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ANALYSIS OF AGRICULTURAL AND FISHERIES POLICIES IN BELIZE

QUANTIFICATION OF SUPPORT AND ITS RELATIONSHIP TO GREENHOUSE GAS EMISSIONS IN 2015-2022

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ANALYSIS OF AGRICULTURAL AND FISHERIES POLICIES IN BELIZE: QUANTIFICATION OF SUPPORT AND ITS RELATIONSHIP TO GREENHOUSE GAS EMISSIONS IN 2015-2022

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ABSTRACT

This study provides an updated analysis of agricultural policies in Belize, utilizing the OECD's Producer Support Estimate (PSE) methodology for the period 2015-2022. During this time, the agricultural sector contributed an average of 8.4% to Belize's GDP, growing by 25%, largely driven by animal production.

The Total Support Estimate (TSE) increased from BZ$90.5 million in 2015 to BZ$97.5 million in 2022, primarily due to a rise in transfers to individual producers (PSE). However, the percentage TSE decreased from 2.1% to 1.7% as GDP growth outpaced TSE growth. Despite this, Belize's agricultural sector remained one of the most supported by public policies in the region, ranking behind Jamaica and Guyana. The percentage PSE averaged 15.8% of farm receipts, higher than in most countries in Latin America and the Caribbean. Market Price Support (MPS) was the largest component of the PSE, accounting for 94% of the total, mainly due to trade protections for domestic poultry producers. Additionally, the percentage General Services Support Estimate (GSSE) averaged 12% of the TSE but declined significantly from 26.8% in 2015 to 4.7% in 2022, primarily because of the conclusion of the EU-funded Sugar Accompanying Measures. Moreover, the percentage Consumer Support Estimate (CSE) was -27% during the period.

This study also introduces the first analysis of fisheries policies in Belize, employing the OECD's Fisheries Support Estimate (FSE) methodology. The percentage FSE averaged 5.9% of total landings over the period, with 98% of the support provided through budgetary transfers to fishers collectively (GSSE). Belize's FSE ranked lower than most regional countries, exceeding only Mexico, Chile and Argentina.

Finally, the study examines the potential contribution of agricultural support policies to greenhouse gas (GHG) emissions. Agricultural policy support was concentrated on poultry, bananas, rice and pigmeat, which are responsible for only 4.36% of total agricultural GHG emissions. This indicates a weak correlation between agricultural policy support and emissions levels by product.

The study concludes with recommendations to gradually reduce dependence on MPS, prioritize less distortive forms of support, and strengthen efforts in data collection and policy evaluation.

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LIST OF ABBREVIATIONS

ACE | Agricultural Carbon Emissions

BAHA | Belize Agricultural Health Authority

BCGA | Belize Citrus Growers Association

BGA | Banana Growers Association

BHSFU | Belize High Seas Fishing Unit

BLR | Belize Livestock Registry

BMDC | Belize Marketing and Development Corporation

BSI | Belize Sugar Industries

BZ$ | Belize dollar

CARICOM | Caribbean Community

CARIFORUM | Caribbean Forum

CBPL | Citrus Products of Belize Ltd.

CCU | Conservation Compliance Unit

CDB | Caribbean Development Bank

CDF | CARICOM Development Fund

CET | Common External Tariff

CFU | Capture Fisheries Unit

CITES | Convention on International Trade in Endangered Species of Wild Fauna and Flora

CPI | Consumer Prix Index

CSE | Consumer Support Estimate

EMS | Early Mortality Syndrome

EMU | Ecosystem Management Unit

EPA | Economic Partnership Agreement

EPZ | Export Processing Zone

EU | European Union

FSE | Fisheries Support Estimate

FTC | Fuel-tax concessions

GDP | Gross domestic product

GHG | Greenhouse Gas

GNI | Gross national income

GSSE | General Services Support Estimate

Ha | Hectare

IDB | Inter-American Development Bank

IICA | Inter-American Institute for Cooperation on Agriculture

IMF | International Monetary Fund

LAC | Latin America and the Caribbean

MPD | Market Price Differential

MPS | Market Price Support

NGO | Non-Governmental Organization

NSV | Net Social Value

OECD | Organization for Economic Co-operation and Development

PCB | Pesticide Control Board

PSE | Producer Support Estimate

SIB | Statistical Institute of Belize

t | Tons

TSE | Total Support Estimate

TURF | Territorial Use Rights in Fishers

UN | United Nations

UNFCCC | UN Framework Convention on Climate Change

US | United States

USAID | US Agency for International Development

VAT | Value-added Tax

WDI | World Development Indicators

WTO | World Trade Organization

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1. INTRODUCTION

This report provides an analysis of the agricultural policy in Belize through the updated application of the Producer Support Estimate (PSE) methodology for the period 2015-2022. Developed by the Organization for Economic Cooperation and Development (OECD), the PSE offers a quantitative approach to assess the level and composition of support provided by agricultural policies. Previously, the PSE was applied to Belize by the Inter-American Development Bank (IDB) for the period 2011-2014 (Foster *et al.*, 2017).

Since 2014, Agrimonitor, an initiative by the IDB, has been estimating and regularly updating the PSE for countries in the Latin America and the Caribbean (LAC) region. The consistency of policy indicators measured by the PSE across countries and over time is particularly valuable for understanding incentives or disincentives within the agricultural sector, serving as a crucial tool to inform policymaking in the region.

THE CONSISTENCY OF POLICY INDICATORS MEASURED BY THE PSE ACROSS COUNTRIES AND OVER TIME IS PARTICULARLY VALUABLE FOR UNDERSTANDING INCENTIVES OR DISINCENTIVES WITHIN THE AGRICULTURAL SECTOR, SERVING AS A CRUCIAL TOOL TO INFORM POLICYMAKING IN THE REGION

This report also aims at assessing the support provided to the fisheries sector through the application of the Fisheries Support Estimate (FSE) method. In addition, it documents the evolution of agricultural policies-related greenhouse gas emissions in Belize using a method developed by the IDB and Professor Tim Josling (Josling *et al.*, 2017). This marks the first application of these two approaches in Belize.

The first chapter of this report provides an overview of the roles played by agriculture and fisheries in Belize's economy, along with an examination of policies supporting these sectors from 2015 to 2022. The second chapter presents the results of the policy support indicators and offers a comparison of the level and structure of agricultural support in Belize with those of other countries in the region. The third chapter delves into the results of the FSE, while the fourth one focuses on agricultural policies-related greenhouse gas emissions during the specified period. Lastly, the fifth chapter delivers policy recommendations based on observations derived from the application of these methods.

2. SECTOR AND POLICY OVERVIEW FROM 2015 TO 2022

2.1. THE ROLE OF AGRICULTURE IN THE ECONOMY

Located in Central America's Caribbean coast, Belize is a small upper middle-income country with a population of 410,000 and a per capita gross national income (GNI) of US$ 6,630. **An estimated 56% of Belize's land is covered by forests and 7% is used for agriculture (FAO, 2022)**. About 75% of the farming population consists of smallholders with less than 10 ha of land, who produce a wide variety of crops such as rice, beans and vegetables, mainly for local consumption (Foster *et al.*, (2017). Larger farms tend to focus

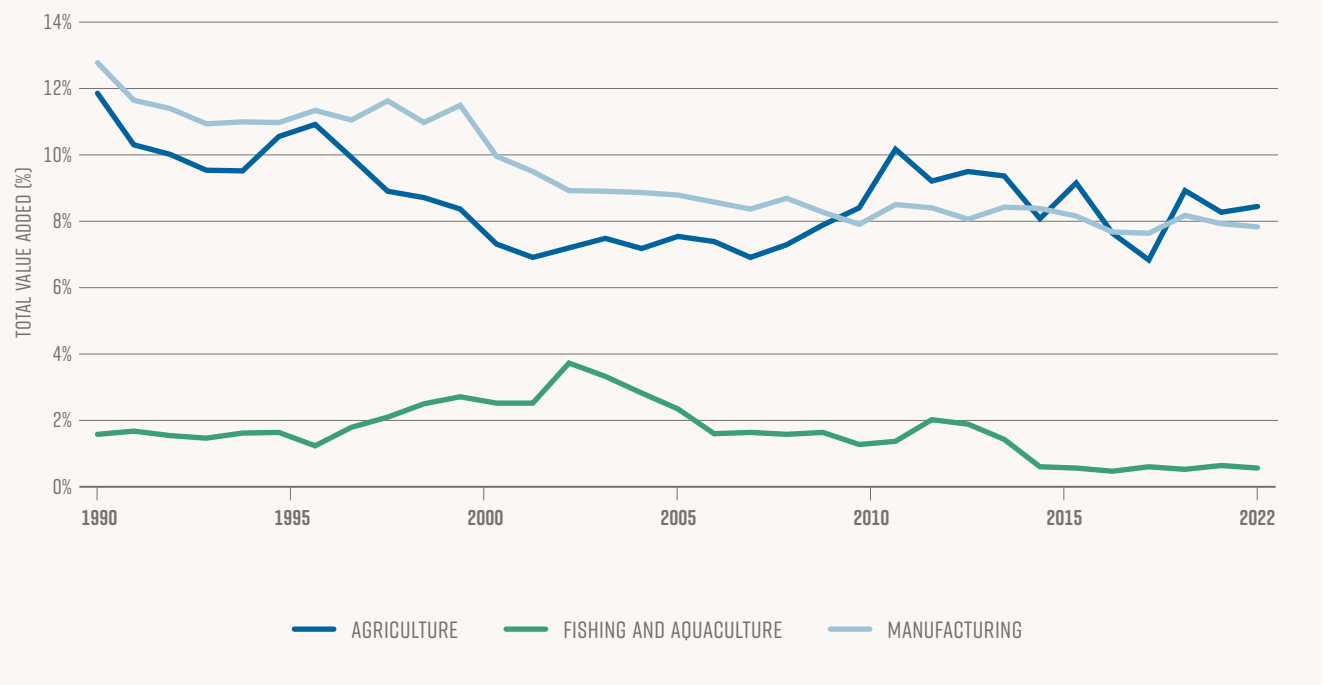
on the production of sugar, banana and citrus for both domestic and export markets. From 2015 to 2022, agriculture (defined as crop and animal production) employed 17% of the labor force **(Table 1)** and contributed to 8.4% of Belize's gross domestic product (GDP) on average **(Figure 1)**. During this period, the agricultural sector experienced a 25% growth, primarily driven by a substantial expansion in animal production. According to the Statistical Institute of Belize (SIB), the value added from livestock production surged by 60% over the same period **(Table 1)**.

