffee Production Area and Production in Guatemala (2019/2020)

Department	2019/2020	
	Area (ha)	Production (ton)
Total	289,427	217,132
Guatemala	12,993	11,128
El Progreso	3,182	7,836
Sacatepequez	5,328	5,827
Chimaltenango	26,940	11,381
Escuintla	12,057	6,017
Santa Rosa	54,746	4,057
Solola	12,336	6,853
Totonicapan	-	-
Quetzaltenango	16,815	6,903
Suchitepequez	15,338	7,289
Retalhulleu	461	2,086
San Marcos	34,234	16,896
Huehuetenango	26,288	33,599
Quiche	2,982	1,887
Baja Verapaz	2,282	6,271
Alta Verapaz	20,403	9,908
Peten.	-	-
Izabal	1,571	414
Zacapa	6,746	10,903
Chiquimula	12,045	22,480
Jalapa	11,038	7,968
Jutiapa	7,493	3,862

Source: AGRICULTURAL STATISTICS 2020, INE

(ii) Major players on the FVC

The coffee production process goes from cultivation to distribution to wet milling to dry milling, with coffee for domestic consumption being roasted domestically and coffee for export being exported to consuming countries and then roasted. 98% of production is exported², and FVC for export is the mainstay. In the cultivation process, coffee beans (cherries) are harvested and transported to the wet mills. At the wet mill, the pulp is removed from the cherries, the mucilage is removed in a fermentation process, and the cherries are processed into parchment through a drying process. Processing to parchment makes the fruit more resistant to temperature and humidity changes, making it suitable for storage. In the dry mill, the outer skin of the parchment is removed and processed into green coffee beans. The players in each process can be divided into three main types as described next.



Part of the wet mill. Cherry pulp is removed in multiple steps from the top, then parchment goes to the drying process.

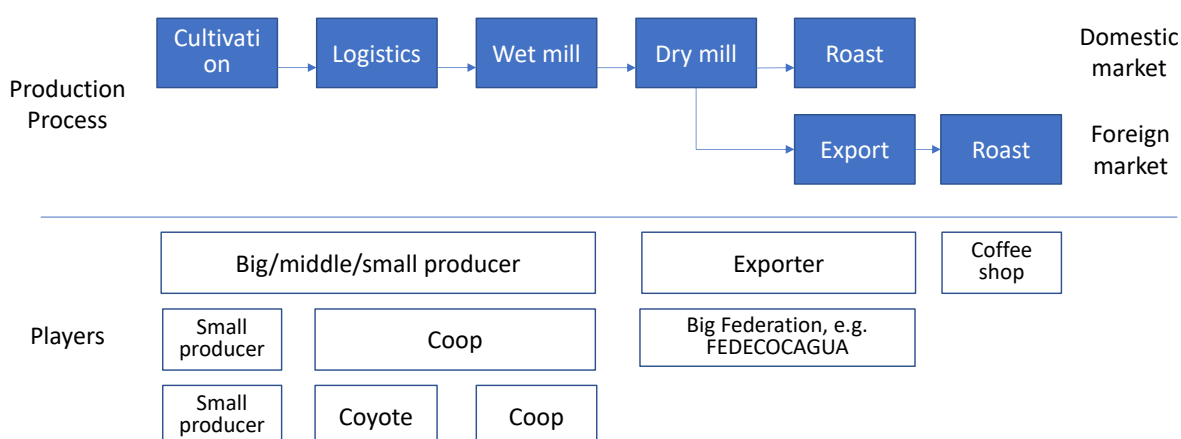


Figure 2.1.10 Coffee FVC Flow in Guatemala

Source: JICA Survey Team (2022)

The first is the case of medium- and large-scale farmers, who not only cultivate, but also own wet mills near their fields and sell parchment to export companies. Exporters have large dry mills.

The second is when small farmers form a producer cooperative and sell directly to the cooperative. If the farmers are concentrated within a certain area, it is easier to transport to the wet mills owned by the cooperative; a cooperative federation like FEDOCOCAGUA owns dry mills and sells parchment to the federation. In the case of FEDECOCAGUA, it also roasts green coffee beans for domestic market as well as exports green coffee beans.. In the second case, the sales are paid to each member after the quality check of the parchment is completed by the cooperative, so there is a time lag of one to two weeks between the time of harvest and the time the cash income is received.

² According to the National Statistics Institute (INE: Instituto Nacional de Estadística), coffee production in 2019 was 4,786,864 Quintales (220,000 tons) and coffee exports were 215,000 tons (FAO).

The third is when small farmers sell to a middleman, called a coyote. This is the case when small farmers are dispersed and it is not reasonable for them to form a cooperative and transport their products to the cooperative's wet mills. There are also small farmers who sell to a middleman and give priority to selling to a middleman in order to receive immediate cash income at the time of sale.

(iii) Issues for each player

- Access to Wet Mill

Some small farmers, especially those discretely located in mountainous areas, sell their cherries to middlemen. Because of the discrete location of the farms, middlemen need to transport the cherries long distances, but 40% of the mass of the cherries is pulp that should be removed. The reality is that unnecessary material is transported long distances, and it is desirable for small farmers to have wet mills near their fields and to transport the material in parchment.

- Wet mill water consumption

Wet mills consume large amounts of water. According to the Guatemalan National Coffee Association (Anacafe), a conventional wet mill requires 2,000 liters of water to process 45 kg (100 lbs) of parchment. With the introduction of water-saving and water-recycling wet mills and technical assistance, the water requirement can be reduced to 150 liters. Efforts are being made to improve these wet mills in order to reduce environmental impact.

- Dry Mill Production Capacity

The market price of coffee beans (green beans) fluctuates wildly. The figure below is a composite price index published by the International Coffee Organization, which shows that prices have fluctuated significantly on a monthly basis since 2010. Monthly price fluctuations have been as high as 24% per month when prices were rising and as low as -10% per month when prices were falling.

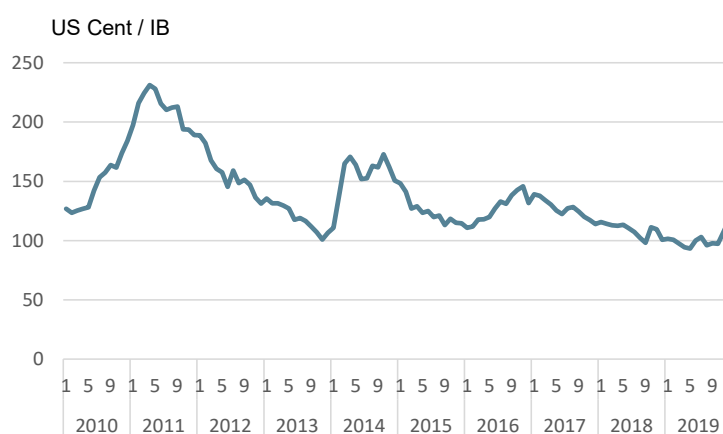


Figure 2.1.11 Market Price Trends of Coffee Beans (Green Beans)

Source): International Coffee Organization's ICO composite price index.

In a market where prices fluctuate widely, it is desirable for exporters to be able to sell in a timely manner when prices are high. For this purpose, it is necessary to have sufficient dry mill processing capacity to process and sell large quantities of green beans when prices are high. According to interviews

with union federations, dry mills are operating at full capacity to process the annual sales volume of green beans, and it is not possible to adjust production volume according to the price of green beans.

- Incorporation of roasting process

Exporters and cooperative federations roast their own coffee for domestic consumption and sell it under their own brands. For exports, on the other hand, coffee is roasted in or near the consumption area and sold under brands such as Tullys or Starbucks, for example. Final processes such as blending and roasting are high value-added, and if it is possible to take advantage of Guatemala's high-quality location and build an original Guatemalan brand, the added value will be greatly enhanced. However, for consumers, there is no reason to dare to purchase an original Guatemalan brand, as the flavor lasts longer when roasted in a location close to the place of consumption. Furthermore, with the brand's name recognition still low, it must compete with other brands that are well known. In order to launch an original brand, B2C marketing is required to overcome these unfavorable conditions.

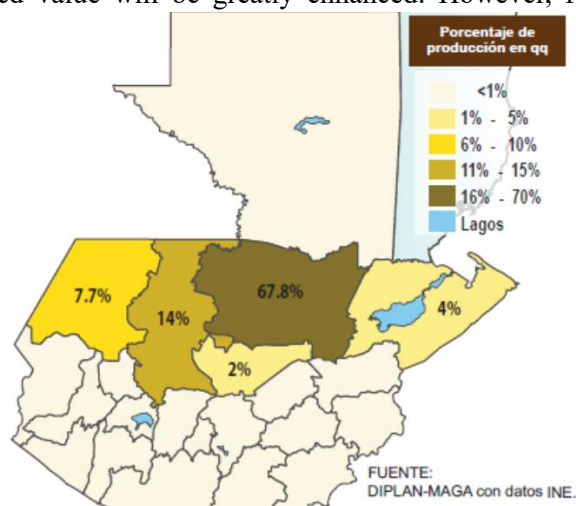


Figure 2.1.12 Cardamom Production Areas in Guatemala

Source: Agriculture in numbers 2016, MAGA

2) Cardamom

① Production Overview

Guatemala ranks first in the world market share of cardamom, making it an important export product with 99% of its production being exported³. Production has averaged 32,000 tons/year over the last 10 years, and as shown in Table 2.1.9, cardamom production in Guatemala has shown steady growth based on trends over the last decade: over the 10-year period from 2010 to 2019, production area has increased by 23% and for production volume by 81%.

The main production area is Alta Verapaz, which alone accounts for 68% of production. This is followed by Quiché (14%), Huehuetenango (8%), Izabal (4%), and Baja Verapaz (2%) (Figure 2.1.12 and Table 2.1.9).

Table 2.1.9 Cardamom Production Area and Production in Guatemala (2010-2019)

Year	Area (ha)	Production (ton)
2010	62,300	22,764
2011	63,910	26,360
2012	69,370	36,241
2013	69,510	38,453
2014	72,406	38,465
2015	74,013	34,509
2016	73,664	35,475
2017	72,593	35,997
2018	75,399	38,163
2019	76,761	41,172

Source: MAGA and FAO

³ Ministry of Agriculture, Grazing and Food, Guatemala, "El Agro En Cifras," 2016 data.

The area under cultivation is 76,000 ha, with the top two departments accounting for 84% of the nation's cultivation area, and only a limited number of regions have suitable production environments. Cardamom is best suited to high altitude and humid environments, and in Guatemala, it generally bears fruit in the second year of growth. Fruiting occurs from May to September in all regions, with peak harvesting from July to October.

The Federation of Cardamom Cooperatives (FEDECOVERA) in Alta Verapaz, a major cardamom production area, is a federation of cooperatives responsible for processing and exporting cardamom and is a major player in the cardamom FVC in the country. The federation has 35,000 farm households under its umbrella alone, and 135,000 households including farm households outside of the federation. There are 42 cooperatives and 120 associations that are smaller than cooperatives. Organic farming is promoted in the federation, and all coffee is grown organically, and 27% is exported at a premium price as certified organic.

(ii) Major players on the FVC

The cardamom production process is cultivation, collection, drying, processing (drying, sorting, and packing), and export. Guatemala has the largest share of cardamom production in the world, and almost all of its production is exported. More than 95% of cardamom growers are ethnic minorities. The average farm size is small, at 1 ha per household. Farmland is allocated by the government to cooperatives under the government's settlement policy and is granted to farmers through the cooperatives. Each cooperative is allocated 45 ha by the government.



FEDECOVERA's own laboratory. It provides its members with quality seedlings through tissue culture.

Cardamom is collected by cooperatives, where the pulp is removed, dried, and parchment is processed. Most cooperatives have flatbed dryers, but some use sunlight to dry the fruit naturally. Generally, cooperatives own trucks and are responsible for transporting parchments to the processing plant of the federation.

FEDECOVERA has a processing plant that is responsible for the processing and export process. The processing plant dries, sorts, packs, and stores the products for export. In addition to the federation, some of the products are sold to exporters via intermediaries. The purchase price of the federation is 5-10% higher than that of a middleman, making it more attractive to farmers. In addition to providing farmers with cultivation guidance, compost, and improved varieties, federation also provides farmers and their families with benefits⁴ and financial services such as loans, thus playing a role in supporting the value chain in addition to processing and exporting. Furthermore, since the federation is composed of cooperatives/associations of farmers, an increase in the federation's share means an improvement in farmers' incomes. The export share of the federations is limited and is estimated to be only a few

⁴ Medical services (dental assistance) and educational opportunity services (scholarships)

percent.⁵

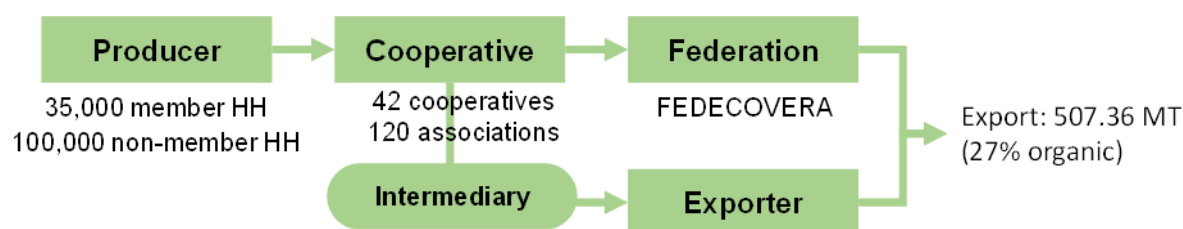


Figure 2.1.13 Cardamom FVC Flow in Guatemala

Source: JICA Survey Team (2022)

Cardamom is a very attractive crop for farmers. According to interviews with farmers and the federation, farmers' income is as high as 1.92 million yen per ha/year.⁶ However, cardamom cannot be harvested in the first two years after planting and yields decrease year by year, so it needs to be replanted after about 8 years. 8-year average income is diluted to 1.44 million yen/year⁷. Even after deducting the initial investment of \$2,000/ha and cultivation cost of \$1,000/ha/year, the average annual net income is considered attractive enough at 1.25 million/ha.

(iii) Issues for each player

- Insect damage (Thrips)

Thrips infestation is such a major challenge that up to 56% yield loss (2016) occurs; since Thrips enters the main stem, the federation believes that contact insecticides are not sufficient to deal with the problem, and organic farming is maintained. As a result of improved aeration, including pruning and removal of surrounding weeds, and cultivation management by instructors, the yield loss due to insect damage in 2022 has improved considerably, averaging 11% nationwide, and 3% only for farmers under the federation's umbrella.

- Farmers' cash flow

While the purchase price is 5-10% higher for sales through the federation, payment to farmers is delayed by about three months. This is due to the fact that cash is not available until the federation sells to the export destination. On the other hand, when farmers sell to intermediaries, cash is available immediately from the intermediaries. If the farmer's cash flow improved and farmers had ability to sell to the federation, it would improve the farmer's profitability.

- Production capacity of union federations

The federation has a processing plant that procures cardamom from its member farmers, processes,

⁵ Total exports from Guatemala (35,000 tons, 2016) compared to limited exports from the federation (507 tons, 2021). The exact share cannot be calculated due to the different time periods covered by both parties.

⁶ Cardamom trees are cultivated at a rate of 1,600 per hectare, and each tree yields 9 kg of cardamom on average. 1.8 kg of parchment is produced from 9 kg of cardamom fruit, and the purchase price by the federation is 1,500 quetzals (30,000 yen) / 45 kg. Therefore,

$1,600 \text{ trees/ha} \times 1.8 \text{ kg(parchment)/tree} \div 45 \text{ kg} \times 30,000 \text{ yen} = 1.92 \text{ million yen/ha}$

⁷ Given that the export value is USD 229 mn (Declaraciones Unicas Centroamericanas, 2016) and the planted area is 73,000 ha (Ministry of Agriculture and Pastoral Food, Guatemala, 2016), assuming that the entire crop is exported, the maximum income per area is USD 3,103/ha. The reason for the large difference compared to \$1.44 million/ha is that farmers under the federation receive cultivation instruction and are likely to have higher yields than the average farmer. Another possible reason could be that cardamom is grown in mountainous areas, and thus the cropped area may include low-density farmland that is cultivated in a rough manner.

and exports it, but it only has the capacity to process 5% of its member farmers' production. However, they only have the capacity to process 5% of their production, and the farmers are forced to sell most of their production to intermediaries. Currently, the company is planning to build a new plant with twice the production capacity of the existing plant and is considering financing.

3) Vegetables (broccoli)

(1) Outline of production

The national cultivation area is small (5,800 ha), and production is concentrated in the high altitude department of Chimaltenango, which alone accounts for 56% of production. This is followed by Huehuetenango (11%), Jalapa (7%), Solola (7%), and Guatemala (5%). Total annual production is 73,000 tons, with a cultivated area of 5,800 ha (MAGA, 2016).

Broccoli production is mainly carried out by small-scale farmers, with a production area of 0.7~1.4 ha per household. Basically, broccoli is grown during the rainy season and can be harvested up to twice. Although dry-season cropping is possible if irrigation can be arranged, many small-scale farmers do not have irrigation facilities and grow maize and beans during the dry season.

The average yield is 12.6 tons/ha, and given that the shipping price for export is 1.1-1.2 quetzals/lb (49-53 yen/kg), sales would be 617,000-668,000 yen/ha if the entire crop could be exported.

(ii) Major players on the FVC

The FVC process for broccoli is cultivation, collection, processing, refrigeration (freezing), and export. Most broccoli growers are small to medium farmers, with an average farm size of 0.7 to 1.4 ha. It can be harvested twice during the rainy season, but dry-season cultivation requires irrigation facilities such as wells and sprinklers, so many farmers grow only during the rainy season and cereal crops such as maize and beans during the dry season. The variety is dominated by Sakata Seed Corporation's Avenger due to its high productivity, which has a 95% market share.⁸

Broccoli is collected by a cooperative and shipped to exporters via a middleman. Some broccoli is also shipped from a cooperative to the domestic market, but the domestic market is limited to 5% of the total production. In addition to the collection and sales functions, a cooperative also provides financial services such as loans for the purchase of seeds and fertilizers. The COIPSA cooperative we visited during our field research consisted of 20 farm households, while HortiCope is made up of 75 farm

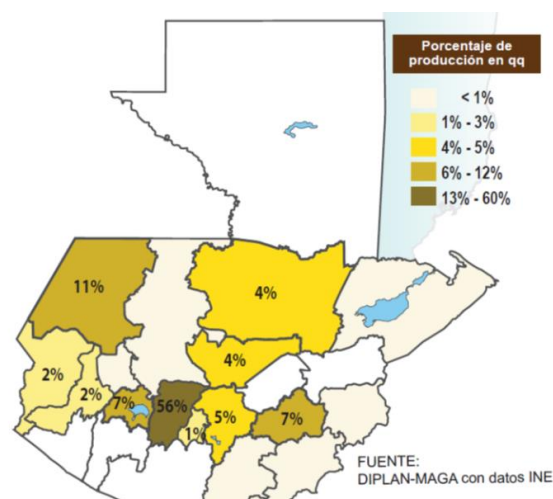


Figure 2.1.14 Broccoli Production Areas in Guatemala

Source: Agriculture in numbers 2016, MAGA

⁸ From an interview with the Institute of Agricultural Science and Technology (ICTA)

households.