TABLE 1: KEY MACRO INDICATORS, 2015-2022

INDICATOR	2015	2016	2017	2018	2019	2020	2021	2022
GNI PER CAPITA (CURRENT US$)	5,730	5,600	5,470	5,600	5,820	5,120	6,040	6,630
GDP GROWTH RATE	3.23	(0.01)	(1.81)	1.06	4.24	(13.73)	17.86	8.73
EMPLOYMENT IN AGRICULTURE (% OF TOTAL EMPL.)	18.08	18.56	17.42	17.43	16.86	17.34	17.22	16.78
CROP PROD. VALUE ADDED INDEX (BASE: 2015)	100.00	91.15	105.22	96.72	89.62	97.01	107.53	112.85
ANIMAL PROD. VALUE ADDED INDEX (BASE: 2015)	100.00	108.81	119.80	132.41	136.89	124.56	166.57	160.17

Source: World Development Indicators (WDI) and the Statistical Institute of Belize (SIB).

FIGURE 1: SHARE OF TOTAL VALUE ADDED BY SECTOR, 1990-2022



Source: Statistical Institute of Belize.

As of 2022, the leading agricultural commodities in terms of production volume were refined sugar, maize, bananas, oranges and poultry meat **(Table 2)**. From 2015 to 2022, the production volume increased by 26% for refined sugar (+26%), by 92% for maize and by 11% for poultry meat but decreased by 13% for bananas and by 68% for oranges.

TABLE 2: PRODUCTION BY VOLUME IN TONS, 2015-2022

COMMODITY	2015	2016	2017	2018	2019	2020	2021	2022
SUGARCANE	1,186,154	1,478,401	1,670,432	1,707,537	1,794,029	1,536,864	1,893,663	1,803,634
REFINED SUGAR	141,998	146,246	177,694	178,205	198,143	144,020	177,875	179,421
MAIZE	57,701	65,761	89,535	77,765	58,049	83,338	108,741	110,651
BANANAS	112,967	80,706	95,036	91,882	95,759	105,646	111,350	98,524
ORANGES	175,046	139,562	137,546	104,568	91,387	99,518	57,345	56,210
POULTRY MEAT	18,495	18,923	19,645	19,677	20,368	18,297	19,187	20,470
PADDY RICE	12,663	16,203	18,751	13,375	13,900	13,942	14,990	15,364
RED BEANS	9,634	4,391	5,235	5,438	5,294	5,147	6,385	6,103
EGGS	2,878	3,932	3,270	3,473	3,406	3,363	3,403	3,542
PIGMEAT	1,635	1,687	1,778	2,123	2,060	2,052	2,099	2,219
BEEF AND VEAL	1,599	1,448	1,483	1,783	1,743	1,578	1,660	1,825

Source: Ministry of Agriculture, Food Security and Enterprise.

Between 2015 and 2022, poultry meat represented 19.2% of the total agricultural value on average **(Table 3)**, making it the highest contributor, followed by bananas (17.0%), refined sugar (16.8%), maize (9.2%) and oranges (6.4%). However, important shifts in these contributions occurred during this period. Bananas experienced a substantial decline by 29%, while oranges plummeted by 68%, both due to decreased production levels. To a lesser extent, poultry meat, pigmeat, beef and eggs also decreased. Conversely, maize, refined sugar and rice witnessed increases by 82%, 16% and 7%, respectively.

From 2015 to 2022, food (dominated by agriculture) accounted for most of Belize's commodity (or merchandise) exports **(Table 4)** and represented the second most important source of foreign exchange after tourism. As of 2022, Belize's exports **(Table 5)** were dominated by sugar (33% of Belize's total value of exports), bananas (16%), marine products (11%) and orange concentrate (5%). At the same time, exports of some other "non-traditional" commodities are also expanding (lobster, conch, animal feed).

TABLE 3: PRODUCTION OF SELECTED COMMODITIES AS A SHARE OF TOTAL AGRICULTURAL VALUE, 2015-2022

COMMODITY	2015	2016	2017	2018	2019	2020	2021	2022	AVERAGE
POULTRY MEAT	18.4%	20.3%	18.7%	20.6%	22.2%	19.1%	17.5%	16.5%	19.2%
BANANAS	18.7%	15.2%	16.3%	17.7%	18.5%	19.0%	17.6%	13.3%	17.0%
SUGAR	16.4%	15.7%	18.5%	16.0%	16.3%	16.9%	15.8%	19.0%	16.8%
MAIZE	7.2%	8.5%	7.8%	8.1%	6.8%	10.3%	11.8%	13.1%	9.2%
ORANGES	9.2%	8.5%	9.3%	6.9%	6.4%	5.4%	2.8%	2.9%	6.4%
RICE	2.4%	3.4%	3.4%	2.7%	2.9%	2.8%	2.6%	2.5%	2.8%
PIGMEAT	2.3%	2.6%	2.5%	3.4%	3.4%	3.2%	2.0%	2.0%	2.7%
BEEF AND VEAL	2.6%	2.4%	2.2%	3.0%	3.1%	2.6%	2.2%	2.2%	2.6%
EGGS	2.3%	3.5%	2.6%	2.5%	2.7%	2.5%	2.0%	1.9%	2.5%

Source: Author's estimations based on data from the Ministry of Agriculture, Food Security and Enterprise, the Statistical Institute of Belize, UN Comtrade and FAOSTAT.

TABLE 4: KEY TRADE INDICATORS, 2015-2022

INDICATORS	2015	2016	2017	2018	2019	2020	2021	2022
FOOD EXPORTS (% OF MERCHANDISE EXPORTS)	70.43	71.21	87.45	87.09	89.81	93.61	92.66	93.93
FOOD IMPORTS (% OF MERCHANDISE IMPORTS)	20.76	21.02	20.53	20.18	20.22	25.65	20.94	18.66

Source: World Development Indicators.

TABLE 5: VALUE OF EXPORTS BY COMMODITY IN MILLION BZ$, 2015-2022

COMMODITY	2015	2016	2017	2018	2019	2020	2021	2022
SUGAR	134.49	103.08	148.04	112.77	136.36	111.46	138.14	162.41
BANANA	97.79	69.48	81.77	74.27	79.52	86.99	91.95	79.61
MARINE PRODUCTS	88.02	41.95	40.12	42.39	48.77	39.17	53.13	53.67
ORANGE CONCENTRATE	81.87	78.50	60.48	57.98	42.11	39.41	28.78	24.36
MOLASSES	6.46	7.07	9.78	6.28	10.08	10.78	15.78	20.70
SAWN WOOD	7.41	6.68	6.47	4.33	3.75	2.58	3.73	3.75
CRUDE PETROLEUM	36.38	22.48	22.75	24.65	20.33	4.89	8.61	3.33
GRAPEFRUIT CONCENTRATE	7.43	9.45	4.23	4.13	5.38	3.34	2.73	2.26
PAPAYAS	13.04	3.92	1.45	1.02	0.32	0.41	0.64	0.76
GARMENTS	–	0.36	–	–	–	–	–	–
OTHER EXPORTS	63.73	58.52	70.50	66.08	67.35	68.28	94.49	134.21
TOTAL VALUE OF EXPORTS	536.61	401.50	445.59	393.91	413.97	367.31	437.97	485.07

Source: Statistical Institute of Belize.

As a member of the **Community of Caribbean states (CARICOM)**, Belize has access to CARICOM's single market and trade agreements. However, as of 2022, CARICOM accounted for only 18% of Belize's commodity exports. Belize's largest export commodity markets were the United Kingdom (24% of Belize's total value exports in 2022), followed by the United States (20%) and the European Union (EU), which accounted for 18% of the total value of exports.

Belize imports only 40% of its food. However, the imports are expanding and the growing bill for food is concerning. Increasing imports of highly processed food contribute to poor diets and a growing incidence of non-communicable disease (FAO, 2022).

2.2. AGRICULTURE – POLICY PRIORITIES AND IMPLEMENTATION

Belize's main strategic agricultural policy document is the **National Agriculture and Food Policy of Belize: 2015 to 2030**, which seeks "to provide an environment that is conducive to increasing production and productivity, promoting investment and encouraging private sector involvement in agribusiness enterprises in a manner that ensures competitiveness, quality production, trade and sustainability" (Ministry of Agriculture, 2015). To achieve this objective, **five pillars** were identified:

1. Sustainable Production, Productivity and Competitiveness
2. Market Development, Access and Penetration
3. National Food and Nutrition Security and Rural Livelihoods
4. Sustainable Agriculture and Risk Management
5. Governance Accountability, Transparency and Coordination

At the institutional level, the **Ministry of Agriculture, Food Security and Enterprise** is responsible for the design and implementation of policies, programs and projects for the development of agriculture in Belize. Its Department of Agriculture is structured around the following areas:

1. **Extension:** which provides technical support services and capacity building to producers and is responsible for agriculture data collection.
2. **Research and development:** which operates in the fields of aquaculture, agri-processing, traditional crops, livestock, horticulture and irrigation.

BELIZE'S MAIN STRATEGIC AGRICULTURAL POLICY DOCUMENT IS **THE NATIONAL AGRICULTURE AND FOOD POLICY OF BELIZE: 2015 TO 2030**, WHICH SEEKS "TO PROVIDE AN ENVIRONMENT THAT IS CONDUCIVE TO INCREASING PRODUCTION AND PRODUCTIVITY, PROMOTING INVESTMENT, AND ENCOURAGING PRIVATE SECTOR INVOLVEMENT IN AGRIBUSINESS ENTERPRISES IN A MANNER THAT ENSURES COMPETITIVENESS, QUALITY PRODUCTION, TRADE AND SUSTAINABILITY"

3. **Other units**: which include the "National Food Security and Nutrition Security Commission", the "Water Management and Climate Change" and the "Central Farm Agricultural Station".

The Department of Agriculture is also supported by transversal entities within the Ministry such as the "Project Execution Unit", the "Monitoring and Evaluation Unit" and the "Policy and Private-Public Sector Interface Unit". Additionally, three statutory bodies (or national agencies) operate in the agricultural field under the authority of the Ministry of Agriculture, Food Security and Enterprise **(Table 6)**.

TABLE 6: STATUTORY BODIES OPERATING IN THE AGRICULTURAL FIELD UNDER THE MINISTRY OF AGRICULTURE, FOOD SECURITY AND ENTERPRISE

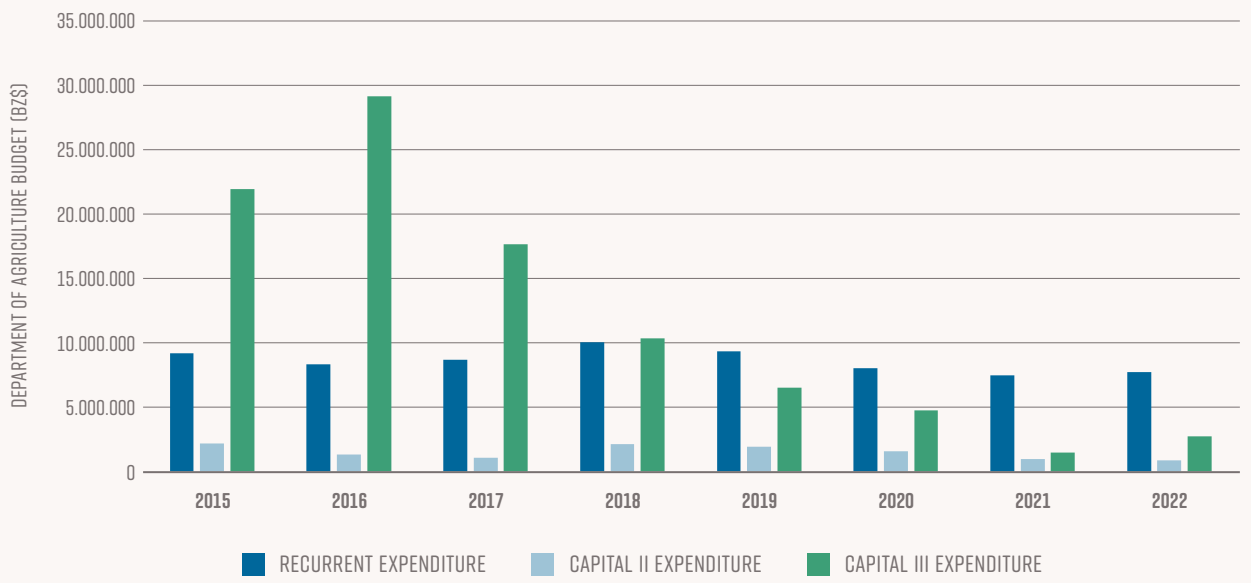
STATUTORY BODY	DESCRIPTION
BELIZE AGRICULTURE HEALTH AUTHORITY (BAHA)	Responsible for agricultural health and food safety in Belize.
BELIZE MARKETING DEVELOPMENT CORPORATION (BMDC)	Mandated to assist in the economic development of Belize by ensuring food security, enhancing product development, providing marketing services for small agri-businesses, and operating on an environmentally friendly, sustainable and viable basis. Specifically, BMDC: (i) procures agricultural products, particularly vegetables, primarily from groups/cooperatives and sells them in the local market. (ii) imports agricultural products required for domestic consumption. (iii) conducts training sessions on packaging, labeling and marketing. (iv) supports rice production in the southern region of Belize, specifically the Toledo District and commercializes the output. Financially independent, the BMDC operates autonomously without financial support from the Government of Belize.
BELIZE PESTICIDE CONTROL BOARD (PCB)	Responsible for the implementation of the provisions of the Pesticides Control Act.

Source: Ministry of Agriculture, Food Security and Enterprise.

2.3. AGRICULTURE – OVERVIEW OF SUPPORT POLICIES AND ACTIONS

In the Government's annual revenue and expenditure reports, the budget allocated to the Department of Agriculture falls mainly under three programs: (i) **Agricultural Research and Development**; (ii) **the National Agriculture Extension Program**; and (iii) **Financial Assistance to Agricultural Producers**. From 2015 to 2022, it decreased significantly from BZ$33.3 million to BZ$11.2 million. While the Department of Agriculture's budget represented 2.61% of the Government's overall budget in 2015, it only amounted to 0.82% in 2022. As illustrated in **Figure 2**, this change was driven by a sharp decrease in Capital III Expenditure, defined as foreign-financed capital and project expenditures, which followed the completion of three large EU-funded projects: (i) the Belize Rural Development Project II (EU-BRDO Project[1]), (ii) the Sugar Accompanying Measures (EU-Sugar Support[1]) and (iii) the Banana Accompanying Measures (EU-Banana[1]).

FIGURE 2: BUDGET OF THE DEPARTMENT OF AGRICULTURE IN CURRENT BZ$, 2015-2022



Source: Ministry of Finance (Approved Estimates of Revenue and Expenditure). Capital II Expenditure: government-funded capital and project expenditures. Capital III Expenditure: foreign-financed capital and project expenditures.

1. Project names as they appear in the Approved Estimates of Revenue and Expenditure Reports per fiscal year, published by the Ministry of Finance of Belize at https://mof.gov.bz/downloads/

Following the PSE method, **agriculture support policies in Belize can be categorized into two main groups:** those involving budgetary transfers or revenue foregone, and those creating a gap between domestic market prices and competitive prices (price transfers)[2].

BUDGETARY TRANSFERS: POLICIES, PROGRAMS AND PROJECTS

Budgetary transfers encompass allocations to the Department of Agriculture, including its decentralized entities, and statutory bodies as well as national (government-funded capital and project expenditures or Capital II Expenditure) and foreign funded (Capital III Expenditure) agricultural development programs and projects. The main programs and projects are listed in Annex 1. No tax exemptions for agricultural inputs were identified.

PRICE TRANSFERS: TRADE REGULATIONS

Agriculture support policies that generate price transfers are primarily linked to trade regulations. As a CARICOM member, Belize allows duty-free imports of nearly all goods from fellow CARICOM members and applies CARICOM's Common External Tariff (CET) to all imported goods, except those not produced, produced insufficiently, or produced in substandard quality within CARICOM. As a CARICOM member state, Belize is also party to (i) regional trade agreements with Colombia, Costa Rica, Cuba, the Dominican Republic and Venezuela, (ii) the Economic Partnership Agreement (EPA) between the Caribbean Forum (CARIFORUM) and the EU, which grants all CARIFORUM goods duty-free and quota-free access to the EU market and (iii) the CARIFORUM-United Kingdom Economic Partnership Agreement. According to the World Trade Organization (WTO), the average tariff protection in 2021 in Belize was 27.5% for agricultural products and 1.3% for non-agricultural products. **Table 7** shows import duties ranging from lowest to highest for several key agricultural commodities selected for the PSE analysis. Those rates are not applied on imports within CARICOM; therefore, the share of duty-free imports of most agricultural commodities exceeds 70% (WTO, 2024). The government also applies retail price controls for a number of commodities, including rice, sugar and

2. Following the PSE method, agriculture support policies are here understood as policies that are agriculture-specific or that benefit primarily agricultural producers.

beans. Those policies create transfers to and from agricultural producers. The net effect of the trade and price policies on the producers of each commodity depends on the trade status of each commodity, market structure and other factors. The level and directions of transfers arising from trade and price policies is estimated and discussed in Section 2.