Major exporters include Legomex, AgroSanJuan, and 4 Pinos. Exporters do the cutting and packaging. Downstream of the exporters, a cold chain has been established, and the vegetables are shipped as refrigerated fresh vegetables, and some are frozen. The main export destination is the United States, where the vegetables arrive by ship in 3-4 days. The time from the farmer's harvest to the exporter's arrival is less than 12 hours (in the case of 4 Pinos), and although the cold chain is not yet in place, this is not a particular problem.

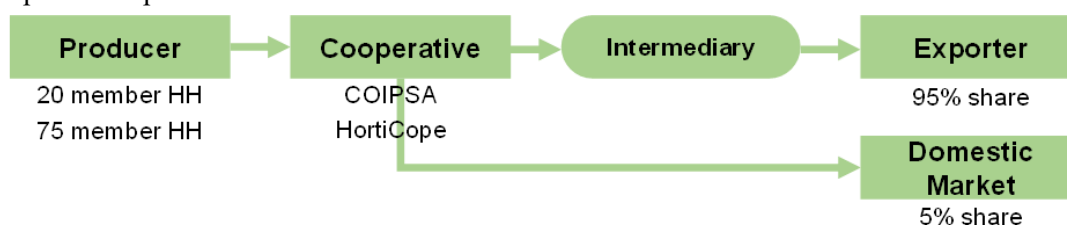


Figure 2.1.15 Broccoli FVC Flow in Guatemala

Source: JICA Survey Team (2022)

(iii) Issues for each player

- Cultivation is only possible during the rainy season due to lack of irrigation facilities

A stable supply throughout the year is required for export, but irrigation facilities such as wells and sprinklers are necessary for cultivation during the dry season, and many small and medium farmers do not have such facilities. The stable production of broccoli throughout the year can increase the added value of the product. The price difference between the wet and dry seasons is about 3 quetzals per bunch in the wet season and 8 to 9 quetzals per bunch in the dry season, nearly three times the retail price in the domestic market.



Broccoli is grown in the rainy season on a cool plateau. Transportation is also a challenge.

4 Pinos, a cooperative and exporter, provides financial assistance to its member farmers for irrigation equipment and greenhouses.

- Stable supply throughout the year

Exporters are responsible for ensuring a stable supply throughout the year, and procurement during the dry season, when production declines, is a challenge. In Chimaltenango department, 15% of farmers have irrigation facilities. In this way, a middleman is responsible for procuring broccoli from various sources.

2.1.3 Panama

The following section provides an overview of FVC production and the current status and issues of

major players in FVC in Panama, with rice, dairy (milk), and plantain as the target commodities.

1) Rice

(1) Outline of production

Rice is the staple food in the country and is the main cultivated crop. Rice cultivation is practiced throughout the country, especially in the plains. The main rice-growing area is Chiriqui Province, which is responsible for 23% of the country's total rice production. This is followed by Panama (19%), Coclé (16%), and Veraguas (14%) (Figure 2.1.16 and Table 2.1.10).

Although the cultivation period varies from region to region, sowing generally takes place from April to August during the rainy season, and harvesting peaks from December to March during the dry season. As shown in Table 2.1.10, the national average planting rate is 121%, and rice cultivation is generally done once a year with rainwater (the irrigation coverage in the country is less than 5%).

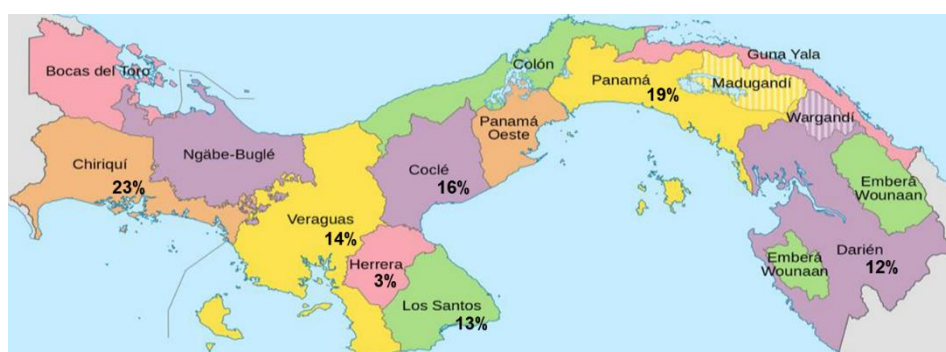


Figure 2.1.16 Rice Production Regions in Panama

Source: MIDA

Table 2.1.10 Number of Rice Farmers, Planted Area, and Production in Panama (2020/2021)

Provinces	No. of Producer	Cropping Intensity (%)	Harvested Area (ha)	Production (ton)
Total	1,448	121.0	85,914	407,991
Chiriquí.	494	109.7	20,273	95,755
Veraguas	168	114.9	11,856	57,487
Herrera	36	150.4	2,561	11,450
Cocle.	289	143.6	12,673	67,295
Panma Oeste/Capira	3	133.3	120	535
Panama Este/ Chepo	148	119.7	15,951	75,988
Los Santos	216	119.7	12,576	51,136
Darien.	94	127.6	9,904	48,347

Source: MIDA

In addition, one of the main characteristics of rice cultivation in the country is that it is done on a large scale: in the 2020/2021 season, the national harvested area will be 85,000 ha and the production will be 400,000 tons, which will be produced by about 1,500 farming households (farmers). This is a simple average of 50 ha per farmer, and in fact, in Chiriqui, there were many farmers with plots of more than 100 ha.

(2) Major players on the FVC

The rice production process in the country consists of production, rice milling, and retail sales, and almost all of the rice produced is destined for domestic consumption (Figure 2.1.17). As mentioned earlier, rice producers are large-scale operators, numbering about 1,500 farmers, and seven farmer organizations have been formed throughout the country. In addition, when the large-scale operators cannot manage all farmland, they lease some farmland to small-scale or non-farmland-owning farmers. In terms of cultivation practices, mechanization has been actively introduced due to the large size of the farm, and relatively large-size tractors and combine harvesters have been introduced.



The Panamanian rice sector is introducing relatively large agricultural machinery (photo shows a combine harvester).

Harvested paddy is milled by rice millers. Rice millers play an important role in rice FVC in the country, not only milling rice at large-scale rice milling facilities, but also providing technical support to farmers, producing certified seeds, and strengthening FVC as a whole. Furthermore, in order to add value to rice, they are working to develop new products such as nutritionally enhanced rice and gluten-free rice flour (according to an interview with Agrosilo, which has the largest share of rice milling in the country).

Milled rice is sold in two grades, Special rice and Premier rice, with Special rice, which generally contains more than 90% finer grains, being the main rice product sold in supermarkets and other retail outlets.

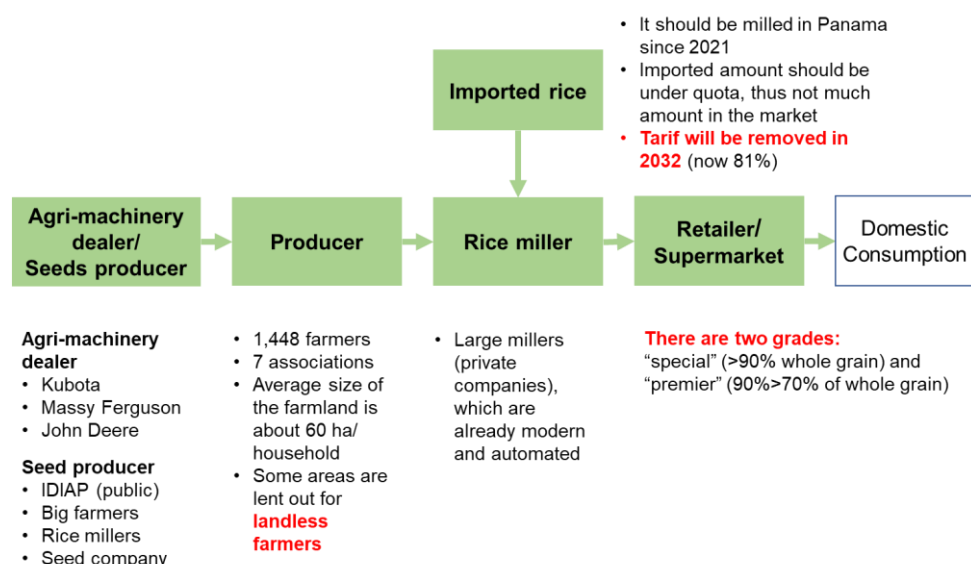


Figure 2.1.17 Rice FVC Flow in Panama

Source: JICA Survey Team (2022)

(3) Issues for each player

- Increased rice productivity

There are many large-scale farmers, and mechanization is progressing, so there is potential for productivity improvement. However, due to climate change in recent years, the rain-fed, one-season cropping system has become vulnerable. In addition, while rice farmers are protected by government subsidies such as the price guarantee for Premier rice, they are not highly motivated to further improve productivity.

- The Role of the Rice Millers in the FVC

Proactive activities by rice millers to strengthen FVC, such as technical guidance to farmers and certified seed production, are welcome, and their contribution is very significant. On the other hand, the imbalance in rice milling capacity by region has been cited as an issue. In particular, paddy harvested in the relatively new rice-growing region of Darien in the eastern end of the country is sent overland to Chiriqui for milling, as rice cannot be milled in this region.

- Strengthening competitiveness in anticipation of tariff liberalization

Rice farmers and rice millers are facing an extreme sense of crisis in anticipation of the complete liberalization of rice import tariffs in 2032. Protection and support of domestic rice by the government and further enhancement of its competitiveness (improvement of quality and quantity) are needed.

2) Dairy (milk)

(1) Outline of production

In Panama, milk is produced in three grades (A, B, and C)⁹ according to different sanitation requirements. The main dairy areas are the relatively cool mountainous and hilly areas, especially in the western province of Chiriqui (Figure 2.1.18 and Table 2.1.11).

Milk is produced throughout the year, and the country's annual production in 2021 is 103,881 tons for Grade A, 3,130 tons for Grade B, and 71,047 tons for Grade C. Grade A is produced approximately 80% of the time, Grade B is produced entirely in the Chiriqui, and Grade C is produced approximately 50% in the Azuero (Table 2.1.11). About 80% of Grade A, all of Grade B, and 50% of Grade C are produced in the Azuero (Table 2.1.11). This difference in production volume and grade is due to the fact that dairy farming has developed in the mountainous and hilly western region of the country, where a cool climate is required as a production environment suitable for dairy farming. On the other hand, in recent years, relatively high yielding dairy breeds have been introduced in warmer climates, making dairy farming possible in other regions.

⁹ A: Bacteria count of less than 200,000 per ml, no antibiotic residues, no higher temperature from acquisition to the pasteurization plant, and stored in the plant until pasteurization.

B: Bacteria counts less than 1 million per milliliter at the time of delivery to the processing plant and free of antibiotic residues.

C: Does not meet the requirements of A and B and does not contain antibiotic residues.

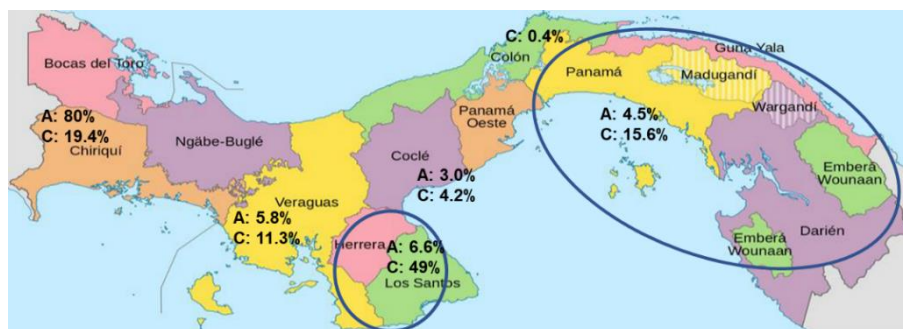


Figure 2.1.18 Dairy Farming Regions in Panama

Source: JICA Survey Team, based on statistical data.

In 2021, there will be 4,700 dairy farmers in the country, and more than 60% of them, or 3,113 farmers, will be small to medium size farmers. COOLACHE, headquartered in Chiriqui, provides feed production, feed sales, equipment sales, and microcredit for its members and other dairy farmers.

Table 2.1.11 Milk Production by Grade in Panama, 2021

Areas	Grade A (ton)	Grade B (ton)	Grade C (ton)
Total	103,881	3,130	71,047
Chiriqui.	83,228	3,130	13,323
Azuero	6,832	-	35,202
Panamá Oeste, Panamá Este and Darién	4,634	-	10,987
Coclé.	3,126	-	2,956
Veraguas	6,061	-	8,369
Colón	-	-	210

Source: MIDA

(2) Major players on the FVC

The milk produced in Panama is mainly destined for domestic consumption (Figure 2.1.19). 4,700 dairy farms produce milk, which is processed by dairy manufacturers. Four major producers (Estrella Azul, Bonlac, Nevada, and Chiricana) almost dominate the milk market in the country, characterized by the fact that they are all foreign companies. On the other hand, homegrown companies have entered the market, albeit on a small scale, for processed products such as cheese. These dairy products are sold by supermarkets and other retailers.

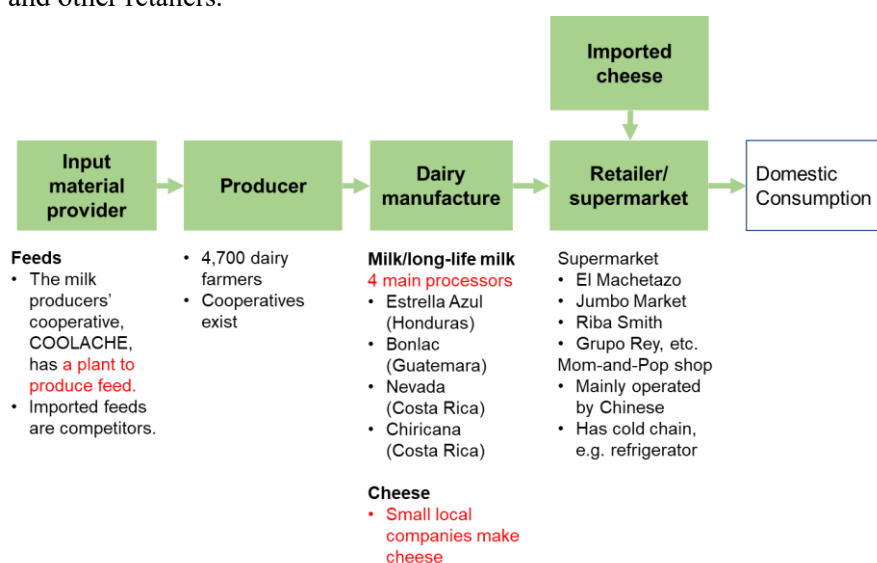


Figure 2.1.19 Dairy FVC Flow in Panama

Source: JICA Survey Team (2022)

(3) Issues for each player

- Motivation of producers to add value

The challenge is that farmers producing Grade C have little motivation to improve the facilities needed to produce Grade A or B. The government provides a subsidy of 10 cents per liter for Grade C milk only, and while these government subsidies help small-scale operators stay in business, they do not necessarily help expand business to invest in new facilities to produce Grades A and B. The subsidies are not always conducive to business expansion. In particular, Grades A and B also require ongoing electricity payments for sanitation, which is a hurdle for small-scale operators.



Grade C is typically transported in small containers at room temperature. It is mainly used for dairy processing.

- Advanced dairy processing

The milk market is almost monopolized by the four major milk producers, leaving little room for entry. On the other hand, while the participation of local companies in the milk (raw and processed) market is limited, small and medium-sized companies are participating in the cheese, yogurt, and other dairy products markets, and further advancement in processing and packaging technology is desirable.

- Strengthening competitiveness in anticipation of tariff liberalization

As with rice, competition with imported products is expected to become tougher for milk and dairy products. Feed production and the introduction of high milk yield varieties to increase production volume, as well as the active use of renewable energy to reduce electricity and other production costs, will be required.

3) Plantain (esp. Asian plantain, *Plantago asiatica*)

(1) Outline of production

Although plantain production is nationwide in Panama, the majority of production is concentrated in the western region, with 50% in the province of Chiriqui and 29% in the province of Bocas del Toro (Figure 2.1.20). Annual production is approximately 170,000 tons, with a cultivated area of about 10,000 ha (Table 2.1.12).

There are 5,151 plantain farmers in the country, and cultivation is done on a small scale. The national average cultivation area per farmer is about 2 ha, and even in Chiriqui, the main production area, it is about 4 ha. While banana production is renewed for about 10 years, plantain is renewed for 3 years, so its input cost is higher than that of banana,

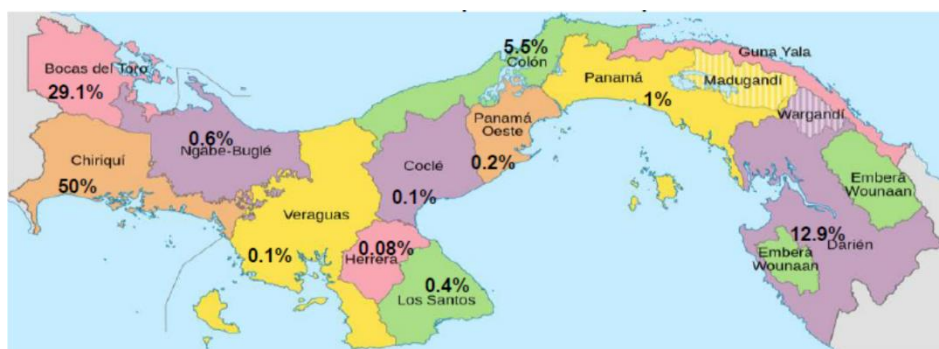


Figure 2.1.20 Plantain Production Areas in Panama

Source: MIDA

Table 2.1.12 Number of Plantain Farmers, Acreage, and Production in Panama, 2020/2021

Provinces	No. of Producer	Harvested Area (ha)	Production (ton)
Total	5,151	10,726	166,781
Chiriquí.	1,455	5,112	83,448
Veraguas	63	15	227
Herrera	59	9	133
Coclé.	29	7	109
Panma Oeste/Capira	20	21	351
Colón	809	670	9,228
Chepo.	95	105	1,672
Los Santos	37	43	512
Bocas del Toro	941	2,755	48,557
Darién.	1,496	1,909	21,476
Gnobe Bugle	147	80	1,069

Source: MIDA

It should be noted that plantain production is susceptible to weather conditions, and in the most recent 2020/2021 season, Hurricanes Eta and Iota caused significant damage with a 13% decrease from the previous year. There is also damage from pests such as Black Sigatoka and Fusarium, which require resistant varieties and proper pest management.