TABLE 7: IMPORT DUTIES BY COMMODITY

COMMODITY	DUTY RATE – CET
RICE	25.00%
RED BEANS	40.00%
SUGAR	40.00%
MAIZE	40.00%
EGGS	40.00%
ORANGES	40.00%
BEEF	40.00%
PORK	40.00%
POULTRY	40.00%
BANANAS	80.00%

Source: Belize Customs, 2023.

2.4. THE ROLE OF FISHERIES IN THE ECONOMY

WILD CAPTURE FISHERIES

Belize's fishing industry is characterized as an artisanal fishery, where the fishing effort is concentrated along the shallow waters of the Belize Barrier Reef Complex and at the three atolls (Turneffe Atoll, Lighthouse Reef Atoll and Glovers Reef Atoll). It employs over 3,000 commercial fishers and contributes to food security, especially in coastal communities **(Table 8)**. Most commercial fishers are members of two fishing cooperatives: the *Northern Fishermen Cooperative Society* and the *National Fishermen Producers Cooperative Society*. Membership offers several benefits such as access to small loans, access to export markets and representation in decision-making circles.

TABLE 8: COMMERCIAL FISHERS AND FISHING VESSELS

	2016	2017	2018	2019	2020	2021	2022
NUMBER OF FISHERS	2,752	2,710	2,525	2,564	3,188	3,072	3,123
NUMBER OF VESSELS	696	770	720	607	871	824	797

Source: Belize Fisheries Department.

The Belize Fisheries Department estimates that wild capture fisheries contributed a little less than two percent of Belize's GDP in 2022. The **spiny lobster and queen conch** fisheries, Belize's most important fisheries, are export-oriented products that mostly enter the US market. The finfish fishery complements the lobster and conch fisheries. Annual landings of wild capture fisheries have increased over the period of reference (2015-2022) from about from about 726 t to 953 t. This increase can be attributed to an intensified fishing effort and a higher demand for seafood products. Similarly, the total value of wild-caught fisheries exports has steadily increased, from approximately BZ$28 million in 2015 to BZ$52 million in 2022 **(Table 9)**. A small amount of seafood is imported from other countries in the form of canned seafood, fish fillet, tuna, oysters, squid and other commodities, and is used to complement local production (particularly for consumption in the tourism industry).

TABLE 9: MAIN WILD-CAUGHT FISHERIES EXPORTS IN 1,000 BZ$, 2015-2022

COMMODITY	2015	2016	2017	2018	2019	2020	2021	2022
LOBSTER TAIL	15,310	12,537	15,399	16,704	20,020	21,070	29,280	24,143
CONCH	8,025	10,572	7,318	13,097	15,443	9,693	15,761	17,526
WHOLE LOBSTER AND LOBSTER MEAT	4,036	5,723	7,950	7,163	7,097	4,761	6,168	10,218
WHOLE FISH	853	400	249	43	68	–	58	94
FISH FILLET	128	–	–	11	–	–	–	4
GRAND TOTAL	28,352	29,232	30,916	37,018	42,628	35,524	51,267	51,985

Source: Statistical Institute of Belize.

Over the last several decades, **lobster fishery has remained Belize's most productive and main income-generating capture fisheries.** It is a seasonal fishery with an eight-month open season. The strong market demand and high price have led it to be the dominant fishery in Belize. The lobsters are caught using lobster traps

or free diving using hook sticks and shades made from a variety of materials. The lobster traps are set in the sea-grass beds behind the reef crest in shallow waters (3-20 m). The fishing fleet consists of (i) small motor vessels or "skiffs" (5-10 m) with engines ranging from 15 to 200 HP and (ii) 10 to 11.5 m sailing vessels with auxiliary outboard motors. The skiffs are usually chosen by fishermen who use traps, while those on sailing vessels are free divers.

Most of the lobsters that are landed are exported and a small quantity is consumed locally. Fishers deliver their lobster catch to the fishing cooperatives, which operate a two-payment system. For the 2022/23 lobster season, fishers have been given a first payment of BZ$31.00 per kg on delivery. A second payment is then given after the products are exported and a dividend is declared (at the closure of the fishing cooperative's accounting period). In 2022, 460 t of lobster were exported **(Table 10)** at a value of BZ$34.4 million **(Table 9)**.

TABLE 10: EXPORTS OF LOBSTER (T), 2015-2022

COMMODITY	2015	2016	2017	2018	2019	2020	2021	2022
LOBSTER TAIL	221	196	236	233	243	291	307	250
WHOLE LOBSTER AND LOBSTER MEAT	116	177	237	200	187	124	134	210
GRAND TOTAL	337	373	473	433	430	416	442	460

Source: Statistical Institute of Belize.

In Belize, **the queen conch is the second most profitable commercial fishery.** This species has historically been fished for local consumption and commercially exploited for fifty years. Prior to commercial exploitation, the queen conch was fished for subsistence purposes. The fishery is still classified as an artisanal fishery in Belize. The fishing season is open for nine months and is regulated by the Fisheries Regulations under the 2020 Fisheries Resources Act. Most of the fishers that fish for lobsters also venture into fishing for conchs by free diving along the Belize Barrier Reef Complex and at the three atolls (Lighthouse reef Atoll, Turneffe Atoll and Glovers Reef Atoll). Most of the conch that is produced is exported to the United States (91% in 2022) and the rest is consumed locally in the tourism industry and local restaurants.

In 2003, the Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES) imposed an embargo on three conch-exporting countries (Honduras, Haiti and the Dominican Republic). Simultaneously, CITES recommended specific

actions for several countries, including Belize, to enable the continued export of conch. Some of these actions included establishing a catch quota, conversion standards and a continuous assessment of the conch population. Compared to the other fish stocks in Belize, the queen conch stock has been assessed several times and its status and management measures have been continuously reported to CITES.

A total amount of 431 t of market clean conch was exported in 2022 **(Table 11)**, valued at BZ$17.5 million **(Table 9)**. Fishing cooperatives also operate a two-payment system with conch fishers. For the 2022/2023 conch season, fishers have been given a first payment of BZ$7 per pound (or BZ$ 15.00 per kg) on delivery. A second payment is then given after the products are exported and a dividend is declared (at the closure of the fishing cooperative's accounting period).

TABLE 11: EXPORTS OF CONCH MEAT (T), 2015-2022

COMMODITY	2015	2016	2017	2018	2019	2020	2021	2022
CONCH MEAT	316	403	270	400	476	326	435	431

Source: Belize Fisheries Department.

Secondary wild capture fisheries in Belize include:

- **Coastal finfish (scale) fishery:** Finfish are mostly targeted when Belize's two major commercial fisheries —lobster and conch— are closed. Several fishing gears such as handline, beach trap and fish traps have been utilized to harvest finfish genera such as snappers (*Lutjanidae*), jacks (*Carangidae*), groupers (*Serranidae*) and barracudas (*Sphyraenidae*). Belize's finfish fishery is considered the country's most complex as it is a multi-gear and multi-species fishery. It is also considered the least-managed and regulated fishery in Belize.

- **Deep slope finfish fishery:** The deep slope finfish fishery is a small artisanal fishery where a limited number of fishers venture only during good weather conditions. The fishing grounds are usually deeper waters in fishing Area 9 (as designated in the Territorial Use Rights in Fishers regime or TURF), which are located a few miles beyond the Belize Barrier Reef Complex and along the western side of the three atolls (Turneffe, Lighthouse Reef and Glovers Reef). Fishing vessels are usually 25-foot fiberglass "skiffs "with 60 HP outboard engines and equipped

with compass, containers with fuel, icebox, fishing gears and other basic equipment. The average crew consists of three persons per vessel. The fishing gears are monofilament nylon with several size circular hooks attached to manual or electric reels. The fishing vessels would normally be anchored off from the main reef or along the western side of the atolls at depths ranging between 800 and 1,000 ft.

- **Shark fishery:** Belize's shark fishery consists of sharks and rays caught by the national fleet in national waters and Belize-flagged foreign vessels in the high seas and other authorized coastal state jurisdictions. It is relatively small compared to the lobster and conch fisheries in terms of number of fishers, volume and value. It remains, however, an activity of economic importance especially between December and March when shark meat is exported to neighboring countries to supply the demand created by the religious Lenten season (in-country demand is very limited). There are five major shark landing sites: Robinson Point, Colson Point, Scipio Caye, Round Caye and Rocky Point (near Monkey River Village). In 2016, an estimated 11 t of shark meat was landed. Of those, it was estimated that 19% were tiger sharks (*Galeocerdo cuvier*), 16% were blacktip sharks (*Carcharhinus limbatus*), 15% were bull sharks (*Carcharhinus leucas*), 11.2% were Caribbean Reef sharks (*Carcharhinus perezi*), 10.9% were scalloped hammerhead sharks (*Sphyrna lewini*) and 7% were great hammerhead sharks (*Sphyrna mokarran*). The local shark fishery is regulated through the enforcement of the shark fishery regulations, which stipulate its fishing season, limited access and reporting format, and other measures (including the prohibition of shark finning). None of the shark species have been recently assessed but it is suspected that some of them might be suffering from high fishing pressure.

- **Sea cucumber fishery:** The harvesting of sea cucumbers for local consumption and exports to neighboring Guatemala and Honduras has been taking place for over 20 years (Pérez and García, 2012). In 2009, the Belize Fisheries Department began regulating the fishery by enacting Statutory Instrument No. 67. It established a closed fishing season, a limited access program and a fee for harvesting of the Donkey Dung Sea cucumber species (*Holothuria mexicana*). The most recent production data available shows that it reached 50 t in 2009, increased to 196 t in 2013 and then dropped to 40 t in 2016. According to the Belize Fisheries Department, the stock of *H. Mexicana* is likely suffering from overfishing.

AQUACULTURE

Until 2016, aquaculture had established itself as an important generator of revenue and foreign exchange in Belize. According to FAO (2024), in 2015 the industry accounted for about 3% of GDP and was primarily based on the production of white leg shrimp (*Penaeus vannamei*). However, an outbreak of Early Mortality Syndrome (EMS) devastated production and posed a severe threat to the industry's survival. Shrimp producers began observing signs of EMS in 2014, with the disease spreading widely the following year. Prior to the emergence of EMS, survival rates across the country typically ranged from 80-85%, but in 2015, many farms reported survival rates as low as 0-10%, leading to a dramatic decline in production and exports.

In 2014, the country's total production volume was 7,163 t, with exports valued at more than BZ$88 million. Farmed white shrimps constituted the country's most significant seafood export, surpassing all other exports, including those from wild capture fisheries, in both volume and value (for comparison, lobster exports, the country's second largest seafood export in 2014, amounted to BZ$15.6 million). However, by 2016, aggregate production had plummeted to 1,089 t, and the value of shrimp exports had dwindled to less than BZ$13 million (Daly and Fernandez-Stark, 2018). The collapse continued during the period of interest and in 2022, exports were worth only BZ$1.5 million.

2.5. FISHERIES – POLICY PRIORITIES AND IMPLEMENTATION

Historically, Belize's fisheries sector was regulated by the Fisheries Act of 1977. In 2002, it was updated with the **Fisheries Resource Act** and its subsidiary regulations which contained, among other elements, improvements with respect to fisheries conservation, management, development and governance (including regulations for marine reserves along the barrier reef as well as managed access areas).

The **Belize Fisheries Department** is responsible for the efficient and sustainable management of Belize's aquatic and fisheries resources to optimize present and future benefits. It is structured around three units:

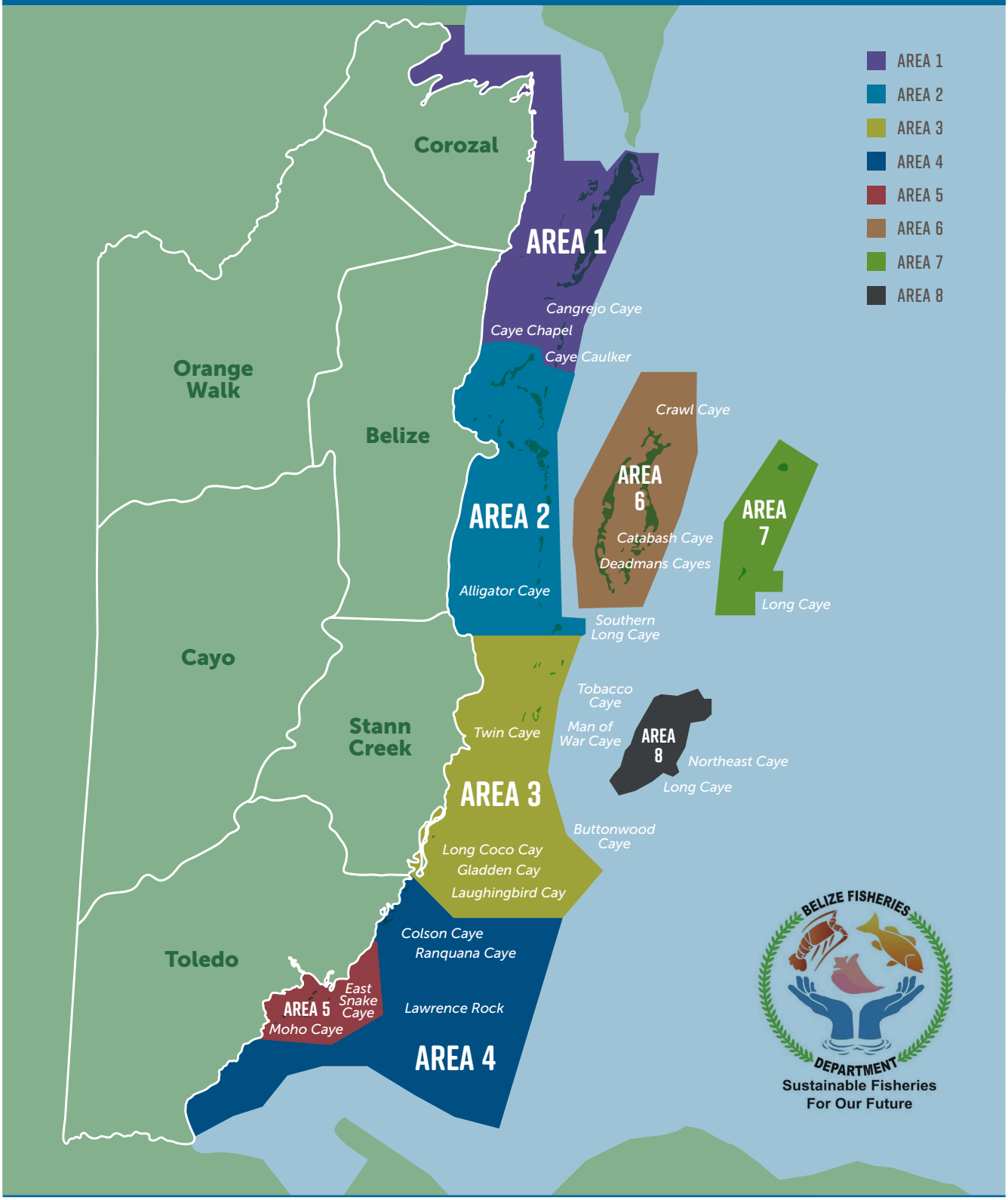
- **The Capture Fisheries Unit (CFU)** which conducts fisheries research and develops conservation measures for the sustainable use of fishery resources.
- **The Conservation Compliance Unit (CCU)** which is responsible for the enforcement of fisheries regulations, the issuance of registration and licenses and community education.
- **The Ecosystem Management Unit (EMU)** which is responsible for liaison with fishing cooperatives, the issuance of research permits and the management of marine reserves.

In 2016, the Belize Fisheries Department led the transition from an open-access fishery to a managed access regime (the regime of Territorial Use Rights in Fishers known as TURFs). This new regime was developed in response to illegal fishing and the growing number of fishers in Belize. It aimed at empowering traditional fishers by enabling them to participate and contribute to the management of fishing areas. The territorial sea was divided into nine fishing areas **(Figure 3)** and Area 9 was designated for deep slope fishing. Fishers were required to obtain fishing licenses at a cost of BZ$25 per year to access Area 9 as well as a maximum of two other areas of their choice. Licenses were also required for fishing vessels at a cost of BZ$25 per year.

In its 2016-2019 growth and sustainable development strategy (Belize Ministry of Economic Development, 2016), Belize's fisheries sector was identified as having significant potential to contribute to the diversification of the economy and to realize job-creating pro-poor economic growth for the country's socio-economic development. However, to reach this potential, several challenges will need to be addressed such as (i) the lack of updated information on the status of lobster, shark, sea cucumber and finfish stocks which weakens management measures presently in place, (ii) the matured nature of the lobster and conch fisheries and the lack of diversification outside of these two fisheries, (iii) the negative effects of climate change, (iv) the dependence on the US market for exports and (v) the lack of infrastructure.

BELIZE'S FISHERIES SECTOR WAS IDENTIFIED AS HAVING SIGNIFICANT POTENTIAL TO CONTRIBUTE TO THE DIVERSIFICATION OF THE ECONOMY AND TO REALIZE JOB-CREATING PRO-POOR ECONOMIC GROWTH FOR THE COUNTRY'S SOCIO-ECONOMIC DEVELOPMENT

FIGURE 3: BELIZE FISHING AREAS



Source: figure based on a map from Belize Fisheries Department.

2.6. FISHERIES – OVERVIEW OF SUPPORT POLICIES AND ACTIONS

The fisheries policies in Belize are focused on promoting sustainable fishing practices. **Therefore, there are no subsidies for individual fishers, other than for aquaculture**, as such subsidies may promote overfishing. The average import tariff for fish and fish products was 33.1% in 2021, higher than for primary agriculture, and foreign citizens cannot apply for fishing licenses.