(2) Major players on the FVC

Plantain produced in Panama is mainly destined for domestic consumption (Figure 2.1.21). As mentioned above, the number of farmers for the most recent season (2020/2021) was 5,151 nationwide. According to interviews with farmers in Chiriquí, the main production area, there is a cooperative but it is not active.

In most cases, the plantain produced is accumulated and transported by intermediaries (and farmers) and brought to wholesale markets. On the other hand, large farmers sometimes conclude annual contracts with supermarkets and trade directly with them, but the number is limited. Processed products such as chips are also widely available, but imported products predominate in



Plantain is transported in bunches by pickup trucks (see photo) or in small portions and spread out on the back of trucks.

supermarkets and other markets.

There are several varieties of plantain, and although plantain is traded by variety at wholesale markets, it is not sold by variety at supermarkets and other retail markets, where prices are set according to the degree of maturity.

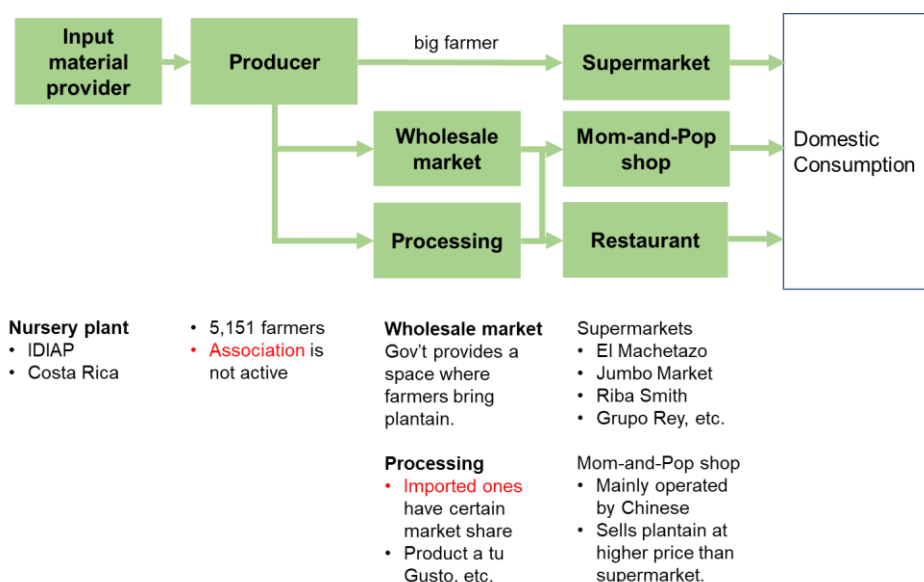


Figure 2.1.21 Plantain FVC Flow in Panama

Source: JICA Survey Team (2022)

(3) Issues for each player

- Introduction of cultivation management techniques for high quality and high yield production

According to interviews with advanced plantain growers, the introduction of on-farm irrigation (drip irrigation) has increased the size per crop and the selling price. Improved cultivation management, including water management, will enable high-quality, high-yield production. In addition, the high cost of pest control is an issue, and the introduction of resistant varieties and mechanization (e.g., drone application of pesticides) to reduce pest control costs are required.

- Advanced processing and packaging technology

Most plantain chips widely available locally are imported, and domestic products are limited. Furthermore, processing and packaging are currently simplified for domestically produced products. In order to add value and expand the sales network, further advancement of processing and packaging technology is required.

2.1.4 Dominican Republic

For the Dominican Republic, an overview of FVC production and the current status and issues of major players in FVC will be summarized, with rice, cacao, and fisheries as the target commodities.

1) Rice

(1) Outline of production

Rice is the staple food in the country, and with an annual per capita consumption of approximately 50 kg, it is one of the highest consuming countries in the Central American and Caribbean region. Therefore, rice, as a subsistence crop, is the largest commodity among agricultural crops in terms of both harvested area and production value. Of the eight agricultural regional divisions used by the Ministry of Agriculture, the main production areas are the irrigated areas of the Northeast, Northwest, and North Central regions, where more than 90% of the national production is produced. In the most recent year, 2021, the national production was 640,000 tons and the harvested area was 190,000 ha (Figure 2.1.22 and Table 2.1.13).

Almost all rice cultivation is irrigated, with a two-season system (approximately 98% of rice is grown under irrigated conditions). Another feature of rice cultivation in the country is the use of ratoon to reduce the cost of rice cultivation. The average farm size is 2-3 ha per farmer, and about 30,000 farmers are engaged in rice cultivation.



Figure 2.1.22 Irrigated and Rice-producing Areas in the Dominican Republic

Source: FAO-AQUASTAT (2015) and Ministry of Agriculture information, combined by JICA Survey Team.

Table 2.1.13 Rice Harvested Area and Production in Dominican Republic (2021)

Agricultural Region	Harvested Area (ha)	Production (ton)
Total	191,193	640,956
North	2,324	7,606
Northeast	87,049	315,007
Northwest	46,949	173,281
Northcentral	37,319	90,711
Central	2,680	8,202
South	-	-
Southwest	11,700	37,088
East	3,171	9,062

Source: Ministry of Agriculture

(2) Major players on the FVC

The rice production process in the country consists of production, rice milling, and retail sales, and

almost all of the rice produced is destined for domestic consumption (Figure 2.1.23). As mentioned above, almost all rice production in the country is irrigated, and the construction and maintenance of irrigation facilities is carried out by the government (Water Utilization Agency: INDRHI). The INDRHI is in charge of maintenance and management up to the main canals, while the secondary canals and beyond are managed by the water users' associations formed in each irrigation district.

There are approximately 30,000 rice farm households in the country, most of which are small-to medium-scale farmers with 2-3 ha of cultivated land. Seven rice farmers' associations have been formed throughout the country. In terms of cultivation management, direct seeding and ratoon cultivation is commonly used to reduce production costs. Furthermore, mechanization has been progressing in recent years, and tractors and combine harvesters are being introduced.



In the Dominican Republic, where farmland size is small and irrigated cultivation is common, there is significant replacement demand for relatively small-scale farm machinery, and Japanese manufacturers are making inroads.

The harvested paddy is milled by a rice miller. In some cases, rice milling is carried out by producer associations in the country, and interview has been conducted with COOPAGRO in Rincon during our field survey. The cooperative has installed silos and rice milling machines, buys rice from members and non-members (and transports the rice to the mill), mills the rice, packages it, and sells it to supermarkets and other retailers.



Figure 2.1.23 Rice FVC Flows in the Dominican Republic

Source: JICA Survey Team (2022)

(3) Issues for each player

- Strengthen competitiveness of domestic rice (reduce production costs)

In the Dominican Republic, the complete liberalization of tariffs on rice imports from the U.S. and other countries will take effect in January 2025, making it an urgent issue to strengthen the competitiveness of domestically produced rice. In terms of production, the high cost of rice has become an issue, and there is a need to improve labor productivity through the promotion of mechanization. Therefore, in recent years, there has been a growing need for small farm machinery (tractors, seeding machines and combine harvesters).

- Modernization of the rice milling industry

There is a high need to strengthen rice milling capacity (equipment renewal and scale expansion)

among rice millers, including agricultural production cooperatives. In addition, there is no product differentiation by production area, variety, or nutritional enhancement, leaving much room for value-adding through branding.

- Aging irrigation facilities, expansion needs

Existing irrigation facilities were built in the 1970s and 1980s, and many of them are in a deteriorated, resulting in very low water use efficiency, which is one of the reasons for low rice productivity. In order to improve rice productivity, it is necessary to improve water use efficiency by renovating and expanding irrigation facilities and modernizing facilities such as linings.

2) Cocoa

(1) Outline of production

The Dominican Republic is known as one of the world's leading organic cocoa exporters. The country's cocoa exports have increased by more than 300% over the past decade, and it is noted that this export trend is expected to continue.¹⁰ Cacao is grown in five of the eight agricultural zones used by the Ministry of Agriculture (North, Northcentral, Northeast, Central, and East). The main production region is Duarte in the Northeast, which produces about 40% of the 70,000 tons produced nationally (Figure 2.1.24 and Table 2.1.14).

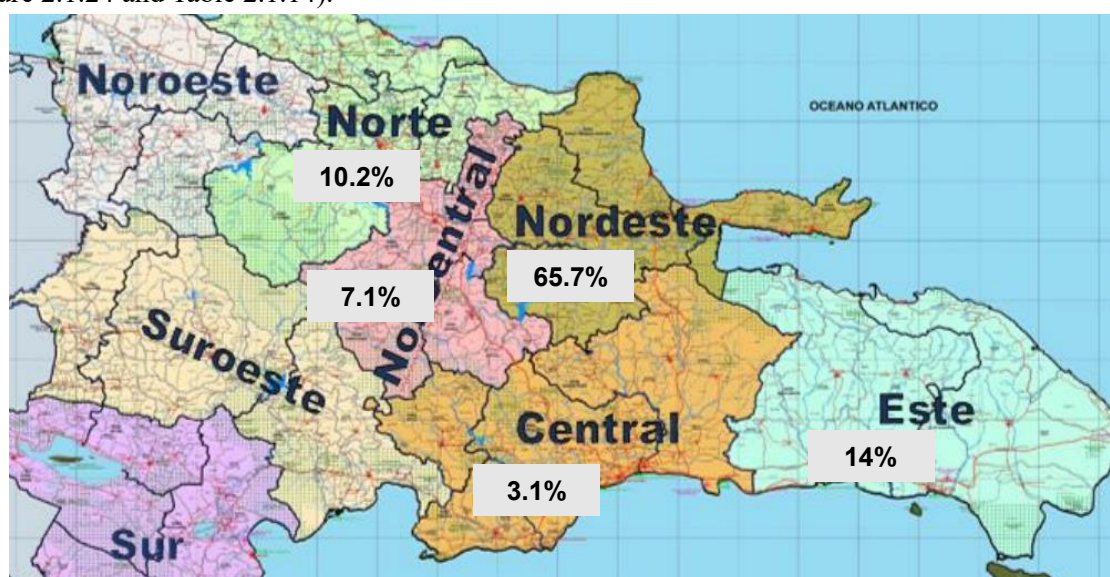


Figure 2.1.24 Cocoa Production Areas in the Dominican Republic

Source: JICA Survey Team, Ministry of Agriculture, by agricultural production area classification.

Table 2.1.14 Cocoa Production Area and Production in the Dominican Republic (2017)

Agricultural Region	Province	Harvested Area (ha)	Production (ton)
Total	-	153,219	71,847
North	Santiago	881	446
	Puerto Plata	7,610	3,852
	Española	5,975	3,024
Northcentral	Hermanas Mirabal	5,660	2,866
	La Vega	629	318
	Monsenor Nouel	3,774	1,911
Northeast	Duarte	59,330	30,034

¹⁰ <https://www.iica.int/es/prensa/noticias/cocoa-key-crop-keeps-dominican-republic-one-leading-countries-export-organic>, IICA

Agricultural Region	Province	Harvested Area (ha)	Production (ton)
	Sanchez Ramirez	9,925	5,024
	Maria Trinidad Sanchez	19,532	9,887
	Samana.	4,400	2,228
Central	San Cristobal	2,563	1,297
	Sant Domingo	519	263
	Monte Plata	12,547	637
East	Hato Mayor	6,415	3,247
	El Seibo	12,767	6,462
	La Altagracia	692	350

Source: Ministry of Agriculture

In Duarte, interviews with local farmers indicate that the average cultivation area is 2-3 hectares per farmer, with small to medium sized operations being the norm. The average cultivation area is 2 to 3 hectares per farmer in Duarte.

It takes 2~3 years from planting to harvesting, and cacao can be harvested twice a year, from April to June (main crop) and from November to January (midcrop). Generally, cacao trees up to 30 years old are said to be the optimum age for production, but interviews with farmers indicate that renewal is not progressing and that productivity is declining, with many cacao trees over 50 years old.

(2) Major players on the FVC

Cacao is an important export commodity in the Dominican Republic, and almost all of it is destined for export (Figure 2.1.25). Cacao beans are generally exported as cacao beans after primary processing (pulp cleaning, fermentation (Española type), and drying). Primary processing of cacao is divided into two types: Sanchez (non-fermented) and Española (fermented), and cacao beans in good condition are mainly used for fermentation (Rizek company uses a sugar meter to sort cacao beans collected from the market).



Boxes used for fermenting cacao. These wooden boxes are arranged in a staircase pattern to allow for efficient stirring (the photo shows a traditional one owned by the cooperative).

Table 2.1.15 shows the major exporters (including producers' associations) in the country. The five companies that handle the largest volume account for more than 60% of total exports and play an important role in the cacao FVC. COOPROAGRO, which was interviewed during the field survey, not only purchases cacao beans from its members, but also assigns technical advisors to provide technical assistance to farmers in obtaining certification (Fairtrade, Rainforest, etc.) and pays for the certification. The cooperative also provides financial support to its members by opening a saving account and offering small loans at low interest rates using the cacao beans produced as collateral.

Table 2.1.15 Major Exporters in the Dominican Republic (Data from October 2015 to September 2016)

Exporter	Transaction (ton)
Total	70,820
Roig Agro Cacao	12,020
Conacado, Inc.	11,372
Rizek Cacao	9,928
Biocafcao	8,265
Cooproagro	5,997

Source: Ministry of Agriculture

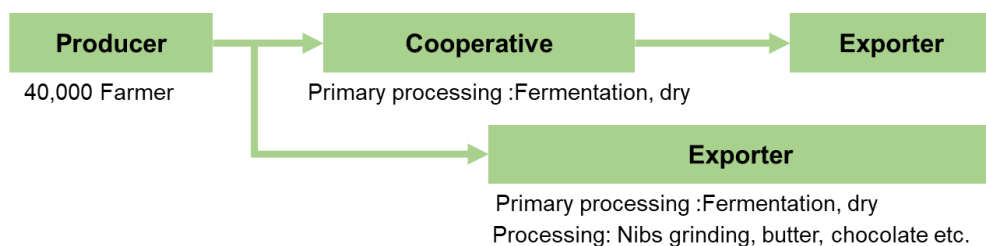


Figure 2.1.25 Cacao FVC Flow in the Dominican Republic

Source: JICA Survey Team (2022)

(3) Issues for each player

- Decline in productivity of cocoa trees

Interviews with farmers and producer associations during the field survey pointed out the decline in productivity due to the aging of cacao trees. Although it is said that the optimum production period is usually up to 30 years old, there are many cacao trees that are over 50 years old, and the productivity of the varieties planted at that time is low. The current average yield is 0.5 tons/ha, but with appropriate renewal, the yield is expected to increase by 3~4 times. In addition, the normalization of hurricane damage due to climate change is also contributing to the decline in cocoa productivity, and there is a high need for restoration of plantations.

- High value-added by secondary processing

Figure 2.1.26 shows the percentage of cacao exported in the Dominican Republic by product. Although organic cacao is a value-added product, 98% of cacao is exported in the form of cacao beans. Domestic production of processed products such as cacao mass, butter, and chocolate through advanced processing will strengthen the domestic cacao FVC.

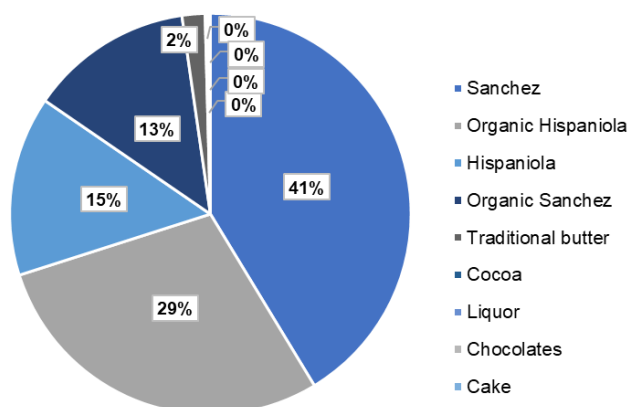


Figure 2.1.26 Percentage of cacao exports by product in the Dominican Republic (October 2018 - September 2019 data)

Source: CONACADO

Rizek, which we interviewed during our field survey, established a processing plant about seven years ago to produce butter and powder, but the company is currently producing on a small scale and is planning to further expand the scale of production.

3) Fisheries

(1) Catch and harvest

Fisheries and aquaculture in the Dominican Republic still have much room for development. In fact, approximately 70% of the seafood consumed in the country is imported. Imports come mainly from Norway, Canada, and Vietnam, and include fillets, crustaceans, frozen fish, dried fish, and salted and

smoked fish. In this context, Decree No. 40/13 (2013) stipulates the sustainable development of fisheries and aquaculture as a national priority and creates a fund for the development of this sector.

The total catch and aquaculture harvest in the country is around 15,000 tons per year, and in addition to grouper, snappers, and other species, lobster is also caught. There are three types of markets: the domestic market, the tourism market, and the export market, with the tourism market being the most demanding.

Table 2.1.16 Catch and Aquaculture Harvest by Major Fish Species in the Dominican Republic (2008-2010)

Species	Capture Production/ Production (Ton)		
	2008	2009	2010
Total	15,379	14,231	14,484
Carp.	489	28	118
Tilapia	744	298	139
Groupers	653	29	1,498
Red snapper	188	79	940
Yellowtail snapper	177	1,393	172
Lutjanidae	1,213	875	1,287
King mackerel	317	66	802
blackfin tuna	261	39	985
Yellowfin tuna (Thunnus albacares)	260	44	630
longfin tuna	-	56	458
Crabs.	103	49	276
Common lobster	1,271	1,411	1,001
Queen Conch	1,634	2,277	256
Squid.	49	1	95

Source: Ministry of Agriculture, CODOPESCA

All 16 provinces bordering the sea have fishing grounds, and eight (Peravia, Azua, San Cristóbal, Barahona, Pedernales, Monte Cristi, Puerto Plata, and Samaná) are considered particularly important fishing grounds. According to the data of the National Agency for Union Development (IDECOOP), there are currently 205 fishing ports in 16 states, with 15,000 fishermen and 30 fishing cooperatives registered. Many are micro and small-scale fisheries.

(2) Major players on the FVC

In the field survey, it has been interviewed to fishing associations that conduct inshore fishing in Boca Chica and La Romana. Many fishermen form associations or other groups (70-200 members). Boats used for fishing are small boats (19 to 21 feet), either owned by associations or rented from vendors (vendors may also act as intermediaries).

The fish are sold directly from the fishermen or through intermediaries or associations to nearby restaurants. One association has received support from the Special Fund for Agricultural Development (FEDA) to build a pier, office facilities, and refrigerated trucks, allowing them to sell to relatively distant destinations when a cold chain can be secured. The Association has received support from FEDA for



A small boat used for fishing. It is not unusual for 10 or more people to be on board.

pier and office facilities and refrigerated trucks.

The regulatory authority for the fisheries industry is the Council of Fisheries and Aquaculture (CODOPESCA) under the Ministry of Agriculture, which grants fishing licenses to fishermen and provides advice on fishing and guidance and monitoring (e.g., compliance with no-fishing periods) for the fisheries industry.

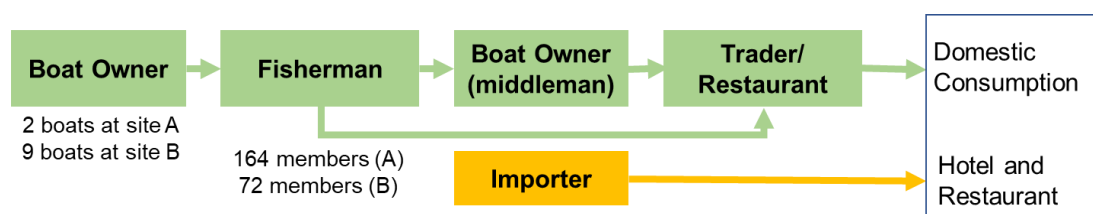


Figure 2.1.27 Fisheries FVC Flows in the Dominican Republic

Source: JICA Survey Team (2022)

(3) Issues for each player

- Traditional skills and knowledge by small-scale fishermen

The scale of marine fisheries equipment (landing facilities, boats, and refrigeration facilities) is small, and fishing techniques are traditional, resulting in low catches. In addition, the cold chain is often underdeveloped, and sanitation is an issue due to lack of technology and equipment.

- Difficulties in accessing finance

One of the reasons for the lack of capital investment is that fishermen often do not own land, which makes it difficult for them to provide collateral when they receive loans from financial institutions. In addition, although cooperative registration enables them to receive loans as an organization, the associations that has been interviewed did not follow any specific application procedures, and their organization has not yet progressed.

2.2 Agtech's Deployment in Central America and the Caribbean

According to the IDB LAB study (IDB LAB, Agtech Innovation Map in Latin America and the Caribbean, 2019), Agtech is defined as "a range of innovations that seek solutions to the problems and challenges facing the agriculture and food industry" and it is established as a relevant field of startups that have the potential not only to generate innovation but also to transform the way food is produced with positive environmental, social, and economic impacts.

According to the same report, there are 457 Agtech companies in the Latin America and Caribbean region, with 51% distributed regionally in Brazil, 23% in Argentina, 18% in the Andean region, 5% in Uruguay and Paraguay, and 3% in Central America and the Caribbean. In the six countries covered in this survey, the sprouting of agtech startups is limited, with 12 companies in Mexico, 2 in Central American countries other than Mexico, and 2 in the Caribbean. The Agtech sectors' target fields can be broadly divided into two categories: general agriculture (55%) and companies specializing in specific agricultural sectors such as vegetables, marine products, and livestock products (45%).

Looking at Agtech's target sectors by country, in Mexico, the agriculture sector in general accounts

for 22%, followed by 33% for commodities and beverages, 22% for fresh vegetables, 11% for bioenergy, and 11% for standing food. In Panama, the agriculture sector in general accounts for 100% (Source: the same report, p. 24). On the other hand, the technologies used in Agtech are distributed as follows: 41% remote sensors, 36% geolocation, 30% mobile technology, 17% IoT, 14% big data, 14% AI, 1% blockchain, and 1% robotics.

With regard to further business opportunities in the sector, the report discusses the following:

"A deeper analysis of the use of digital technologies in Agtech may be carried out to identify opportunities for further digitization. - The global outlook shows that the most massive incorporation of remote sensor technologies, geolocation and mobile technology. The more detailed sector-by-sector analysis outlines areas of particular interest for future technology development, among which the following can be mentioned:

- Greater use of sensors in Big Data and precision agriculture are expected to begin to provide feedback to management systems. Both areas have been relatively disconnected so far, and there is an evident opportunity for their strengthening through greater incorporation of data and information into management systems.
- Mobile technology is and will continue to be very important to bring new innovations to the market. Even today, both connectivity and use are relatively low.
- Across the spectrum of more sophisticated technologies, it is evident that there is much progress to be made in the sector with the incorporation of IoT, artificial intelligence and robotics. Data generation, capture, storage and processing will become increasingly valued in this market."

The report also features a promising agtech startup company, Tierra de Monte (founded in 2015, co-founders Adriana Luna & Etienne Rajchenberg Cecena), a Mexican company covered in this survey. An overview of the company is as follows.

Problem and Innovative Solution:

- The extensive use of chemical fertilizers and pesticides in agriculture is a threat to natural ecosystems and rural workers, and can affect the sustainability of productive systems in the long term, with stronger impact on small producers with fewer resources.
- The purpose of Tierra de Monte is to make agriculture a source of well-being and freedom. The company seeks to reduce the use of agrochemicals through the implementation of microbiological technology that restores ecosystem health, allowing to increase production and reduce risks and costs.
- Through microbiological technology the company enables the development of sustainable agriculture.
- The company produces biological products based on different communities of microorganisms to control pests, regenerate soils and nourish plants.

Main Achievements:

- Ever since it was established, the company has increased product sales and the areas it covers,

by working with local partners.

- In 2018, at least 15,000 hectares across 15 states impacting around 10,000 people were covered. Similarly, the use of the company's products replaced about 5,000 liters of insecticides and 7,000 liters of fungicides.
- The company won the Banamex Award for being the company with the greatest social impact. It was also awarded the CEMEX-TEC Prize in 2016 in the Social Entrepreneurs category. The company was also a semifinalist in the Cleantech Challenge Mexico 2015, in MassChallenge 2017 and is currently one of the StartUp I3 LATAM companies selected by the New Ventures accelerator.

Meanwhile, regarding recent Agtech trends in Latin America and the Caribbean, in the Arpegio and AgFunder study¹¹, the research team selected 78 successful startups based on company growth and amount of venture capital funding. The country with the largest number of startups was Brazil (26 companies), followed by Argentina (18 companies), Argentina (18), Chile (15), Mexico (8), Colombia (6), Peru (2), Costa Rica (1), and El Salvador (1) followed.

Eight companies were selected in Mexico covered in this survey, including, for example, Jüsto, Inc. The company is a Latin American agri-food tech startup that is leading the way in revamping the grocery supply chain, with a business that delivers fresh, frozen, local food directly from distribution centers to customers' homes. It recently completed a \$12 million bridge round to complement a \$10 million seed round in 2019, riding the wave of surging demand following the Corona disaster.

2.3 Other Considerations for FVC

1) Vertical and Horizontal Integration

As we have shown, some form of FVC integration is taking place in each country and in each item. In general, there are two forms of VC integration: vertical integration and horizontal integration. "Vertical integration is the broadening of the range of processes required to supply goods and services. Horizontal integration is the unification of multiple firms that are responsible for a particular process." In the case of FVC, vertical integration is the integration of a series of sectors from the supply of agricultural materials to cultivation, processing, distribution, etc. Expansion of scale through the acquisition of rice mills and expansion of area in the cultivation sector can also be considered as horizontal integration.¹² In addition, the collective shipment of agricultural products produced by individual farmers through the formation of a cooperative can also be considered as a type of horizontal integration.

The table below summarizes the forms of integration in the target commodities in the four countries where field research was conducted for this study. This is not representative of the country as a whole, but rather a summary of the general trend based on information from the countries visited by the survey

¹¹ Source: Sofia Ramirez, A Mini Guide to Latin American Agrifoodtech in 2020, July 2020, <https://agfundemews.com/a-mini-guide-to-latin-american-agrifoodtech-in-2020>

¹² https://www.nri.com/jp/knowledge/glossary/1st/sa/suicyoku_suihei

team.

Table 2.3.1 Characteristics of FVC Integration in Target Countries and Items

Country/Item	vertical integration	horizontal merger	Contents
Guatemala			
coffee	-	weak	Eight production areas have been formed throughout the country and branding is in place. Processing (green bean production) is also carried out by cooperatives and federations, and this can be considered a gradual horizontal integration.
cardamom	weak	-	The collection, drying, and processing are conducted by cooperatives and federations, and sales are made to exporters, resulting in gradual vertical integration. However, horizontal integration is still in its infancy due to limited processing capacity and the limited number of producers who can process and sell through the cooperatives.
vegetable	-	-	Although there are some small associations, relative transactions are the mainstay, and vertical and horizontal integration is not well developed.
Panama			
comment	Fat.	Fat.	Agrosilo has achieved horizontal integration in the rice milling business by gaining the top market share in just over 10 years since its opening. This has been made possible by securing commercial distribution, especially for high-quality rice, and by securing unhulled rice through technical assistance to farmers. In recent years, the company has also been engaged in seed production, making it possible for one company to handle a significant portion of rice VC, excluding production. In Panama, a small number of large rice mills have captured much of the market.
Dairy (milk)	-	Fat.	In Panama, four foreign-owned companies dominate the raw milk industry, and horizontal integration is fairly advanced. On the other hand, small-scale processors of cheese and other processed products exist in various regions, and the degree of horizontal integration is relatively weak.
plantain (esp. Asian plantain, Plantago asiatica)	-	-	Union activities are not active, and overall, integration is not progressing well. Many processed products such as chips are imported.
Dominican Republic			
comment	Fat.	weak	Vertical integration is achieved as producer associations build their own rice mills, which handle drying, milling, and packing. In addition, by forming a cooperative, joint shipments are possible, and there are also efforts at area integration, i.e., gradual horizontal integration. The cooperative also operates an agricultural input store.
cocoa	Fat.	Fat.	Cacao production cooperatives are horizontally integrated in the sense that they consolidate their production, and at the same time, they are vertically integrated by conducting pre-processing at the cooperative. Rizek, on the other hand, is expanding into the secondary processing process in addition to the primary processing (export of cacao beans), which is vertical integration.
fisheries	-	-	In the fishing cooperatives we visited, each sold their individual catch to various restaurants on a relative basis, with little integration.
Mexico			
avocado (Persea americana)	-	Fat.	The formation of cooperatives has made it possible to ship a certain scale of products and sell them directly to supermarkets (Walmart) without going through the market. However, the farmers still enjoy the benefits of collective ownership (integrated status), such as financial guarantees from FIRA.
comment	weak	weak	In terms of the relationship between rice mills and farmers, the mills are loosely integrated horizontally (expansion of production area to be purchased) by offering low-interest loans to farmers who are not members of the cooperative but who promise to sell their rice. However, this can be seen as a form of enclosure of the production area by the rice mill, and from the viewpoint of the rice mill, it is similar to vertical integration.
Meliosma rigida (species of flowering plant)	Fat.	weak	The processing plant itself owns its own cultivation plots, thereby vertically integrating production and processing. This vertical integration is complemented by contract farming with neighboring farmers.
tomato	Fat.	weak	AgroPark is vertically integrated, with its own greenhouse cultivation and processing (fruit selection, packing, pre-cooling, etc.). It also has plans to expand its production area (number of greenhouses) through further investment, which is a form of horizontal integration.

Source: JICA Survey Team (2023)

Note) ○: Strong integration is observed, △: Gradual integration is observed, -: Not very well integrated or unknown.

As shown in the table, although many of the countries in this study have many small farmers, they

are often organized in associations or federations of associations, which allows for gradual horizontal integration in the production sector. Among these, in the case of avocados in Mexico, organization has led to changes in sales channels, and integration has been used in a positive way. In addition, in the larger of these cooperatives, such as the federations in cardamom and coffee in Guatemala, or in rice and cacao in the Dominican Republic, the cooperative/union federation is also responsible for processing, thus integrating production through to processing.

On the other hand, there are also examples of active integration in corporate activities, most notably the horizontal integration of rice and dairy (milk) in Panama. The characteristic feature is the horizontal integration of rice and dairy (milk) in Panama. The relatively small size of the market in Panama may be one of the reasons for this, but a few companies have achieved a high market share through acquisitions and other means. It can be said that these companies are winners in the market competition rather than consolidators, but it is noteworthy that they are also providing technical and financial support to farmers in order to secure unhulled rice as raw material, in addition to constructing a large-scale rice mill.

For example, in the fisheries sector in the Dominican Republic, fishing is conducted in an extremely unregulated manner, and sales are made on a case-by-case basis. Under these circumstances, the hotel and restaurant industry in the Dominican Republic, which has a thriving tourism industry, is striving to secure a certain quantity of high-quality products by importing most of its marine products. As a result, the domestic fisheries industry has become fixed without progress in its development and integration.

Thus, there have been various forms of FVC integration in the subject countries. In the case of vertical integration, it appears that most of the integration takes the form of capital investment, especially in the processing sector, and the company or cooperative integrates the production sector in a loose form (integration as a cooperative, or through a contract contingent on financing). At the same time, there are also cases where the ties between players are strengthened through sales contracts and other means to reduce transaction costs and improve quality (through the presentation and operation of quality standards).

On the other hand, in the case of horizontal integration, there were several cases of cooperatives consolidating their products and developing new sales channels. In the case of the Panamanian rice milling industry, the introduction of the latest rice milling machines to expand market share at once can be said to be similar to horizontal integration with capital investment at the core (although it is somewhat questionable whether both types of integration can be considered "integration" in the strict sense of the word).

As we have seen, in both vertical and horizontal integration, capital investment and organization are the common denominators in promoting integration. In order to further strengthen the development of FVCs in each country, it is recommended that horizontal and vertical integration be used as options for increasing productivity and creating added value, and that agricultural finance be used as a tool to achieve this.

CHAPTER 3 SUPPORT DIRECTION AND IDEAS FOR DEVELOPMENT SCENARIO

3.1 Direction of Assistance and Proposed Development Scenarios for the Countries Surveyed

3.1.1 Mexico

1) Direction of support and proposed development scenario

Along with Brazil, Mexico presents the largest economic power among Latin American countries, as it joined NAFTA (now USMCA) in 1994 and became a member of the OECD in the same year. On the other hand, in the agricultural sector, the entry into enforcement of the Free Trade Agreement led to an expansion of imports of inexpensive agricultural products from North America, such as corn and other grains.

In addition, the government's budget for agricultural development and food production support was cut from the late 1990s to the early 2000s. Combined with lower producer prices for the country's less profitable agricultural products, it had led to a decline in the cash income of small farmers. It led to social problems as well, as farm laborers and small farmers who could no longer earn sufficient income in rural areas migrated to urban areas in search of work or crossed the border into the U.S. to work.

Under these circumstances, efforts to support agricultural production have been reinvigorated in recent years. In its Plan Nacional de Desarrollo 2019-2024, the current administration has proposed strengthening food sovereignty (soberanía alimentaria), increasing domestic agricultural production through measures such as the Programa de Apoyo a la Agricultura, aiming to increase self-sufficiency, reduce import dependence, and improve rural livelihoods.

On the other hand, structural changes are also required to apply to climate change, as climate change is also resulting in the transformation of suitable areas for cultivation for different crops, based on the declining water resources in the northern region of Mexico and changes in rainfall patterns throughout the country. In other words, changes in cultivation areas for specific crops and diversification of crops grown in specific areas are needed (see Box).

In the agricultural finance sector, the FND (Financiera Nacional de Desarrollo Agropecuario, Rural, Forestal y Pesquero), which had been in charge of agricultural loans for small farmers, was transferred to the Ministry of Social Welfare (Secretaría de Bienestar), one of the agencies established to implement welfare benefit programs. As a result, support for the poorest of the poor, those who need subsidies to survive, was reorganized as part of the public assistance program. As a result, small- and medium-scale farmers who have been eligible for loans from the FND but who have difficulty in obtaining loans from private financial institutions may be left behind, as there will be virtually no government financing available.

As described above, although Mexico has made remarkable economic progress and is positioned as a leader in Latin America, its agricultural sector is highly vulnerable, and improving competitiveness under free trade agreements, especially in the efficiency of food production, including basic grains, is a major challenge. In this context, climate change is transforming the water resource environment and

Sushi rice production plan led by Morelos Rice Growers Association and Japanese immigrants in Chiapas

With rice production in the U.S. states of California and northern Mexico facing water shortages due to recent climate change, the Morelos State Rice Growers Association is about to launch a plan to expand sushi rice production in Morelos with the aim of increasing rice production in their state and improving farmers' livelihoods.

On the other hand, a similar plan led by descendants of Japanese immigrants in Chiapas aims to promote sushi rice production for selling it to Walmart in the country, while keeping in mind the tight supply and demand for sushi rice in the country due to the sushi boom and their identity as descendants of Enomoto immigrants.

In the future, it will be necessary to tie up with the National Institute of Agroforestry and Forestry (INIFAP) Agricultural Experiment Station and others to improve locally suitable varieties, develop irrigation facilities utilizing spring water, and promote mechanization, for which funding and technical support will be required.

other agricultural ecosystems, and there is a need to develop technologies to adapt to these changes. Furthermore, policy changes are forcing the restructuring of the agricultural financial sector. In light of this, the following development scenario is proposed as a direction of support for strengthening FVC in Mexico.

<Development Scenario Proposal (Direction of Support)>

Mexico has a variety of agricultural ecosystems exist from the arid north to the tropical rainforest in the south, and where the cultivation environment and suitable cultivation areas are changing due to climate change. It is necessary to rebuild agricultural production infrastructure and FVC to contribute to climate change adaptation, and to support companies and associations (including Japanese communities) that are working in this direction.

The project will also support the establishment of advanced agriculture and FVC that can serve as a model for Latin American countries by providing direct support to companies and associations, or by strengthening the agricultural financial sector, which is currently facing increasing uncertainty, and thereby contribute to strengthening the competitiveness of the agricultural sector. In addition, accumulated knowledge shall be used to cooperate in technological and human resource development in the Latin American region, with Mexico as a partner.

2) Support Project Proposal

The following project is proposed as a Japanese support measure to realize the development scenario proposed for strengthening FVC in the country.

(1) Private Sector Investment and Finance:

Currently, the poor, who are positioned at the bottom of the agricultural sector, are being assisted by a welfare program through the Ministry of Social Welfare. In order to ensure support for small and medium-sized farmers who have not been adequately supported by private financial institutions, the project will provide agricultural financial assistance in three steps through PSIF to FIRA (Fideicomisos Instituidos en Relación con la Agricultura), an institution affiliated with the Central Bank of Mexico. In other words, after securing a credit line in the FIRA through PSIF, the FIRA provides loans to private financial institutions under certain conditions, which in turn provide loans to companies, cooperatives, farmers, and other entities engaged in the agricultural and FVC sectors.