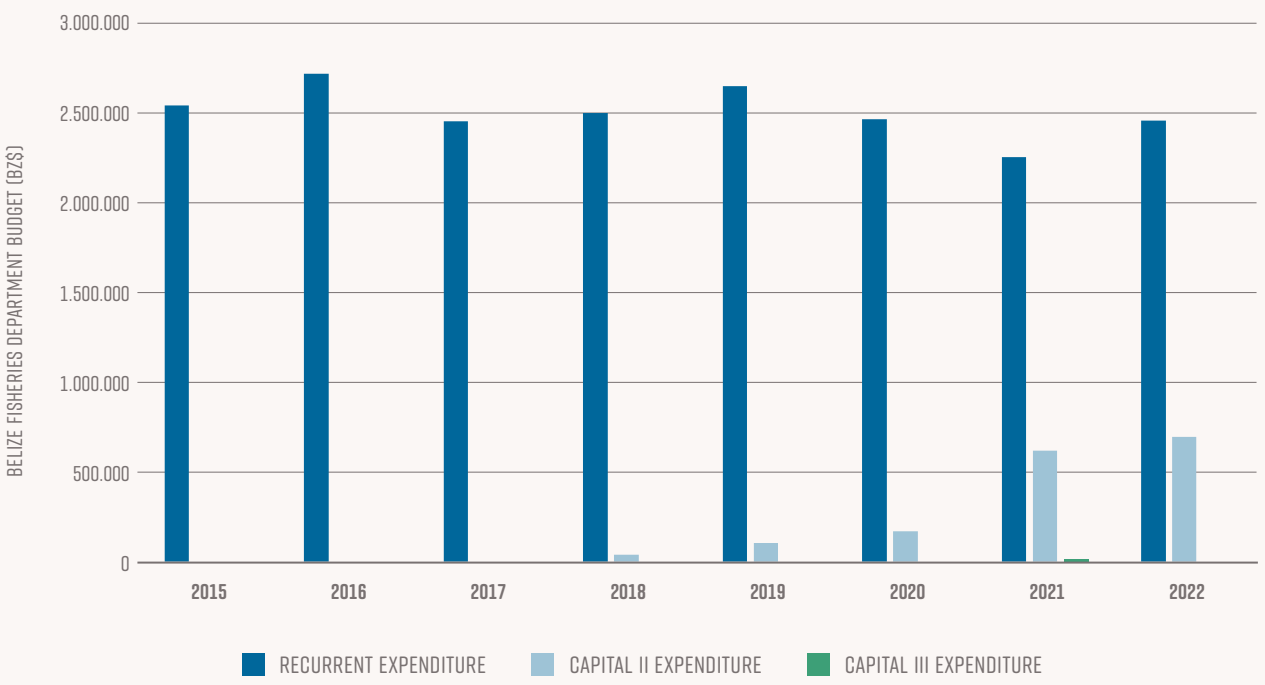
From 2015 to 2022, the budget allocated to the Belize Fisheries Department increased from BZ$2.5 million to BZ$3.3 million. As illustrated in **Figure 4**, this change was driven by an increase in Capital II Expenditure used to finance (i) the purchase of goods and equipment, (ii) operational and maintenance costs for the Department's facilities and (iii) three new projects ("Sustainable Development of Belize's Fishery Resources", "Institutional Strengthening" and "Marine Reserve – Ecosystems Management"). In addition, it also reflects the fact that expenditures for projects "Conservation Compliance Unit" and "Conservation Management", which were previously recorded under the Strategic Management and Administration (Forestry) Programme (or Unit) of the Ministry of Sustainable Development, Climate Change and Disaster Risk Management, were transferred to the Fisheries Resources Management and Development Programme (i.e.: the Belize Fisheries Department) starting in fiscal year 2021/2022.[3]

Policies and projects that supported Belize's fisheries sector during the period of reference also included:

- **The Belize High Seas Fishing Unit (BHSFU)**, which oversaw the management of the high seas fishing industry (i.e.: beyond territorial waters) via the implementation of a quota system.
- **The project "Expanding Small Scale Fish Farming for Rural Communities"** implemented by the Agricultural Research and Development Programme (or Unit) of the Ministry of Agriculture, Food Security and Enterprise.
- **The Aquaculture Programme (or Unit) of the Ministry of Agriculture, Food Security and Enterprise**, which provides training and equipment to fish farm workers and owners.

3. In fiscal year 2019/20, the Belize Fisheries Department was moved from the Ministry of Agriculture, Food Security and Enterprise to the Ministry of the Blue Economy and Civil Aviation.

FIGURE 4: BUDGET OF THE BELIZE FISHERIES DEPARTMENT IN CURRENT BZ$, 2015-2022



Source: Ministry of Finance (Approved Estimates of Revenue and Expenditure).

3. ESTIMATE OF SUPPORT TO AGRICULTURE

3.1. METHOD

The PSE method is a standardized quantitative method developed by the OECD (2016) to measure the support to the agricultural sector. Since 1987, the OECD has been estimating and regularly updating the PSE for its member countries and increasingly, for other associated countries. Similarly, since 2014, Agrimonitor, IDB's Agricultural Policies Monitoring System, has been undertaking this task for its member countries in the LAC region.

The transfers created in the economy due to agricultural policies are categorized based on the nature of the services they provide to individual producers (PSE), individual consumers (Consumer

Support Estimate, or CSE) or the sector as a whole (General Services Support Estimate, or GSSE). The Total Support Estimate (TSE) represents the sum of all three components, adjusted to avoid double counting, as transfers associated with the price policies appear in both PSE and CSE calculations.

The PSE evaluates the support received by the agricultural sector from policies involving both budgetary transfers (including revenue foregone) and price transfers. While the former can be straightforwardly expressed in monetary terms, and thus compared, the latter requires an additional analysis to compare actual market conditions with a benchmark scenario. The aggregated effect of such policies in the supply-demand framework is measured by examining price ratios in both "with policy" and "without policy" scenarios. Producer prices (at the farm gate) are compared with "reference" (or "border") prices that would prevail in the absence of policy interventions (i.e., under market equilibrium conditions). The effect of price policies is quantified by the gap between market and reference prices, known as the Market Price Differential (MPD). A positive gap signifies benefits for producers, whereas a negative gap indicates implicit taxation of farmers to the advantage of consumers. When aggregated at the sector level (by multiplying the MPD by the level of domestic production), the Market Price Support (MPS) is derived.

According to the OECD method, only those policies that are agriculture-specific or primarily benefit agricultural producers are included in the support measurement[4]. Implementation costs such as salaries, travel expenses and capital goods, which do not yield any transfers to producers, are excluded.

Table 12 lists the main sources for the data used in this analysis.

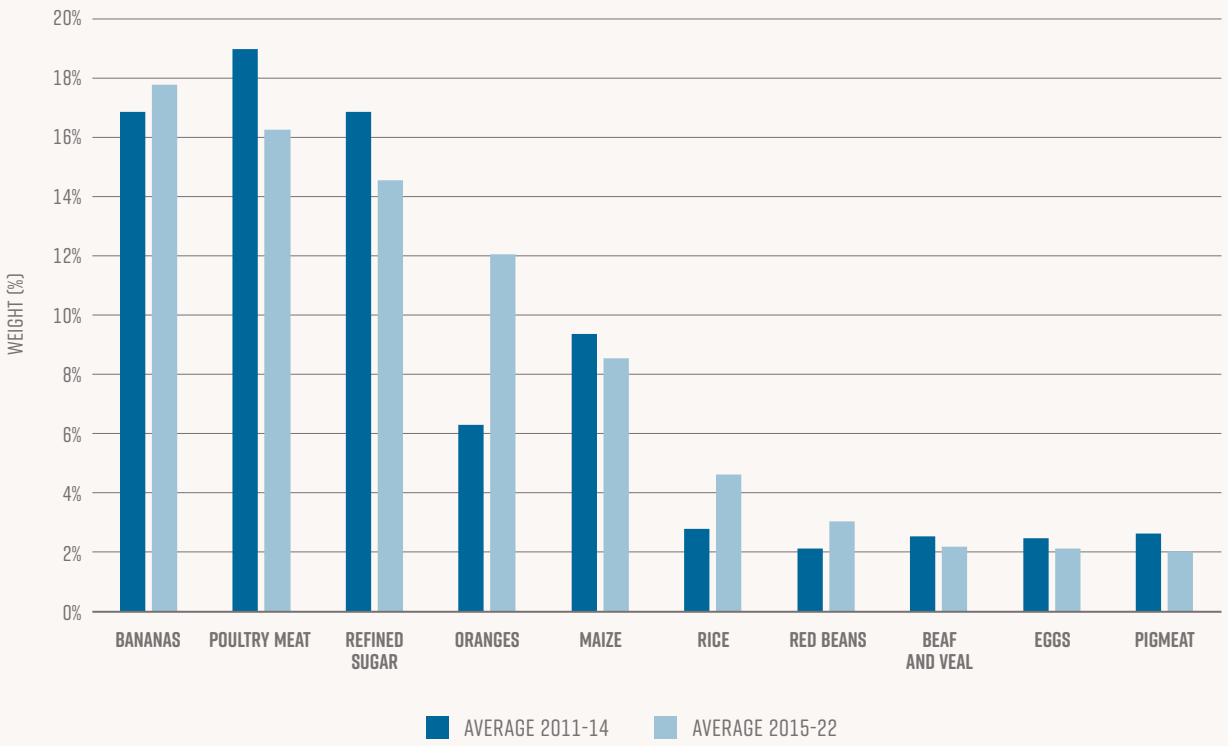
TABLE 12: MAIN DATA SOURCES

DATA	MAIN SOURCES
VOLUMES OF PRODUCTION	MINISTRY OF AGRICULTURE, FOOD SECURITY AND ENTERPRISE
FARM-GATE PRICES	MINISTRY OF AGRICULTURE, FOOD SECURITY AND ENTERPRISE
REFERENCE PRICES	MINISTRY OF AGRICULTURE, FOOD SECURITY AND ENTERPRISE, STATISTICAL INSTITUTE OF BELIZE, UN COMTRADE AND FAOSTAT
TRADE DATA	MINISTRY OF AGRICULTURE, FOOD SECURITY AND ENTERPRISE, STATISTICAL INSTITUTE OF BELIZE, UN COMTRADE AND FAOSTAT
PUBLIC EXPENDITURES	MINISTRY OF FINANCE AND CUSTOMS

4. Forestry and fishery support policies are thus excluded.

To estimate the MPS, OECD (2016) recommends selecting a basket of commodities representing at least 70% of the average total value of agricultural production over the previous three years. **Figure 5** presents the list of selected commodities (or "MPS commodities") and their individual shares of the total value of agricultural production used in both Foster *et al.*, 2017 (average 2011-2014) and the present analysis (average 2015-2022). Globally, MPS commodities represented 83% of the average total value of production over the period 2011-2014 (Foster *et al.*, 2017) and 81% over 2015-2022.