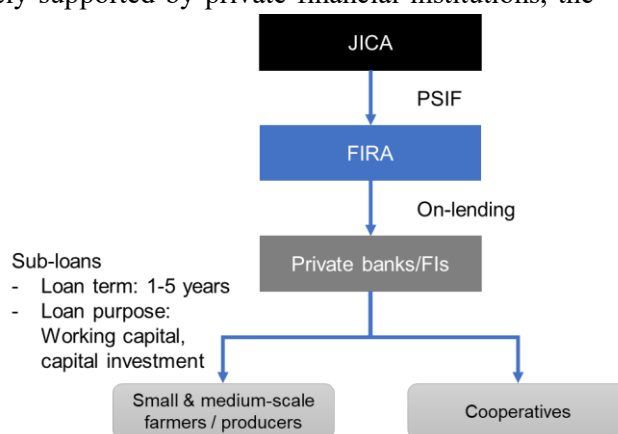


Figure 3.1.1 Proposed Flow of Funds in PSIF (Mexico)

FIRA manages information on the credit ratings of farmers and agriculture-related companies that are borrowers through its loan guarantee operations. FIRA maintains information on the latest business trends of each loan recipient. In addition, because FIRA facilitates government-financed agricultural financial guarantees, agricultural lending through FIRA is expected to be relatively easy to identify cases with high financing needs and to excel in risk management.

In addition, now that the government agricultural extension system has been dismantled and the private sector has taken the lead, there is a framework in which FIRA provides salary supplements to companies and organizations that hire private agricultural extension staff from outside. It is expected that the appropriate operation and combination of these frameworks as a single organization will generate

technical support for the recipient and thus high development impact.

Possible loan targets include those aimed at promoting the production, processing, and distribution of export-oriented items. For example, the loans could be used for greenhouse cultivation of vegetables using advanced technology, agro-parks to select and pack fruits and vegetables, and other projects that will promote exports and create labor employment in rural areas (including the rice cooperative in Morelos and the Japanese farmers in Chiapas), and the expansion of the avocado processing cooperative. In all of these cases, the loan is expected to have a wide-ranging impact, since in Mexico there is often widespread vertical integration from production to processing and distribution.

When providing loans, priority could be given to supporting the introduction of solar power generation, the introduction of engines and boilers with low greenhouse gas emissions, or energy-efficient refrigeration and freezing facilities, in order to contribute to climate change adaptation measures that the government is ambitiously promoting.¹ Support for crop diversification to adapt to new environments as a measure against climate change could also be a candidate. For example, support for the promotion of collection, sorting, and processing plants with solar panels and other facilities that can reduce greenhouse gas emissions can be a candidate. Also, rice farming cooperatives in Morelos and sushi rice production plans led by Japanese farmers in Chiapas, cultivation and processing of nopal adapted to arid regions, water-saving irrigation of avocados and berries may be included.

The following items can be cited as reasons for proposing PSIF with a three-step financing through FIRA, rather than a two-step loan through a government-affiliated financial institution. First, FND, a public financial institution that had provided loans directly to farmers and other final borrowers, was dissolved and could no longer be a recipient of JICA funds. FIRA, on the other hand, is a public organization that provides loans to private financial institutions, but it is affiliated with the central bank and has a history of nearly 70 years, having once operated as the only institution in the country that provided finance to agriculture. However, since private financial institutions offer loans to the agricultural sector at interest rates in the 10% to 20% range, with deposit rates in the 5% to 10% range, there is expected to be a sufficient need for overseas investment funds through FIRA, depending on the interest rate.²

(2) Support for information sharing platform in R&D:

INIFAP is responsible for agricultural research and development in Mexico, and is engaged in the improvement of crop varieties and technologies, utilizing the 38 agricultural experiment stations located throughout the country. So far, INIFAP has implemented three projects: "Modernization Technology for Small-Scale Rice Cultivation," "Improvement Plan for Vegetable Production Technology in Morelos State," and "Development and Extension Plan for Small Farmers' Tropical Fruit Trees." In addition, with INIFAP as a partner, JICA had provided technical cooperation: "Strengthening Production of Quality Seeds to Support Small Sesame Growers in Paraguay," "Support to Smallholder Farmers in El Salvador," and "Biological Pest Control in Nicaragua."

In recent years, the scope of research has been expanded to include the development of technologies applicable to climate change (e.g., flood response, drought response, pest control, etc.) and the use of digital tools to predict disease and pest outbreaks over wide areas. For example, the Panama disease of banana and Tropical Race 4 (TR4) disease, which raged in Southeast Asia before reaching Latin America,

¹ In the case of Suntory Spirits, Inc., which was selected for the Joint Crediting Mechanism (JCM) project of the Global Environment Center (GEC), the reason for the selection was that the introduction of once-through boilers and fuel conversion at its tequila plant in Mexico would reduce greenhouse gas emissions ((https://gec.jp/jcm/jp/projects/16pro_mex_02/), and promotion of the introduction of such boilers could also be a candidate. Similarly, Maekawa Corporation's high-efficiency refrigeration facility has also been selected for JCM (https://gec.jp/jcm/jp/projects/13pro_ina_03/), and there are promising Japanese companies that can contribute to climate change measures in the FVC sector.

² Subsequent discussions with the department in charge of JICA confirmed that FIRA was not eligible for PSIF because it did not have the status of a private company (S.A.).

are expected to lead to a rapid response by providing information from countries where knowledge has been accumulated.

In addition, it is an effective means to receive useful genes and information from genetic resource information banks in various countries when considering countermeasures against diseases that are becoming a problem in the country. For example, in Mexico and other rice-growing regions around the world, problems such as the *Burkholderia* fungus in rice is getting a serious problem and the contamination of red rice have been problematic. There is a search for genetic resources that are resistant to these diseases, and adaptive technologies to cope with such problems.

However, in the case of such a country where economic development is progressing, support for initiatives that contribute to networking among research institutions in each country to enable rapid access to the latest technological information, or for the establishment of platforms to make such things possible, would be more effective than traditional cooperation on specific research issues. In addition, the promotion of technical assistance and networking among institutions in the region, with Mexico's leading agricultural research institutions in the Latin American region as partners, is expected to benefit other Central American and Caribbean countries as well.

A similar initiative, FONTAGRO (Fondo Regional de Tecnología Agropecuaria), is a non-profit organization (foundation) that supports agricultural research in Central America and the Caribbean, targeting professionals, researchers, and farmers in Latin America and the Caribbean.³ JICA's own support for the establishment of such a network, or R&D support through such an existing network, could be considered as a candidate for broad-based support. However, in the case of R&D support, rather than loan project, grant aid projects or other support schemes such as SATREPS would be candidates.

(3) Support for establishment and expansion of agro-park

(PSIF: Support for promotion of smart agriculture with automatic environment control)

For developing a model for the widespread development of advanced agriculture, Mexico has the potential to provide a good environment as it has a variety of agro-ecosystems (tropical rainforest, tropical monsoon, savanna, desert, steppe, temperate humid, west coast maritime climate, etc.). In addition, as shown in 4.1.5, Mexico is one of the few countries in the survey area with several successful agtech companies.

An example of a model initiative in another country is the agropark built in the state of Morelos, where greenhouses have been constructed with a total area of 30 ha and tomatoes are grown under automatic environmental control. The park is practicing water-saving cultivation to make effective use of limited water resources, and it also has a processing facility that uses clean energy.

These efforts are in line with the Mexican government's promotion of export promotion and crop diversification through programs such as Programa de Apoyo a la Agricultura, and have high policy relevance. In addition, the company is promoting the employment of women (more than 80% of its employees are women), which is a good example of social contribution in rural areas. Such projects with high social impact are meaningful targets for JICA's support, and can be considered as candidates for support through PSIF to financial institutions or directly to the company, as described above.

3.1.2 Guatemala

1) Direction of support and proposed development scenario

³ FONTAGRO: <https://www.fontagro.org/en/>

Although Mexico is not included, a total of 16 countries in Latin America and the Caribbean are members, including the Dominican Republic, Panama, and Honduras, which are among the six countries surveyed in this study. Examples of such support include assistance in rice breeding and support for research and development projects to increase the resistance of banana varieties to Panama disease.

In Guatemala, the lack of employment has led to a social problem of regular and irregular migration to the U.S. and Mexico, mainly among the indigenous Mayan population. As a result, the hollowing out of domestic industry has become a problem throughout all industries. Therefore, the creation of employment through the strengthening of the agricultural sector, which is the main industry in rural areas, is an urgent issue.

On the other hand, Guatemala's agriculture is blessed with diverse topography and climatic conditions, from coastline to mountains, which are utilized to produce coffee, cardamom, and other craft crops for export. In fact, Guatemalan coffee has been expanding into the Japanese market and is highly regarded for its quality.⁴ Guatemala also boasts the world's largest share of cardamom. However, all of these products are produced on small farms in mountainous areas, and the production system is centered on fragile small-scale farmers.

In Guatemala, on the other hand, farmers' associations are very active, and are organized hierarchically from associations (farmer groups) to cooperatives to federations. In particular, for export commodities such as cardamom and coffee, in many cases, cooperatives and federations are responsible for all processes after harvesting, including collection, drying, sorting, processing, packing, and export. Strengthening these features of cooperatives and federations results in strengthening FVC and will benefit many small-scale farmers.

Thus, in Guatemala, the support needs of small farmers, especially in mountainous rural areas, are high, and yet it is expected that support through the strengthening of cooperatives and federations will function effectively to reach them. Therefore, we propose the following development scenario as a direction of support for strengthening FVCs in Guatemala.

<Development Scenario Proposal (Direction of Support)>

The project aims to improve the livelihood of producers through financial and technical support to cooperatives, etc., mainly for specialty coffee and cardamom produced by taking advantage of regional characteristics, and thereby contribute to job creation.

2) Support Project Proposal

We propose the following project as a Japanese support measure to realize the above proposed development scenario for strengthening FVC in the country.

(1) PSIF or TSL for financial institutions

Credit support to agricultural production cooperatives, etc. through PSIF or TSL through the government by providing capital to BANRURAL (governmental bank). Loans to small- and medium-scale farmers, loans to cooperatives, and loans to small- and medium-scale farmers through credit unions could be considered. Possible loan targets include introduction and scale expansion of processing facilities at the

⁴ For example, Suntory Boss' Rainbow Coffee is produced from coffee beans from seven different regions in Guatemala. In addition, FEDECOCAGUA, a federation of coffee producers' associations, ships coffee beans to Tully's Coffee in Japan.

cooperative level, e.g., for coffee, introduction of wet mills to cooperatives; for cardamom, introduction of dryers and warehouses; and for vegetables, introduction of greenhouses and irrigation facilities.

However, although a survey of FVC officials confirmed the existence of financing needs, it is necessary to confirm financing needs because BANRURAL is largely funded by deposits (mainly through overseas remittances), only about half of which are used for loans. Another possibility is to provide yen loans to the government and sub-loan the funds to BANRURAL, but in this case, the government would have to bear the foreign exchange risk and interest rate of the yen loans.

(2) Collaboration with tech companies:

When providing development finance support through two-step loans or PSIF for financial institutions, it is conceivable to combine technical assistance not only to FVC-related parties but also to participating financial institution (PFI). For example, support for the construction of digital platforms for PFI utilizing fintech or the provision of agri-tech services for end-users could be considered.

3.1.3 Panama

1) Direction of support and proposed development scenario

With the return of the Panama Canal from the United States at the end of 1999, Panama has achieved breakthrough economic growth as a logistics and financial hub. On the other hand, the economic disparity between urban and rural areas has widened, and this economic disparity has become a social problem, as repeated demonstrations by indigenous peoples and the resulting road closures have slowed domestic distribution. Under these circumstances, strengthening the agricultural sector, which is the main industry in rural areas, has become an urgent issue.

In line with the openness of the financial sector, foreign companies are also expanding into the agricultural sector⁵, and there are many individual farmers who operate on a large scale⁶, some of them in a corporate-like manner. As a result, in the rice sector, for example, large-scale agricultural machinery such as John Deere and Massey Ferguson are common and more economically efficient forms of farming management. In the rice milling sector, there are major rice mills that have the latest milling machines, including color sorters, and large silos for storage. And, as if hanging on to such a sturdy VC, landless farmers of any size are renting land for their farming operations.

In this industrial structure, it is expected that supporting further investment promotion by these companies and associations, which play a central role in VC, will lead to the elimination of bottlenecks in VC, which will in turn benefit landless farmers and others. It should be noted that the bottleneck here includes not only the conceptual chain structure of FVC, but also geographical linkages. For example,

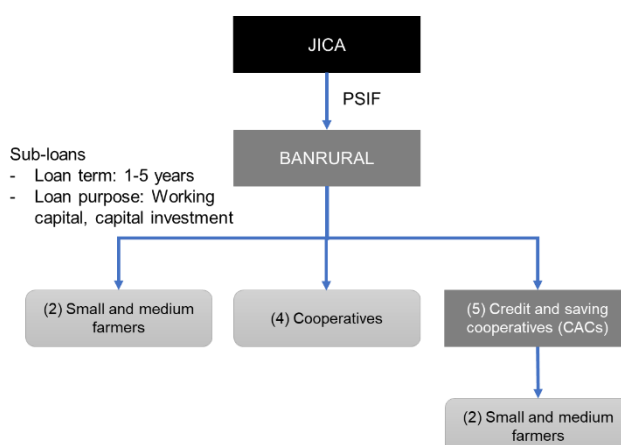


Figure 3.1.2 Proposed Flow of Funds for Overseas Investments and Loans to Financial Institutions (Guatemala)

⁵ For example, the four largest companies engaged in the processing and sale of dairy products are all owned by foreign capital (including some that have been acquired).

⁶ It is not unusual for the area of farmland owned by a single farmer to exceed 1,000 ha.

the western region of Panama, represented by Chiriqui, is well known as a major agricultural production area, but in recent years, agricultural development in the eastern region, such as Darien, located on the opposite side of Panama City, has been progressing. However, since there are no modern rice mills in the region, there have been cases reported of harvested paddy being transported to a rice mill in Chiriqui. This geographical imbalance is also a bottleneck, so it is important to take this into account when promoting investment.

Under these circumstances, the Panamanian government has begun promoting the "food hub" concept, following in the footsteps of the "logistics hub" and "financial hub. Specifically, the plan targets a total of 20,000 ha of land throughout the country and provides various preferential measures for agricultural investment. These policies are also timely as they provide an opportunity to promote the strengthening of FVCs in Panama.

Given that the economic disparity between urban and rural areas has emerged in the shadow of recent economic growth, and that there is a need to correct this disparity through strengthening the agricultural, livestock, and fisheries industries in rural areas, we propose the following development scenario as a direction of support for strengthening FVC in Panama.

<Proposed Development Scenario (Direction of Support)>

Contribute to correcting the disparity between urban and rural areas by strengthening the food business in rural areas through financial support for companies (e.g., rice millers) and associations (livestock feed production associations) that are closely connected to farmers on the FVC and by investing in companies that have entered the food hub concept.

2) Support Project Proposal

The following project is proposed as a Japanese support measure to realize the above development scenario for strengthening FVC in the country.

(1) Overseas investment and loans for financial institutions:

Credit support to agricultural production associations, companies, etc. through overseas investment and loans or TSL through the government by providing capital to Global Bank (private banks). If there is a contract between producers and processors, as is currently the case, the loan can be provided with that contract as a guarantee. In addition, the FECCI's interest rate supplement program⁷ (4% interest rate supplement for investments in the agricultural sector) can be used for loans.

For example, in the rice sector, irrigation improvements by farmers and enterprises, expansion of rice mills, and introduction of rice husk-recycling dryers are likely to be candidates for financing, while in the dairy sector, expansion of processing plants and solar power sources are likely to be candidates. In the plantain sector, there is likely to be demand

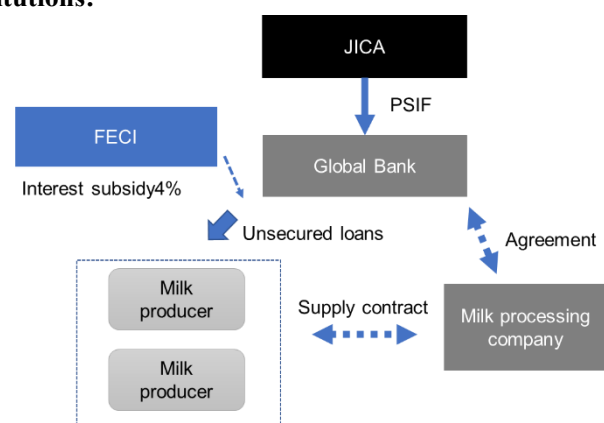


Figure 3.1.3 Proposed Flow of Funds for Overseas Investments and Loans to Financial Institutions (using Panama and dairy farming as examples)

⁷ FECCI (Fondo Especial de Compensación de Intereses): In Panama, for loans of \$5,000 or more, borrowers bear an additional 1% and pay it to the FECCI via the bank. When farmers receive loans, they receive an interest subsidy of 4% (3.5% for agro-businesses exporting non-traditional products) from the FECCI.

for funds for the introduction of field irrigation facilities, the application of modern agriculture (e.g., pesticide application by drones), and the introduction of processing facilities.

The reason for proposing foreign investment and loans to private financial institutions rather than two-step loans is that the government-affiliated financial institutions, Banco National and the Bank for Agriculture and Pastoral Development (BDA), do not have a sufficient demand for funds. While Banco National, a state-owned bank, has the largest share of loans to agriculture, its interest rate is extremely low, averaging 0.8%, because it is responsible for managing government funds. BDA also receives loans from FECCI at low interest rates, resulting in loan interest rates as low as 2%-4%, and neither bank is allowed to provide additional funding material.

(2) Support for the Food Hub Initiative:

Support for the country's food hub concept for the promotion of food business. Overseas investment and loans for financial institutions as presented in (1) above or individual overseas investment and loans for companies applying for the food hub concept that are expected to have a social impact. However, since the Food Hub Initiative has just been launched, no specific information on approved projects is available as of December 2022.

(3) Collaboration with tech companies:

When providing development finance support through overseas investments and loans for financial institutions, it is conceivable to combine technical assistance not only to FVC-related parties but also to participating financial institutions. For example, support for the construction of digital platforms for PFIs utilizing fintech or the provision of agri-tech services for end-users could be considered.

3.1.4 Dominican Republic

1) Direction of support and proposed development scenario

As shown in the FVC survey results for each country in Chapter 2, the Dominican Republic's agricultural sector has already reached a certain level of self-sufficiency in rice, for example. In cacao, the country has established a firm position in organic cacao exports. In the rice sector, there are cooperatives that operate rice milling business. In the cacao sector, the private sector plays a major role in the processing and export, supporting producers in obtaining organic and other international certifications (fair trade, etc.).