FIGURE 5: WEIGHT OF SELECTED PSE COMMODITIES OVER TOTAL VALUE OF AGRICULTURAL PRODUCTION



Source: Author's estimates based on data from the Ministry of Agriculture, Food Security and Enterprise, the Statistical Institute of Belize, UN Comtrade and FAOSTAT.

Regarding trade, the status of most of the selected commodities did not change relative to Foster *et al.* (2017). Refined sugar, bananas, maize and oranges remained net exported commodities, while rice, eggs, beef and veal, pigmeat and poultry meat remained net imported ones. Red beans, however, became a net exported commodity.

3.2. RESULTS

LEVEL AND STRUCTURE OF SUPPORT TO PRODUCERS

The results of the PSE for Belize over the period 2015-2022 are presented in **Table 13**. Definitions of the terms can be found in Annex 3.

TABLE 13: SUPPORT ESTIMATE IN BELIZE, 2015-2022

INDICATORS	UNITS	2015	2016	2017	2018	2019	2020	2021	2022
TOTAL VALUE OF PRODUCTION (AT FARM GATE)	MBZ$	550.0	492.6	546.4	485.3	468.6	498.2	569.1	673.6
SHARE OF MPS COMMODITIES (%)	%	82.0	81.6	83.4	83.2	84.6	84.0	76.6	75.3
TOTAL VALUE OF CONSUMPTION (AT FARM GATE)	MBZ$	270.1	276.3	275.5	256.3	244.8	268.7	314.3	384.7
PRODUCER SUPPORT ESTIMATE (PSE)	MBZ$	**65.5**	**96.2**	**88.2**	**91.2**	**72.2**	**82.7**	**59.9**	**92.8**
A. SUPPORT BASED ON COMMODITY OUTPUTS	MBZ$	63.0	85.1	78.8	81.1	67.3	80.5	59.6	91.3
A1. TOTAL MARKET PRICE SUPPORT (MPS)	MBZ$	63.0	85.1	78.8	81.1	67.3	80.5	59.6	91.3
BEEF AND VEAL	MBZ$	–	–	–	–	–	–	–	–
BANANAS	MBZ$	1.4	3.0	4.1	8.8	4.0	4.3	4.9	5.7
EGGS	MBZ$	–	–	–	–	–	–	–	–
MAIZE	MBZ$	–	–	–	–	–	–	–	–
ORANGES	MBZ$	–	–	–	–	–	–	–	–
PIGMEAT	MBZ$	7.0	6.8	4.8	6.8	7.6	6.6	2.1	3.5
POULTRY MEAT	MBZ$	44.6	50.0	51.7	49.2	47.1	46.8	43.6	45.2
RED BEANS	MBZ$	0.1	0.7	1.7	0.4	2.6	0.3	(2.0)	0.9
RICE	MBZ$	7.8	10.6	10.8	7.0	7.7	6.9	7.5	8.4
REFINED SUGAR	MBZ$	(9.2)	(1.6)	(7.4)	(4.7)	(12.2)	2.9	(10.3)	4.9
NON MPS COMMODITIES	MBZ$	11.3	15.7	13.1	13.6	10.4	12.9	13.9	22.6
A2. PAYMENTS BASED ON INPUT USE	MBZ$	2.3	10.8	9.2	9.9	4.7	2.0	0.2	1.5
G. MISCELLANEOUS PAYMENTS	MBZ$	0.3	0.2	0.3	0.2	0.2	0.3	0.1	0.0
PERCENTAGE PSE (OVER TOTAL VALUE OF PRODUCTION)	%	11.9	19.1	15.9	18.4	15.2	16.5	10.5	13.7
GENERAL SERVICES SUPPORT ESTIMATE (GSSE)	MBZ$	**24.9**	**22.8**	**12.5**	**6.2**	**7.1**	**7.3**	**5.3**	**4.6**
AGRICULTURAL KNOWLEDGE AND INNOVATION SYSTEM	MBZ$	4.4	4.0	4.1	5.4	4.7	4.1	3.5	3.5
INSPECTION AND CONTROL	MBZ$	0.4	–	–	–	–	–	–	–
DEVELOPMENT AND MAINTENANCE OF INFRASTRUCTURE	MBZ$	13.0	15.7	5.8	0.5	1.1	1.1	0.2	0.5
MARKETING AND PROMOTION	MBZ$	0.1	0.0	0.0	0.2	0.1	0.1	0.1	0.0
CONSUMER SUPPORT ESTIMATE (CSE)	MBZ$	**(72.0)**	**(83.7)**	**(81.1)**	**(75.8)**	**(75.9)**	**(72.3)**	**(67.7)**	**(78.3)**
TRANSFERS TO PRODUCERS FROM CONSUMERS (-)	MBZ$	(71.0)	(83.0)	(80.9)	(75.7)	(75.6)	(72.2)	(67.6)	(78.2)
OTHER TRANSFERS FROM CONSUMERS (-)	MBZ$	(1.07)	(0.71)	(0.20)	(0.21)	(0.34)	(0.24)	(0.15)	(0.12)
TRANSFERS TO CONSUMERS FROM TAXPAYERS	MBZ$	0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.0
EXCESS FEED COST	MBZ$	–	–	–	–	–	–	–	–
PERCENTAGE CSE (OVER TOTAL VALUE OF CONSUMPTION)	%	(26.6)	(30.3)	(29.4)	(29.8)	(31.0)	(26.9)	(21.5)	(20.3)
TOTAL SUPPORT ESTIMATE (TSE)	MBZ$	**90.48**	**119.01**	**100.70**	**97.45**	**79.33**	**90.13**	**65.21**	**97.49**
TRANSFERS FROM CONSUMERS	MBZ$	72.06	83.74	81.13	75.91	75.91	72.39	67.71	78.32
TRANSFERS FROM TAXPAYERS	MBZ$	19.49	35.97	19.77	21.74	3.76	17.98	(2.35	19.29
BUDGET REVENUES (-)	MBZ$	(1.07)	(0.71)	(0.20)	(0.21)	(0.34)	(0.24)	(0.15)	(0.12)
PERCENTAGE TSE (AS % OF GDP)	%	2.06	2.66	2.22	2.13	1.66	2.20	1.34	1.72

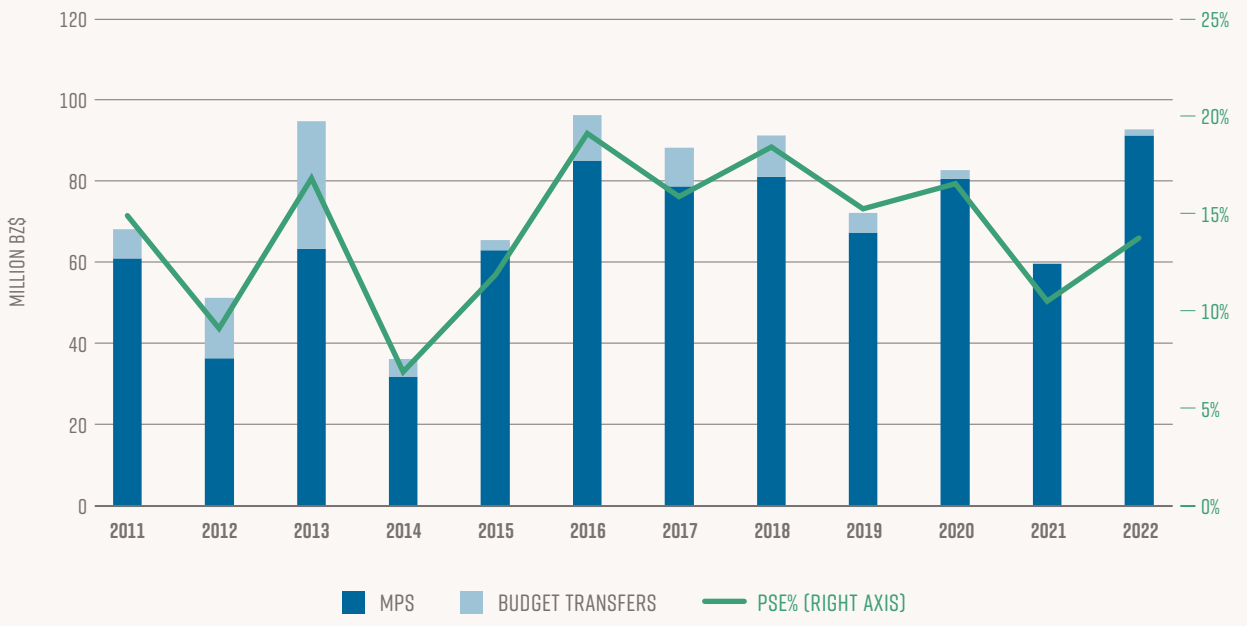
Source: Author's estimations based on data from the Ministry of Agriculture, Food Security and Enterprise, the Ministry of Finance, the Statistical Institute of Belize, UN Comtrade and FAOSTAT. See definitions in Annex 3.