On the other hand, climate change has caused many problems associated with droughts and floods, and in recent years, hurricanes, which had previously passed over the country's eastern seaboard, come into the inland areas and have made landfall and caused extensive damage. This high vulnerability to climate change has become an issue, particularly in the production sector. Furthermore, elimination of tariffs with the US is scheduled for 2025, and improving the competitiveness of domestically produced rice is an urgent issue.

In addition, the agricultural sector is undergoing many changes. In the rice sector, the use of large agricultural machinery from Brazil and the US had been common, but inefficiency has become an issue in the country's small farm sizes. In recent years there has been an increasing need for replacement with relatively small agricultural machinery. Another issue is that irrigation facilities built in the 1980s, including the ones constructed with Japanese assistance, are aging, and water use is becoming significantly inefficient.

The cacao sector is also undergoing changes. Cacao plantations planted 30 to 40 years ago are losing

productivity, and there is a growing need to replace them with new, genetically improved cacao. Furthermore, there is a growing need for investment in the processing sector. Some companies and cooperatives are shifting their strategy from exporting green beans, which was the norm in the past, to primary processing in the country to add value to their products.

Thus, it was confirmed that in the agricultural sector of Dominican Republic, there are challenges for improvement and expansion from the production sector to the processing sector. Support needs are high to solve them, responding to climate change and changes in the trade environment. For this reason, the following development scenario is proposed to strengthen FVCs in the Dominican Republic.

<Development Scenario Proposal (Direction of Support)>

Contribute to the stable domestic production of agricultural products that are robust to climate change risks by promoting the modernization of agricultural production and supporting the introduction of agricultural insurance and the rehabilitation of irrigation facilities in particular.

2) Support Project Proposal

Following projects are proposed as Japanese support measure to realize the above proposed development scenario for strengthening FVC in the country.

(1) FVC Enhanced Two-Step Loan (TSL):

Two-step loan with BANCO AGRICOLA (government bank) as the participating financial institution (PFI) is proposed. Given the wide range of investment needs from production to processing and distribution, the loan will support sub-loans for the entire FVC. Its targets include, for example, agricultural machinery, transport trucks, and rice milling machines in the rice sector, and cacao replanting and processing facilities in the cacao sector. In the fisheries sector, the loans can be used for fishing boats, fishing nets, and cold chain equipment, etc. However, since individual fishermen do not own land as collateral, they must be organized to obtain loans as a group. In addition, the financing to BANCO AGRICOLA as a PFI may be coordinated with the IDB (This idea was taken for further survey).

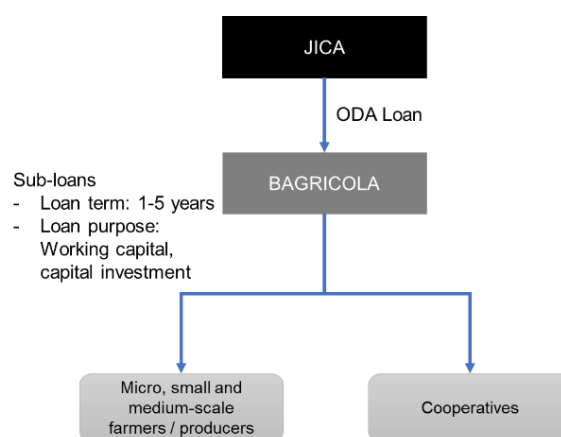


Figure 3.1.4 Proposed Fund Flow in Two-Step Loan (Dominican Republic)

(2) Irrigation rehabilitation project loan:

Rehabilitation of aging irrigation systems and, in part, concrete lining of earthen canals to enable efficient water use is proposed. The project will be combined with technical assistance to improve water management capacity of the producers, given the high rate of water use and losses in the agricultural sector. Co-financing with the IDB is a potential idea as they have similar ideas for loan project. In addition, a special organization for the development of the San Juan region has been established by the new administration, and a 12,000 ha irrigation development plan has been proposed. Therefore, support for comprehensive FVC development that is consistent with such policy could be an option.

(3) Agricultural insurance development and dissemination:

It is to support the development and dissemination of agricultural insurance products that include weather and yield indexes. Since the southwestern part of the country is frequently affected by drought and the northeastern part by floods, the introduction of agricultural insurance products for each of these areas is being considered. As weather observation facilities and wide-area weather data using satellite

images are being developed with the support of various donors, support will be provided for the development of insurance products utilizing these facilities, and outreach to farmers (e.g., in combination with seasonal loans), taking government subsidies into consideration.

(4) Other support (technical assistance for financial institutions and farmers)

When providing financial support through two-step loans, etc., it is conceivable to combine technical support not only for FVC-related personnel but also for participating financial institutions. For example, support for building a digital platform for PFI using fintech and improving operational efficiency through this platform can be considered. Also, customer-targeting strategies, operational management, improvement for project implementation, public relations activities, monitoring, etc. are candidates. In addition, the provision of agricultural technology, agricultural management guidance, and agri-tech services to TSL end-users could also be combined as a supplemental support for TSL. In light of the relatively slow development of fintech and agricultural DX companies in Japan, it is also conceivable to launch the following programs for fostering leaders.

a) A project to support the planning and implementation of the FVC Accelerator Program:

JAD, one of the largest farmer-related NGOs in Latin America (185,000 members), serves as a counterpart in planning and managing the new FVC Accelerator Program. Experts (agricultural technology, farming, agtech, marketing, finance/fundraising) are dispatched to provide advice, mentoring, and lectures to farmers (JAD members) participating in the program, while strengthening ties with Japan and other Asian countries. In the medium term, the program aims to develop a new end-user base for TSL projects that provide financial support to farmers/MSMEs.

b) Support for entrepreneurship development platforms to promote collaboration between Japan & Asia

Boost Acceleration Camp @PYHEX WORK (main participating entrepreneurs are related to FinTech and AgTech) as a counterpart to strengthen the entrepreneurship support function in the country by promoting collaboration with entrepreneurs and support related organizations in Japan and other Asian regions, thereby supporting global entrepreneurship development in the country. The project supports the country's global entrepreneurship development. In the medium term, the project aims to supply fintech and agtech that can be used by PFIs and end-users for TSL projects that support the financial aspects of farmers/MSMEs.

3.2 Technical Cooperation Attached to Two Step Loan (6 Target Countries)

The direction of support and proposed development scenarios in the four countries targeted by the field survey have been described. This section discusses a proposal to increase the added value in providing agricultural financial support, mainly TSL, under the theme of "support for strengthening FVC through agricultural finance," which is the main objective of this survey.

The table below summarizes the potential participating financial institutions in the six target countries, their respective stages of financial development, the financial challenges they face, and the proposed solutions (three types). As mentioned above as a "other support " for the Dominican Republic, it is believed that adding these solutions to TSL could provide new value to JICA assistance as well.

Table 3.2.1 Organization of Information for Value-Added Studies to TSL (Direction of Proposed TA to be Included)

	Mexico	Guatemala	Honduras	El Salvador	Panama	Dominican Republic	summary
PFI Candidate and Financial Development Stage							
PFI candidate envisioned for TSL for farmers/MSME	medium FND	medium BANRURAL	weak BANADESA	medium BFA or BH	-	good BAGRICOLA	PFI candidates in each country are assumed in order to materialize the image of the proposed TA. Global Bank (Panama) is a candidate for the PSJF.
Financial Deepening (Credit extended by banks to private sector / nominal GDP)	28.7	35.0%	67.1%	58.3%	95.7%	29.0%	This financial deepening ratio is a World Bank indicator that gauges the level of bank credit volume.
Stages of Financial Development	11th	15th	25th	25th	25th	119th	The presence or absence of a legal framework such as creditor rights (collateral law, bankruptcy law, debt protection, lease-related legislation, etc.) and credit information (private and public) is a criterion for evaluation.
The fundamental problem that gives rise to the phenomenon of uneven distribution of funds							
1. Lack of accounting information within the business	<p>Many farmers/MSMEs do not keep books and do not accumulate bookkeeping/accounting information essential for business management and external financing</p> <p>The biggest management challenge for farmers/MSMEs is weak cash management/cash flow management (including the formulation and implementation of medium- to long-term repayment plans). However, financial institutions are unable to accurately and real-time grasp the actual cash management status of farmer/MSME customers and provide in-depth support. The screening practice for business loans is based on traditional financial statement analysis based on the recent two financial statements plus collateral (with an emphasis on land), resulting in high expense ratios, and lack of manpower and time to provide detailed customer support. Cloud-based services for "accounting and cash management" such as PayPal and QuickBooks are not widely available and farmers/MSMEs have little access to them. Therefore, comparing the potential support needs of farmers/MSMEs for their internal financial operations with those of external support, there is a large support gap in the areas of "centralized cash flow management" and "realistic and effective marketing and budget planning (including business plans) for new businesses".</p> <p>There are business risks inherent in agriculture, such as declining harvest yields and market prices due to bad weather, etc., which are difficult to deal with under the traditional business model of banks doing lending business with less profitability (note: this is also the rationale behind policy-based finance for agriculture).</p>						
2. Support gap	<p>The problems concerned are common and fundamental, although they vary in degree depending on the economic conditions in each country. While issues 1. and 3. are commonly pointed out from the lender's perspective, issue 2. is analyzed with a focus on the borrower's practice. There exists a support gap as a fundamental problem.</p> <p>Note that "collateralism," which is often pointed out, is a set of lending practices that rely excessively on collateral and is a problem on the part of lenders.</p>						
3. Agriculture-specific risks							
Solution A: Build and operate a digital platform for PFI using fintech							

	Mexico	Guatemala	Honduras	El Salvador	Panama	Dominican Republic	summary
Outline	<p>(1) Establish and operate a credit management service platform for PFIs that backs up the financial infrastructure of farmers/M/SMEs by automating cash flow/cash flow management and budget planning, and utilizing the borrower's financial information obtained there on a continuous, real-time basis.</p> <p>(2) If fintechs that are needed by PFI to improve the overall efficiency of banking operations exist in domestic and overseas countries, add services in conjunction with them as an option. For example, automation of operations on the lender side using AI, etc.</p>	<p>The Central Bank (BCH) and the National Commission for Banking and Insurance (CNBS) have already established committees to study the fintech sector, respectively. In order to create an environment of collaboration between the public and private sectors, a Financial Innovation Committee (MIF) was also created in October 2019. The MIF is supported and promoted by the IDB.</p>	<p>The government is working with fintech companies to develop a legal framework to incorporate the fintech industry, but currently there is little regulation. The Central Bank (BCR) aims to assess the performance of fintech companies currently active and to come up with a regulatory framework that will promote business while maintaining financial order and fairness by absorbing risks in the financial industry.</p>	<p>Supervisory Agency (SBP) creates legal instruments and a regulatory framework for financial services that complement international services, such as e-wallets, digital currency providers, payment management systems, and remittance apps; UNDP focuses on supporting fintech development, and since 2016, Alternative Finance Lab events have been implemented.</p>	<p>The key issues to promote financial DX are open banking and regulatory sandboxes. Legislation related to open banking is targeted for 2024; The Payment Systems Regulations (2019) establishes a framework to regulate fintech companies that make digital payments, and with the support of the World Bank/IFC, a technology Sandbox is scheduled to begin in November 2022.</p>	<p>[TSL-TA (Draft)] (In countries where TSL will be realized) (1) TSL operational support for PIUs, (2) TA for banks: (i) training/consulting on DX strategy development (including fintech application in banking practice) (←Support Solution A), (ii) training on management support for clients (cash management, development of medium- and long-term repayment plans, marketing and new business planning); and (3) technical/farming guidance for FVC end-users.</p> <p>In the Fintech Index Ranking (2020) for the North America and Latin America region, Mexico City (10th), Bogota (16th), Buenos Aires (18th), Santiago (23rd), and Rio de Janeiro (24th) are ranked in the top 50 from Latin America, while other than Mexico, the surveyed countries are not ranked in the top 50.</p>	
Fintech Regulatory Environment	<p>With the approval of the Fintech Law in March 2018, tighter regulations surrounding digital products have encouraged new products and new partnerships between financial and telecommunications companies, ushering in a new wave of innovation in digital financial services. Mexico is the largest fintech market in the region.</p>	<p>National Strategy for Financial Inclusion (ENIF) developed (2019, Ministry of Economy). The Central Bank operates the SIB Innovation HUB. In the domestic market, the percentage of e-payment users in the population is 6.28%, while personal finance is still marginal at 0.9%. Fintech integration is in its budding stage.</p>	-	-	PA Fintech, Innovation and Digital Economy Association (membership unknown) (note: actually a government-led group that is not active)	ADOFINTEC (126 members, including 57 fintech members)	The Dominican Republic ADOFINTECH, (and Mexico Fintech Mexico) are the most likely to have organizational strength and collaboration potential. Ref: Finnovista's Fintech Rader Mexico 2018, Rader Fintech RD 2022 (ADOFINTECH)
Resources (Domestic)	Fintech Mexico (195 members, including 115 fintech members)	GT Fintech Association (28 members, of which the number of fintech members is unknown)	-	-			
Resources (within LAC)	Overall, there are 2,482 fintech companies active in Latin America and the Caribbean, according to the IDB and Finnovista report. This is						Source: IDB and Finnovista,

	Mexico	Guatemala	Honduras	El Salvador	Panama	Dominican Republic	summary
Resources (World)	<p>a sharp increase compared to the previous survey points of 703 companies in 2017, 1,166 companies in 2018, and 1,830 companies in 2020. This number of companies is 22.6% of the total global number of 11,000 companies (Source: Findexable, The Global Fintech Index 2021). By country, the number of companies is concentrated in Brazil (771 companies, 31%) and Mexico (512 companies, 21%), with the two countries accounting for 52% of the total. Among the countries covered in this study, the Dominican Republic (55 firms, 2%), Guatemala (31 firms, 1%), Honduras (25 firms, 1%), Panama (16 firms, 1%), and El Salvador (14 firms, 1%). If we look at the "lending" sector, also known as "digital credit solutions" or "alternative finance," there are 502 companies in the region (as of 2021: 115 in 2017). They include consumer finance (56%), business lending (20%), factoring (11%), P2P consumer lending (7%), and P2P business lending (6%).</p> <p>Automated cash management/budget planning and authorisation functions for credit management tools (e.g. CaFE), asset management tools (e.g. Moneytree), cloud accounting services (e.g. QuickBooks, Sage, Xero) and APIs for financial institutions (e.g. Authlete). Below is a summary of the case studies.</p> <ul style="list-style-type: none"> • CaFE: Skwile, founded in 2014 by a Japanese resident of London, is a tool for automating cash flow and budget planning and credit management for financial institutions. https://www.cashflowcafe.co.uk • Moneytree: An asset management service developed and operated by Moneytree, established in 2012 by Australian founders living in Tokyo. https://getmoneytree.com/au/company/about • QuickBooks: Cloud accounting service developed and operated by Intuit, founded in the U.S. in 1983. https://quickbooks.intuit.com/# • Sage: accounting software from a company founded in 1981 in the U.K. Expanded to North America in 1998. Currently in 20 countries. Launched Sage Business Cloud in 2018. https://www.sage.com/en-us/ • Xero: Cloud accounting service from a company founded in New Zealand in 2006. It is rapidly growing its user base globally and currently has 2.7 million users. https://www.xero.com/try-now/accounting/xero-accounting-software/ • Authlete: A Japanese business that verifies authentication via API. https://www.authlete.com/ja/ <p>On the other hand, in Central Asia (8 countries), there is a dedicated web-based risk assessment tool for farmers called CLARA (Cash-flow-Linked Agri-Risk Assessment), built by IFC's development team in 2017 (database is MySQL), which IFC has authorized leading national IFC has approved it for use by leading banks in various countries. The tool includes a business plan, cash flow projections for the loan term, loan repayment plan, need to renew/purchase new agricultural equipment, cash flow projections for the following month, and a database of market prices of agricultural products that is updated quarterly, which can be used by financial institution staff in their screening and monitoring operations. The IT system can be used, for example, in Uzbekistan. This IT system is also used, for example, in the IFAD agricultural development project in Uzbekistan. It may be a good idea to develop and utilize a similar system in this case.</p> <p>In general, fintech covers a wide range of areas, including artificial intelligence (AI) and big data (machine learning, predictive analytics), cryptography (smart contracts, biometrics), mobile access and the Internet (API: application programming interface, e-wallets, new payment platforms), and other technologies. A wide variety of financial applications are emerging that leverage. In the area of agriculture/MSME finance, the focus is on automation of operations on the lender side using AI and other technologies. For example, (1) machine learning is used to automatically reject companies applying for loans with high credit risk and determine interest rates based on credit risk, (2) natural language processing is used to assist staff in handling customer inquiries by phone (recognizing customer voices and providing necessary information on a computer screen), and (3) the bank staff can provide information on the bank's business activities. (1) automatic rejection of companies applying for loans with high credit risk and determination of interest rates according to credit risk using machine learning; (2) support for staff in receiving telephone inquiries from customers (recognizing customers' voices and providing necessary information on computer screens), monitoring of corruption by bank staff (detecting signs based on communication with colleagues, e-mail, telephone calls, etc.), support for detection and response to money laundering; (3) data entry and examination of customer financial statements using robotics, etc.</p>						<p>Fintech in Latin America and the Caribbean - A Consolidated Ecosystem for Recovery, April 2020.</p> <p>[Short-term Expert Dispatch for Development in the LAC Region (draft)] For example, "Support for Promotion of Japan & Asia Partnerships to the Dominican Republic Entrepreneurship Development Platform". The local counterpart will be Boost Acceleration Camp @PYHEX WORK (main participating entrepreneurs are mainly related to fintech and Agtech). The project aims to support the development of global entrepreneurs in the country by promoting collaboration with entrepreneurs and support organizations in Japan and other Asian countries. In the medium term, the project aims to provide fintech and agtech that can be used by PFIs and end-users to TSL projects for financing of farmers/MSMEs. Reference: https://pyhex.com/</p>
	<p>Solution B: Leverage Agtech services for end users</p> <p>Agtech companies that can provide products/apps that can be used by TSL end-user farmers are gathered, and 4~5 companies are combined to establish a service platform that TSL end-users can use either for free or for a fixed monthly subscription fee. The platform will</p>						<p>[FVC Accelerator Program Planning and Implementation</p>
Outline							

	Mexico	Guatemala	Honduras	El Salvador	Panama	Dominican Republic	summary
Resources (domestic and within LAC)	<p>There are 12 Agtech companies in the country. Agriculture in general accounts for 22%, with the others being 33% commodities and beverages, 22% fresh vegetables, 11% bioenergy, and 11% permanent crops.</p>	<p>Ponoma Food System, an agricultural accelerator program by Ponoma Impact (150 graduates, including 10 Agtech companies)</p>	<p>According to the IDB Lab survey, there are 457 Agtech companies in the Latin America and Caribbean region, with a regional dispersion of 51% in Brazil, 23% in Argentina, 18% in the Andean region, 5% in Uruguay and Paraguay, and 3% in Central America and the Caribbean. Excluding Mexico, the five countries covered in this study have a limited concentration of startups, with two in Central American countries and two in the Caribbean. The country with the largest number of startups is Brazil (26 companies), Argentina (18 companies), Chile (15), Mexico (8), Colombia (6), Peru (2), Costa Rica (1), and El Salvador (1). For the Dominican Republic, it is possible for the Boost Acceleration Camp @PYHEX WORK to introduce a variety of Agtech companies through partner universities and other organizations.</p>	<p>serve as a sales tool for the newly established agtech companies to generate revenue, while TSL end-users will be able to use convenient products/apps at low cost. However, considering the immature accumulation of domestic resources (Agtech companies) in the countries listed below, it is difficult to realize this idea using domestic resources in reality. If JICA-TSL were to be realized in the Dominican Republic, it would be possible for the Boost Acceleration Camp @PYHEX WORK to introduce various agtech companies through partner universities, etc. However, it is still not certain whether it is possible to build a service platform that realistically meets the true needs of TSL end-users (including smallholder farmers).</p>	<p>Support Project in LAC (draft) For example, "Dominican Republic FVC Accelerator Program Planning and Implementation Support Project". The counterpart will be JAD (185,000 members), the largest farmer-related NGO in the LAC region, and support the planning and operation of a new FVC Accelerator Program. While strengthening ties with Japan and Asia, the project will dispatch experts (in agricultural technology, farming, agtech, marketing, and finance/fundraising) to provide advice, mentoring, and lectures to farmers (JAD members) participating in the program. In the medium term, the project aims to develop a new end-user base for TSL projects that provide financial support to farmers/MSMEs. Reference: https://jad.org.do/en/</p>	<p>Source: IDB Lab, Agtech Innovation Map in Latin America and the Caribbean, 2019, p. 13</p> <p>Source: Sofia Ramirez & Gonzalo Perez, LaTam Agrifoodtech Market Map: From seed to consumer, Oct 2020.</p>	
Solution C: Linkage with Risk Complementation Tools							
C-1. Agricultural Insurance: Agricultural insurance is incorporated in the product design of TSL sub-loans, or if the end user (small farmer) who applies for a TSL sub-loan wishes to do so, the PFI will provide agricultural insurance coverage at the time of sub-loan application.							
Candidate partners (domestic)	Agroasemex	-	-	-	Agricultural	AGRODOSA	

	Mexico	Guatemala	Honduras	El Salvador	Panama	Dominican Republic	summary
Insurance Industry Overview	The major player is ProAgro, which announced its "Parametric Risk Transfer Initiative" for smallholder farmers at the March 2022 Insurance Development Forum. Reinsurance company Guy Carpenter is leading the initiative, along with insurance companies AXA, Munich Re, and Swiss Re, with Agroasemex (a state-owned insurance company) as the local partner.	-	-	-	Insurance Institute (ISA) Applicants for rice farmer loans are required to take out ISA Crop Insurance. The government subsidizes 50% of the insurance premium (US\$113/ha, 4% of production cost).	According to Ministry of Agriculture Circular No. 157 (2009), when farmers get loans from BAGRICOLA, AGRODOSA's Crop Insurance is mandatory and 50% of the premium is subsidized by the government. If BAGRICOLA becomes a PFI, it is likely that the said practice will be followed. Weather index insurance is not a realistic option due to lack of observational data and other issues.	Regarding the introduction of weather index insurance, if the Mexican precedent (Parametric Risk Transfer Initiative) is successful in the future, there will be room to consider the possibility of applying it in other countries. In that case, a candidate for collaboration is the reinsurance company Guy Carpenter. In particular, if TSL is realized in the Dominican Republic, where agricultural insurance is partially or mandatorily introduced, support for the development and dissemination of weather and yield index insurance products from the perspective of addressing climate change is worth considering. (Reference: Weather index insurance for dairy businesses has been approved from the support of Columbia University in the US).
C-2. Credit guarantee: linkage with public systems that provide public credit guarantee services to loan applicants who are hindered by lack of physical collateral							
Domestic Cases	As needed, government credit guarantee programs are reviewed and implemented on a year-by-year basis. There is no public guarantee agency.	DFC Guarantee, a credit guarantee fund for SMEs by DFC & USAID (jurisdiction: Ministry of Agriculture, etc.; Bank: Interbanco; Loan guarantee size: \$15 million (guarantee multiple: 10x); target: SME sector (western mountainous areas) including farmers.	-	-	-	There is no credit guarantee system. On the other hand, there is a large amount of unregistered farmland, and registration of farmers' land for the preservation of ownership is not progressing well due to the fees involved. As a result, farmers are	While there is debate about the merits and demerits of the credit guarantee system, the system simply allows loans to ripple out for the "budget amount secured x guarantee multiplier". Budgetary measures need to be taken by the government and cannot be discussed lightly.

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	Mexico	Guatemala	Honduras	El Salvador	Panama	Dominican Republic	summary
		Guarantee coverage ratio: 50%. Started in 2021.				unable to provide physical collateral (mainly land), which is an impediment to financial facilitation for farmers.	

Source: Compiled by JICA survey team based on various statistical materials, reports and field surveys (September-October 2022)

3.3 Proposed Project in the Dominican Republic (for Coordination with the IDB)

In realizing the JICA support indicated in 3.1.4, the possibility of co-financing with the IDB was considered. This section describes the nature and feasibility of co-financing with the IDB, which has several projects planned in the Dominican Republic, among which two could be considered for co-financing with JICA: (1) a two-step loan with Banco Agrícola as a participating financial institution, and (2) an irrigation rehabilitation project. A summary of each is provided below.

3.3.1 Two-Step Loan (TSL)

The IDB was in discussions with the government and Banco Agrícola to form a project for agricultural financial support called "Programa De Financiación De Inversiones Sostenibles Y Mejora De La Productividad en El Sector Agrícola" as of 2023. The project had already been discussed with the French government (AFD) and Banco Agrícola, the financial institution that will implement the project. The Japanese government's participation in the project in the form of a joint type of co-financing was not very realistic, given that the co-financing with the French government had already been agreed upon and was expected to be approved in the first half of 2023 (based on interviews with an agricultural officer at the IDB Dominican Republic office).

Other possible cases of some form of coordination included: (1) targeting the sectors not covered by the IDB project (hereinafter referred to as "IDB-TSL project"), and (2) JICA takes charge/ co-finance a Phase 2 project of a similar project, assuming that the demand for funds is sufficiently large. The table below provides an overview of development finance loans by the IDB.

Table 3.3.1 IDB Development Finance Loans (TSL-Type Loans)

Item	IDB (to be approved in 2023)
Project Title	Programa De Financiación De Inversiones Sostenibles Y Mejora De La Productividad en El Sector Agrícola
Budget	USD 120 million
Duration	5 years (3 years of disbursement)
Executing Agency	Banco Agrícola
Objectives	To increase the provision of credit for productive and environmentally sustainable investment by small and medium agricultural producers
Project Component	1) Financing sustainable investments and competitiveness 2) Non-reimbursable TA for farmers 3) Institutional strengthening for BANCO AGRICOLA
Target Beneficiaries	Small and medium-sized agricultural producers ("1" and "2") as well as BANCO AGRICOLA ("3")
Commodities	Rice, cacao, coffee, avocado, pineapple, coconut, lime, mango, banana, and cattle
Technologies	"Green" technologies which meet the criteria of international banks: precision irrigation systems, use of efficient engines, use of biomass, solar drying, acquisition of the certificates, etc.

Source: IDB

1) Cooperation options with IDB

(1) Targeting sectors not covered by IDB projects

The IDB's project, which aims to provide credit for productive and environmentally sustainable investments by small and medium agricultural producers, targets rice, cacao, coffee, avocado, pineapple, coconut, lime (citrus), mango, banana, and livestock (cattle). From the FVC's viewpoint, the project will specifically support the introduction of Green Technology in the "production sector. In contrast, JICA's project proposal is to expand the support to other sectors than the production sector, while keeping these commodity items as the target of support.

In fact, in the rice, cacao, and fisheries sectors covered by this survey, there is a high level of willingness to invest in the "processing" sector, in addition to "production". For example, in the rice sector, rice mills are highly motivated to expand the scale of their operations, and some cooperatives have expressed

interest in introducing rice husk dryers (i.e., those that generate electricity, rather than using rice husks as a direct heat source), especially in light of the recent sharp rise in energy prices.

In the cacao sector, there are several companies and associations that are willing to introduce value-added processing facilities (to produce cacao powder, cacao nibs, and even chocolate) in the country, rather than exporting green beans as raw material. In the fisheries sector, there is a high potential demand for a cold chain for sanitary management of landed seafood. The provision of development finance loans targeting these processing and distribution sectors could contribute to the strengthening of FVCs.

However, if the IDB expands the scope of its support, it may be possible for the IDB to use the funds for purposes not limited to "green tech," which is the objective of the project. In this case, JICA could establish its own project objectives (e.g., the main objective is to strengthen FVCs) and implement the projects in parallel, aiming for a mutually complementary relationship between the two projects. Alternatively, even in the FVC sectors other than the production sector, it may be possible to follow the objective of the IDB project (green tech) by limiting the use of funds to "introduction of machinery using solar power panels" or "introduction of machinery using fuel-efficient engines," etc.

(2) Phase 2 implementation (co-financing or sole source financing)

It is conceivable that the contents of the IDB project will remain largely unchanged and that Phase 2 will be implemented seamlessly at the same time as the completion of the project (planned for a 5-year implementation period). The advantage of this proposal is that the participating financial institutions in Phase 1 have sufficient experience in the procedures for screening and financing end borrowers and disbursement of donor funds, and smooth implementation can be expected (however, it should be noted that there may be differences in the procedures required by JICA and IDB). (However, if there are differences in the procedures required by JICA and the IDB, care should be taken). In addition, if JICA finances Phase 2 independently, it has the advantage of clarifying the main donor in the form of "IDB for Phase 1, JICA for Phase 2," etc.

In order to implement Phase 2, further financing needs and the project effects of Phase 1 must be confirmed to contribute to the desired objectives, and only if these conditions are met, the IDB may implement Phase 2. If the IDB is also willing to implement Phase 2, a realistic landing point would be to co-finance the project with JICA, the IDB, and possibly the AFD.

In addition, in order to implement Phase 2 through JICA's sole or co-financing, it is necessary to pay attention to whether there is any discrepancy between the timing of decision-making on project formation and the progress of Phase 1, i.e., whether sufficient information and knowledge have been accumulated to make a decision.

(3) Summary of coordination options including TA

The table below summarizes the combinations of cases in which JICA and the IDB cooperate or co-finance projects, depending on whether there is additional financial need, while considering the TSL and various types of technical assistance (TA) described above as options. In the case where additional financing needs are identified (upper row), there are cases where JICA implements a TSL project to strengthen FVC on its own, and cases where JICA participates in an IDB project as co-financing. On the other hand, if the immediate financial needs are met with a loan of USD120 million from the IDB and the French government, as well as a USD60 million loan from CABEL, which has separately announced its plan, technical assistance may be provided to support the TSL projects by these institutions. The company will also provide technical assistance to support TSL projects by these institutions.

Table 3.3.2 Project Combination Options for Implementing Coordinated Support with IDB

Prerequisite		Option		
Funding Needs	A certain demand for funds exists in the FVC	Option 1: JICA alone to build a TSL project	TA associated with TSL (for PIUs, PFIs, end users)	Addition of option (3) to option (1) or (2)
		Option 2: Injection of funds for IDB projects (tripartite co-financing with the AFD)	-	
	A demand for funds is not found ^{*1}	Option 3: Technical support for TSL implementation, dispatch of experts, etc.		

*1: For the time being, US\$120M from the IDB and the French government and US\$60M from CABEL will be sufficient.

Note: For examples of technical assistance and dispatch of experts, see "4.1.3 Dominican Republic 2) Proposed Support Project 4) Other side support".

2) Other items to be Considered

The following are points when implementing a TSL in coordination with the IDB to strengthen the FVC in the Dominican Republic.

a) Project Objectives

The IDB's cooperation projects focuses on "promotion of green tech" in the context of climate change measures. On the other hand, at the 27th Conference of the Parties (COP27) to the United Nations Framework Convention on Climate Change (UNFCCC) held in Egypt in November 2022, it was agreed to establish a new fund on "loss and damage" in addition to "mitigation" and "application," which have been the focus of the past. In other words, it is suggested that the emphasis will shift from "mitigation measures" focusing on reducing greenhouse gas emissions to a greater emphasis on mitigating the damage caused by climate change that has already occurred.

In line with this trend, it would be desirable for JICA's projects to have the objective of supporting recovery from losses rather than adaptation. In the context of the Dominican Republic, this means support for more resilient agricultural production and FVC in a country that frequently experiences droughts and floods, including the introduction of cultivation systems adapted to these conditions and the development of infrastructure to reduce damage.

b) Implementing/Cooperating Organizations

If the FVC sector is to cover a wide range of sectors from production to processing and distribution, consideration should be given to establishing a system to meet diverse technological needs by including relevant organizations other than the Ministry of Agriculture as implementing or cooperating organizations. For example, Junta Agroempresarial Dominicana (JAD) has a wide network with private companies and various research institutes and can dispatch experts. JAD has experience in working with donors such as the IDB.

c) Support for women's activities

Some commercial banks and microfinance institutions in the Dominican Republic have programs designed to support women, or operate in ways that give preference to women in practice, even if they do not have clear rules in place. Yet, most of the loans provided by these financial institutions are for small business start-ups, and support for women in the agricultural sector is limited. On the other hand, a relatively high percentage of women are involved in the processing and marketing sectors of FVCs, due in part to their manual dexterity. Therefore, it is expected that supporting the expansion and provision of credit lines to the processing and sales sectors will contribute to increasing the possibility of supporting women.

3.3.2 Irrigation Rehabilitation Project (Yuna River Basin Management Project)

During the survey, the following three irrigation systems were found under consideration for the IDB project.

- AGLIPO I, II and III irrigation systems (Aglipo-1 to 3 irrigation systems)
- Yuna - Cañabón irrigation system
- Masipedro irrigation system

Of these irrigation systems, Aglipo-1 and 2 irrigation systems were constructed in the 1980s with Japan's cooperation and found to be quite dilapidated to date. For example, in the Aglipo-1 irrigation system, the pumps at the pumping station are aging, and one of the three pumps has completely failed. The system is also inefficient due to its relatively large size and outdated equipment.

The rubber dam (a large rubber tube installed across the river and inflated when necessary to function as an intake weir), which is the intake weir for the Aglipo-2 irrigation system, has already completely lost its function due to damage. As an emergency measure, INDRHI has installed gabions at the site where the rubber dam was constructed to maintain the water level to allow water to flow into the canal (see photo).



Aglipo 2 water intake point. There used to be a rubber dam on the right bank side of the flood discharge gate (white frame), but it is no longer

However, because it does not have the expansion function of a rubber dam or the gate function of a fixed weir, it is in the same condition throughout the year, and there are concerns about whether it can safely carry away floodwaters during the rainy season, as well as concerns about its stability as a structure. Therefore, it is necessary to make immediate repairs to ensure safety and functionality.

On the other hand, for Aglipo-3, there is an existing irrigation facility that has been traditionally utilized, and a plan to substantially rehabilitate it was made. Although a Feasibility Study (F/S) was conducted by JICA in 1995, it was not implemented. Based on these, this is a plan for rehabilitation by the IDB in a form that includes all of Aglipo-1 to 3 (later, Aglipo-3 was omitted from the plan). Table 3.3.3 shows the projects and irrigated area, cost, etc. for each of Aglipo-1 to 3. As shown here, INDRHI estimates that the budget for Aglipo-1 and Aglipo-2, which are mainly for rehabilitation, will be USD 10 million and USD 20 million, respectively, while Aglipo-3, which includes new areas, will cost about USD 125 million.

Table 3.3.3 Plan in Aglipo Irrigation Systems

Irrigation Scheme	Works	Current irrigated area (ha)	Additional irrigated area (ha)	Total Irrigated area (ha)	Number of beneficiaries	Cost (USD Millions)	Months
AGLIPO I Renovation	Rehabilitate water intakes, update pumping systems, repair tide gates, improve irrigation drainage channels, install water control works, gates, etc., procure heavy equipment for canal maintenance, strengthen irrigation committees, etc.	8,514	0	8,514	3,127	10	18
AGLIPO II Renovation	Renewal or rehabilitation of water intakes, rehabilitation of rubber weirs or other	7,135	0	7,135	1,584	20	24

	gated fixed weirs, repair of tide gates, improvement of irrigation and drainage channels, installation of water control works, gates, etc., acquisition of heavy equipment for canal maintenance, strengthening of irrigation committees, etc.						
AGLIPO III Renovation / New Construction	Construction of an irrigation system to replace aging or inadequate irrigation facilities; intake facilities in four existing canals and eight new intake facilities; pumping station at Villa Riva; pontoon and eight other small lakes; lining of 96.5 km of main canal and 68.86 km of secondary canals; and 217.0 km of secondary canals, 217.0 km of tertiary canals. An additional 23 km of tertiary channels (earthen channels) and new drainage network (8.94 km of trunk drainage channels, 71.96 km of secondary drainage channels, 180.81 km of tertiary drainage channels, 8 flap-gate evacuation facilities), flood control facilities (22.5 km of Payabo River, 19 km of Cascarilla Channel), road network improvement (63.95 km of trunk roads, 1167.0 km of secondary roads km, 1167.20 km of secondary roads, 8.8 km of agricultural roads), construction of office buildings	4,900	3,980	8,880	2,696	125	36

Source: INDRHI (January 2023)

The IDB planned to conduct the F/S from February 2023, targeting the Aglipo irrigation systems and two other irrigation systems in the Yuna River Basin. Therefore, it was judged that JICA could participate in part or all of these projects based on the project plan and the cost estimate prepared by the F/S. If the irrigation systems that Japan had supported in the past could be renovated, it would lead to the continuation of the project effects, and it could be expected to be a good model of Japan's support.

3.3.3 Way Forward for Co-Financing with IDB and Others

During the field survey in January 2023, discussions were held with the IDB, Banco Agricola, INDRHI, and Ministry of Agriculture officials to reach a mutual understanding on the future direction of the project. The following is a summary of the main points discussed.

1) Coordination on Two-Step Loans (TSL)

- Including the USD 150 million IDB-TSL (co-financing with AFD) and the loan by CABI (CABI-TSL), the total loan to Banco Agricola is USD 180 million. Even so, it is believed that a financial gap still remains, and VC support from JICA for the production sector and beyond would be desirable.

- In other words, the IDB and JICA will study the possibility of a "parallel" type of collaboration (financing) for Banco Agricola.
- Since the IDB appraisal is expected at the end of February 2023 and the L/A signing in April of the same year, JICA will proceed with preparations for the JICA-TSL on a different timeline. Information on the progress of each will be shared closely.
- As for the target crops of the JICA-TSL, as with the IDB-TSL, it would be good to include a variety of crops such as rice, fruits, cacao, livestock, dairy. However, since the IDB is promoting the introduction of green tech, care should be taken not to deviate too much from it to avoid confusion within Banco Agricola.
- Both parties consider the contents of the TA component for the bank.

2) Cooperation in irrigation rehabilitation projects

- Since the IDB plans to implement F/S, irrigation projects will be considered as a joint implementation by the IDB and JICA.
- The schedule for the IDB is that the Identification Mission in early February 2023, followed by the FS scheduled up to February 2024, Appraisal in May 2024, QRRM (Quality and Risk Review Meeting) in May 2024, and approval in June 2024.
- JICA's schedule is to start information gathering in February 2023, send Conditional Acceptance Letter in May 2024, and internal JICA approval in June 2024 based on the results of the Appraisal mission. Pledge is expected in August 2024, with the aim of signing the E/N and L/A by the end of 2024.
- Since JICA's schedule and the IDB's schedule may not match, it could be proposed that the IDB precedes with a 2023 budget of 120 million USD and JICA adds it as a 2024 budget.
- Regarding environmental and social considerations, it is assumed that there may be some differences, such as stricter requirements for JICA compared to IDB. For this reason, it was agreed to consider including the items required by JICA in the TOR of the F/S and that the IDB will share the results of the survey as soon as possible.

3) Way forward

Based on discussions with the IDB and other relevant agencies, it was decided that additional survey must be conducted on the following

(1) TSL: Survey of financial institutions' capacity to implement and demand for funds

As a complement to the IDB-TSL, which mainly targets the agricultural production sector, JICA will consider implementing TSL targeting the post-production sector (processing, distribution, etc.). Specifically, JICA will evaluate sub-loan targets, funding needs, and the implementation capacity of the expected participating financial institutions (PFIs), and compile basic information for TSL implementation in parallel with the IDB.

(2) Irrigation rehabilitation: Information gathering and field survey on the proposed project

The possibility of co-financing (joint type) by JICA and the IDB will be considered after collecting and confirming information and the current status of Aglipo, taking into account that IDB plans to implement F/S in several irrigation schemes in the Yuna River Basin from February 2023.

JICA agreed to conduct a survey, consultations, and coordination with the relevant organizations. The results of this particular survey were compiled in a separate edition of the report, as they include

information related to the project formation.

3.4 Consideration of Private Sector Investment and Finance (PSIF) Scheme

This study is intended to seek comprehensive solutions to local problems by mobilizing mechanisms such as ODA loan, grant aid, and technical cooperation. However, apart from comprehensive solutions, there are some cases in which private companies are trying to realize sustainable FVCs by supporting farmers while doing their business. Although not necessarily synergistic with the support measures and proposed development scenarios described above, this section introduces four cases that should be supported through Private Sector Investment and Finance (PSIF) scheme. The details of the investment plans are omitted from this report, as they are confidential information of each company.

3.4.1 FEDECOVERA (Guatemalan Cardamom Federation of Cooperatives)

(1) Business Overview and Contribution to FVC

The company is a federation formed by a number of cardamom cooperatives. It is a large organization with a total of 35,000 members. The total amount of cardamom produced by its members accounts for 40% of Guatemala's total cardamom production and 20% of the world market share. Despite this monopoly, in the past, each farmer sold to separate brokers, resulting in a complicated distribution structure and lack of sales power for the farmers. Owing to establishing the company, the distribution structure was consolidated into the company, thereby increasing the selling power. One example to show the company's selling power is organic cardamom. While practically all cardamom is grown organically, the company obtained organic certification, developed a customer base that wanted organic cardamom, and then sold 27% of its sales volume as organic cardamom at a high price.

Cardamom produced by farmers is collected and dried by cooperatives or smaller associations. The company's business model is to consolidate these products, process, sort, package, and export them. The company also provides financial support to farmers, breed improvement, and production and distribution of compost.

(2) Issues and business plans

The capacity of the plants responsible for processing, sorting, and packaging is far below the production volume of the members, which accounts for only 5% of the members' production. Hence, the cooperative members often sell to other exporters. In order to consolidate trading to the company, which can buy at higher prices, the company plans to build a new plant with about twice the capacity of the existing plant. This will enable the cooperative members to sell at higher prices and also benefit from financial support and improved varieties.



Figure 3.4.1 FEDECOVERA Laboratories and Breeding Grounds

3.4.2 Rizek (Cacao Processing Company in the Dominican Republic)

(1) Business Overview and Contribution to FVC

The company purchases cacao beans from farmers and engages in primary processing (fermentation and drying), secondary processing (production of cacao mass, cacao butter, and cacao powder), and tertiary processing (production of chocolate).

The company's strength lies in its flavor technology based on a variety of fermentation methods. As many as 40 different fermentation recipes exist, including the origin of the cacao beans, sugar content, number of fermentation days, and frequency of agitation. The company's ability to manage such diverse and delicate flavors results in high value-added primary processed products.

The company supports existing farmers in replanting and implementing plantation projects. In some cases, yields have increased up to four times through the planting method, selection of appropriate varieties according to soil and climate, and introduction of irrigation. In the plantation business, the company procures farmland, prepares it, sells it to farmers, and recovers the cost of the farmland from the sales proceeds through a payback system. Through the plantation business, the company encourages small-scale farmers to become large-scale farmers and helps them improve their livelihoods.

(2) Issues and business plans

Not only in the Dominican Republic, but in many cacao bean-producing countries, secondary processing and beyond take place in the chocolate-consuming country, resulting in little profit for the producing country. The company is planning to increase production of secondary processing, or in other words, to expand its factories, by taking advantage of the competitive strength of its primary processed products. In fact, inquiries for secondary processed products appear to be increasing, and it implies that its business plan is realistic.

Supporting the company's plan will increase the added value of cacao FVC in the Dominican Republic, and farmers will also benefit through the company's replanting support for existing farmers and plantation business. As mentioned above, we consider a two-step loan through ODA Loan in the Dominican Republic, but the scale of sub-loan through a two-step loan is insufficient for the scale of investment for the above factory expansion plan, and it is appropriate to support the project with PSIF scheme.

3.4.3 EQUIMAX (Agricultural and Transportation Equipment Dealer in the Dominican Republic)

(1) Business Overview and Contribution to FVC

The company is a dealer of agricultural machinery and transportation equipment (forklifts, trucks, reefer trucks, etc.), and has about a 50% share of the market in the Dominican Republic. In the Dominican Republic, where large harvesters used to be popular, the company has increased sales by proposing small harvesters to farmers based on the actual conditions of their fields. This story shows its strong demand discernment capability.

Another of the company's strengths is its finance function. While financing is the bottleneck for mechanization in the country, banks have a small presence in installment sales. The company is working with auto loan companies in its group to increase sales by offering installment sales of farm machinery and transportation equipment. The company's efforts to help FVCs resolve bottlenecks in mechanization from upstream to downstream are highly significant for strengthening FVCs.

(2) Issues and business plans

As mentioned above, we consider a two-step loan with ODA Loan in the Dominican Republic, and propose a loan specifically for midstream and downstream FVC. The transportation equipment traded by the company is suitable for the midstream and downstream of the FVC and falls under the main player supplying equipment eligible for two-step loan financing. In order to smoothly expand its supply structure when the market expands through two-step loans, we propose to support the company using PSIF scheme.



Figure 3.4.2 Equimax Dealers

3.4.4 ADOPEM (Bank and Microfinance in the Dominican Republic)

(1) Business Overview and Contribution to FVC

ADOPEM was founded in 1982 as an NGO called the Dominican Association for Women's Development. From there, the banking operations were spun off as ADOPEM in 2004. In 2012, the Microfinance Fund of BBVA, a major Spanish financial group, purchased 70% of ADOPEM's shares. It is a member of the Association of Banks of the Dominican Republic (ABANCOROD) and the Central American Microfinance Network (DECAMIF).

Of the 157,889 loan recipients, 67% are women and 41% live in rural areas. The company focuses on access to finance for women and rural areas that are less likely to have access to loans and are vulnerable. In addition to banking services, the company also provides microfinance in 10 prefectures with particularly high levels of poverty. The company's market share in these 10 prefectures is 63%, making it the dominant provider of access to finance in high-poverty areas.

Compared to Banco Agrícola, ADOPEM specializes in smallholder farmers. However, the small-scale livestock sector accounts for only 4% of the total number of clients.

Regarding collateral requirements for the company's loans, no collateral is required for loans under 300,000 pesos (but a cosigner is required), and collateral is necessary for loans over 300,000 pesos. Although the company verifies equipment and vehicles and recognizes them as collateral, it rarely mortgages them in writing. Nationwide, 582 business officers monitor income and assets through audits, screen personalities, and assess referrals. The NPL rate is kept low at 2.1%, and the company's screening mechanism can be judged to be functioning properly.

The company's loan target is not necessarily limited to FVCs, but given its focus on lending to women and rural communities, it is likely that its loan target will be industries related to FVCs, such as agriculture, food processing, and wholesale and retail of agricultural products. It would be positioned to support smaller farmers and businesses that would not have access to the two-step loans mentioned above.

(2) Issues and business plans

The plan is to increase the number of clients in the small-scale agriculture and livestock sector from 4% to 10% of the total, and the challenge is to train staff with knowledge of the agriculture and livestock sector for this purpose. It is proposed to support the financing of loan funds through PSIF scheme, as well as to support the training of staff with knowledge of the agriculture and livestock sector.

CHAPTER 4. CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusion

In this survey, desk review was conducted on basic information on the agriculture and agriculture finance sectors in six Central American and Caribbean countries; the findings are summarized in Volume I of the report. After that, a cross-country comparison of basic information on agriculture, finance, gender, and donor coordination was made to select the countries to be surveyed through the field visit. The findings are summarized in the table below (for detailed data, see Volume 2, Chapter 2).

As shown in the table, coffee, bananas, and other export products are the main agricultural products in all six countries. In addition, there are also agricultural products that are unique to each country, such as cardamom in Guatemala and melons in Honduras. In terms of agricultural patterns, Guatemala and Honduras are based on labor-intensive agriculture with a high percentage of agrarian population and agricultural labor force, and a relatively high dependence on agriculture, while Mexico and Panama are characterized by agriculture that is land intensive. In the Dominican Republic and Mexico, per capita water resources are low, but irrigation coverage is high compared to other countries.

**Table 4.4.1 Basic Indicators for the Six Countries Covered
(Agriculture, Finance, Gender, and Donor Cooperation)**

Item	Summary
Agricultural Potential	
Water resources	In the Dominican Republic and Mexico, the amount of water resources per capita is low and the share of water use by the agricultural sector is high. Therefore, measures to effectively utilize water resources by upgrading agricultural water use (irrigation improvement, water conservation, reuse, etc.) are necessary.
Agricultural land	Mexico and Panama have large pastureland areas, good potential for livestock and dairy farming.
Irrigation rate (%)	Mexico and the Dominican Republic have high irrigation rates.
Agricultural Characteristics	Coffee and bananas are the main crops in all countries, and fruit trees, vegetables, and horticulture are grown on top of these crops. Some of the most distinctive crops include melons in Honduras, cardamom in Guatemala, and organic produce in the Dominican Republic. However, the scale of investment varies.
Agriculture GDP share (%)	For Guatemala and Honduras, the share of agriculture GDP is around 10%, and it remains an important industrial sector, especially in rural areas.
Rural Population Percentage (%)	High in Guatemala and Honduras
Percentage of agricultural workforce (%)	High in Guatemala and Honduras
Agricultural Labor Employment Status	Many small and medium-sized entities in Honduras, Panama, and the Dominican Republic.
Gender	
Percentage of women in agricultural labor force (%)	High in Panama
Percentage of firms with women as CEOs (%)	El Salvador and Honduras are higher, but not by much.
Percentage of women landowners (%)	Overall, women's access to land ownership is low and financing is difficult to obtain. In terms of ease of gender mainstreaming, countries with higher rate such as Panama have an easier to implement; but countries such as Guatemala, where women's land ownership is lower, have a greater need.
Gender Initiatives of National Governments	Both Guatemala and Honduras governments recognize that gender is an issue. However, due to small budgets and human resources, gender mainstreaming has not progressed.
Finance	
Possibility of TSL with yen loans	Currently, only the Dominican Republic is recognized for implementation of TSL. From the perspective of the Bank's implementation capacity, the possibility of TSL is also considered for Panama.
Possibility of yen loan support through co-financing with other donors	Currently, only the Dominican Republic has the possibility of other donor coordination.
Financial soundness of the agricultural development banks or similar banks	Currently, the Agricultural Development Banks of Mexico, Dominican Republic, and El Salvador are evaluated sound.

Item	Summary
Possibility of PSIF	In Mexico, there are many projects by IDB for the agricultural sector. Otherwise, there are relatively few or none.
Support coordination	
Support from other donors	Loans from other donors (e.g., IDB) make co-financing easier, but the issue is how to allocate quota. Relatively large-scale support is provided to Mexico, while loans and technical cooperation are provided to producers in other countries.

Source: Organized by JICA research team based on information from various statistical materials and reports

Note: Based on information from desk review until August 2022

Based on this basic information, the following country-specific development scenarios were established, and support measures were proposed as shown below. The support measures include two-step loans and project loans, as well as private sector investment and finance (see Volume 2, Chapter 3 for details).

Table 4.4.2 Development Scenarios and Proposed Support Measures (Summary)

Country	Development Scenario (Narrative Summary)	Support Measures
Mexico	Provide direct support to companies and associations (including Japanese communities) with the aim of rebuilding agricultural production infrastructure and FVCs to contribute to climate change adaptation. Alternatively, through strengthening the agricultural finance sector, which is currently facing increasing uncertainty, support the establishment of advanced agriculture and FVC that can serve as a model for other Latin American countries.	<ol style="list-style-type: none"> 1. PSIF for Financial Institutions 2. Information sharing platform support for R&D 3. Support for establishment and expansion of agro-parks (PSIF: Support for promotion of smart agriculture with automatic environment control, etc.)
Guatemala	The project aims to improve the livelihood of producers through financial and technical support to cooperatives, etc., mainly for specialty coffee and cardamom, thereby contribute to job creation.	<ol style="list-style-type: none"> 1. PSIF for financial institutions or TSL 2. Collaboration with Tech Companies
Panama	Contribute to mitigating the disparity between urban and rural areas by strengthening the food business in rural areas through financial support for companies (e.g., rice millers) and associations (livestock feed production associations) that are closely connected to farmers on the FVC. Also, investing in companies that have entered the food hub concept.	<ol style="list-style-type: none"> 1. PSIF for Financial Institutions 2. Support for Food Hub Initiative 3. Collaboration with Tech Companies
Dominican Republic	Contribute to the stable domestic production of agricultural products that are robust to climate change risks by promoting the modernization of agricultural production and supporting the introduction of agricultural insurance and the rehabilitation of irrigation facilities.	<ol style="list-style-type: none"> 1. Two-Step Loan (TSL) 2. Irrigation Rehabilitation Project 3. Agricultural Insurance Development and Extension 4. Other lateral support (technical assistance for financial institutions and farmers)

Source: JICA survey team

Of these, the feasibility of TSL in each country was particularly examined. As a result, in Guatemala and Honduras, where labor-intensive agriculture is a distinctive feature, the need for investment and technical assistance to enable agricultural workers to benefit appears to be high. But in these countries the hurdles to TSL realization were judged to be high due to the financial soundness of potential loan recipients. Panama and the Dominican Republic were identified as countries with relatively high loan eligibility, but Panama did not demonstrate a high need for Japanese loans in terms of financing costs.

Based on this background, the possibility of implementing TSL in the Dominican Republic was judged most promising. Since the possibility of co-financing with the IDB was also recognized, additional survey was conducted to obtain more information for the formation of the projects. The candidate projects are: (1) TSL for food value chain improvement through a parallel co-financing with the IDB, and (2) a watershed management project (including two rehabilitation sites of irrigation facilities constructed through Japanese cooperation) through a joint co-financing with the IDB.

The survey continued to collect basic information for the formation of these projects until January 2024, after which JICA will consult with government agencies and coordinate with donors for the implementation of the projects.

4.2 Recommendations

1) FVC cross-sectional implementation system

In this study, we conducted a survey on the theme of strengthening food value chains through agricultural finance, and proposed several specific project ideas. One of the key issues to be considered when promoting the strengthening of food value chains as a JICA project is to devise a framework for implementation. In all countries, the agricultural production sector is handled by an organization similar to a "Ministry of Agriculture," but the subsequent processing, distribution, and marketing sectors are often handled by ministries other than the Ministry of Agriculture, such as the "Ministry of Commerce and Industry. In particular, the presence of small, medium, and micro enterprises in these sectors is significant, so the modality of technical support is naturally different from that of support for agricultural production.

The key is how to build a project implementation system that can approach the targeted FVC sectors and beneficiaries. However, it is desirable to establish an implementation system that includes public-private partnerships, as there are a wide range of entities that can provide technical assistance, such as producer associations and private companies.

2) Cooperation with Japanese companies

Since the land sizes and thus economic sizes of many countries in Central America and the Caribbean are small, their markets are small, and with the exception of Mexico, Japanese companies are not very active in the region. On the other hand, in countries with small farmlands (e.g., the Dominican Republic), there is a growing need for small-scale agricultural machinery that is easy to operate in smaller farmlands, and Japanese-made agricultural machinery is highly competitive, and the potential for applying Japanese technology is well recognized.

In addition, there is a growing need for the introduction of green technology, such as solar power generation systems and high-efficiency boilers and engines, as climate change countermeasures. There are several Japanese companies that have established bases in the target countries and are developing business with these technologies. Thus, cooperation with such private Japanese companies is also a potential.

The presence of Japanese companies as buyers of the agricultural products is also significant. In the Central American and Caribbean region, which is known as a coffee and cacao producing region, there are several countries and local companies that Japanese companies see as promising suppliers of raw materials. For example, a Japanese confectionery company sells chocolate products in Japan bearing the name of the Dominican Republic, and the ingredients for these products are procured directly from local companies in the Dominican Republic. There are also examples of coffee companies that procure coffee from Guatemala and the Dominican Republic on a contractual basis. These companies also provide specific product specifications and technical assistance, and it is expected that these resources will be utilized in the project to be implemented in the future.