ESTIMATES OF SUPPORT TO INDIVIDUAL PRODUCERS

Between 2015 and 2022, individual producers in Belize experienced increasing support both from the public sector and increased prices at the expense of consumers. The value of transfers to individual producers (PSE) amounted to BZ$65.5 million in 2015 and increased to BZ$92.8 million by 2022, with an average of BZ$81.1 million per year over this period. Similarly, the percentage PSE (%PSE; the support to producers expressed as a share of gross farm receipts) rose from 11.9% in 2015 to 13.7% in 2022.

Transfers to individual producers (PSE) comprise two elements: (i) the MPS and (ii) budget transfers supporting producers individually. As depicted in **Figure 6**, Belize's PSE during the period of interest predominantly consisted of the former, despite its distorting effects on producers' production decisions and its impact on consumers who end up paying higher prices for agricultural commodities. On average, Belize's MPS represented 94% of the total PSE over the period, amounting to BZ$75.8 million annually. The primary driver of Belize's MPS remained the measures in place to protect domestic poultry producers (62% of Belize's total MPS over 2015-22, on average), followed by rice (11%), pigmeat (7%) and bananas (6%).

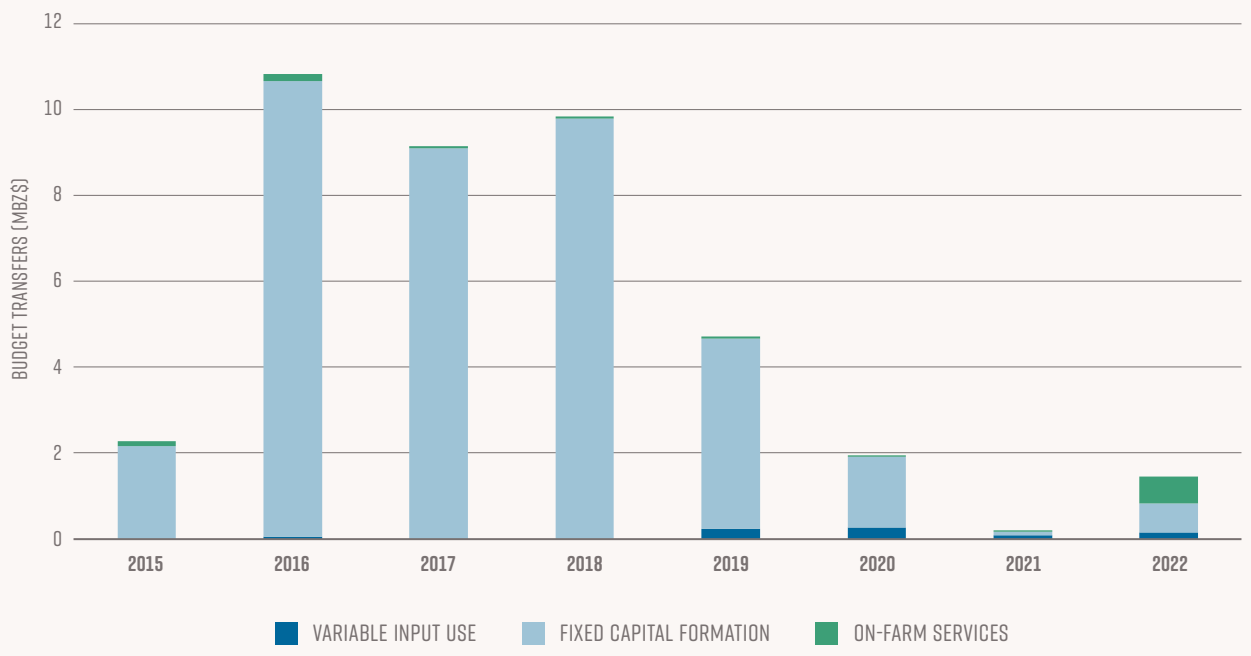
FIGURE 6: PSE COMPOSITION IN MILLION BZ$, 2011-2022



Source: Author's estimations based on data from the Ministry of Agriculture, Food Security and Enterprise, the Statistical Institute of Belize, UN Comtrade and FAOSTAT.

Budget transfers to individual producers (or "payments based on input use", **Table 13**) include payments for variable input use, fixed capital formation and on-farm services. In Belize, such transfers mainly consisted of payments for fixed capital formation linked to the EU-funded Banana Accompanying Measures. With the end of this project in 2019/2020, the value of annual budget transfers to individual producers dropped significantly. In 2022, it amounted to less than BZ$1.5 million **(Figure 7)**.

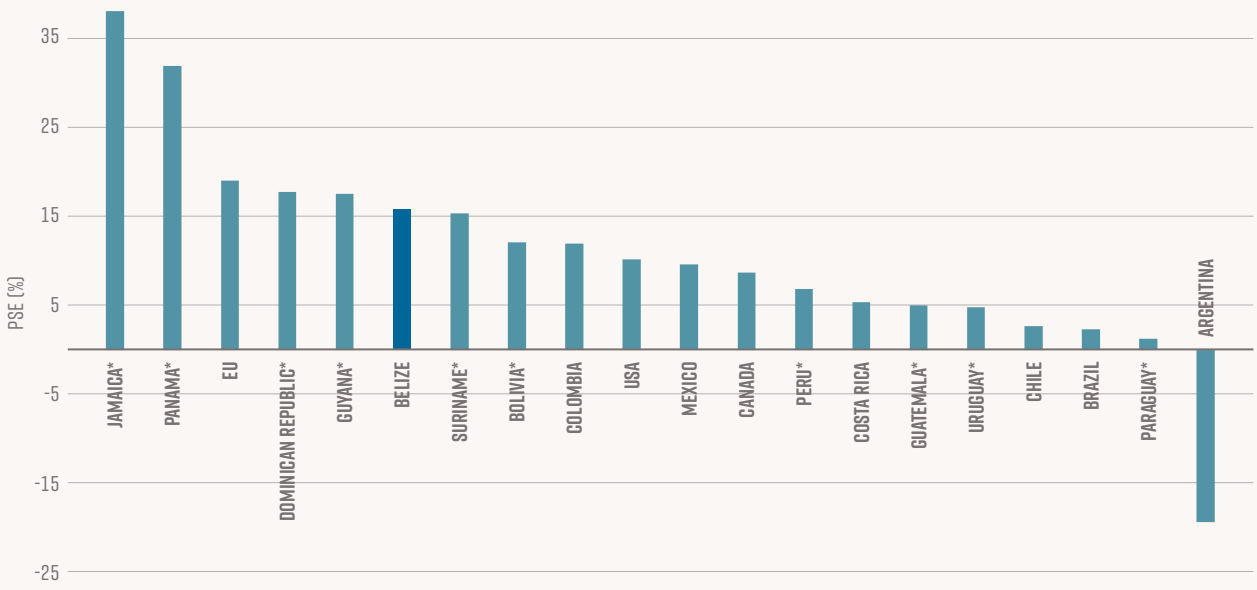
FIGURE 7: BUDGET TRANSFERS TO INDIVIDUAL PRODUCERS IN MILLION BZ$, 2015-2022



Source: Author's estimations based on data from the Ministry of Agriculture, Food Security and Enterprise, the Statistical Institute of Belize, UN Comtrade and FAOSTAT.

Between 2015 and 2022, Belize's average level of support to individual producers (%PSE of 15.8%) surpassed that of most countries in the region **(Figure 8)**. It exceeded the levels seen in Guatemala (5%), Costa Rica (5.4%) and Mexico (9.7%), while falling short of the support observed in Guyana (17.6%), Panama (32%) and Jamaica (38%).

FIGURE 8: PERCENTAGE PSE IN BELIZE AND IN SELECTED COUNTRIES, 2015-2021



Source: Author's estimations based on data from the Ministry of Agriculture, Food Security and Enterprise, the Statistical Institute of Belize, UN Comtrade and FAOSTAT.
* Data was not available for all the years of interest.

ESTIMATES OF SUPPORT TO INDIVIDUAL PRODUCERS BY COMMODITY

The level of support to individual producers by commodity is measured first by the MPS, and then by the single commodity transfer (SCT), which shows the level of commodity-specific support provided through both price support policies (MPS) and budget transfers. The MPS indicator must be interpreted with care. While its intent is primarily to capture policy effects on agricultural producers and consumers, it does also capture implicit non-policy factors such as:

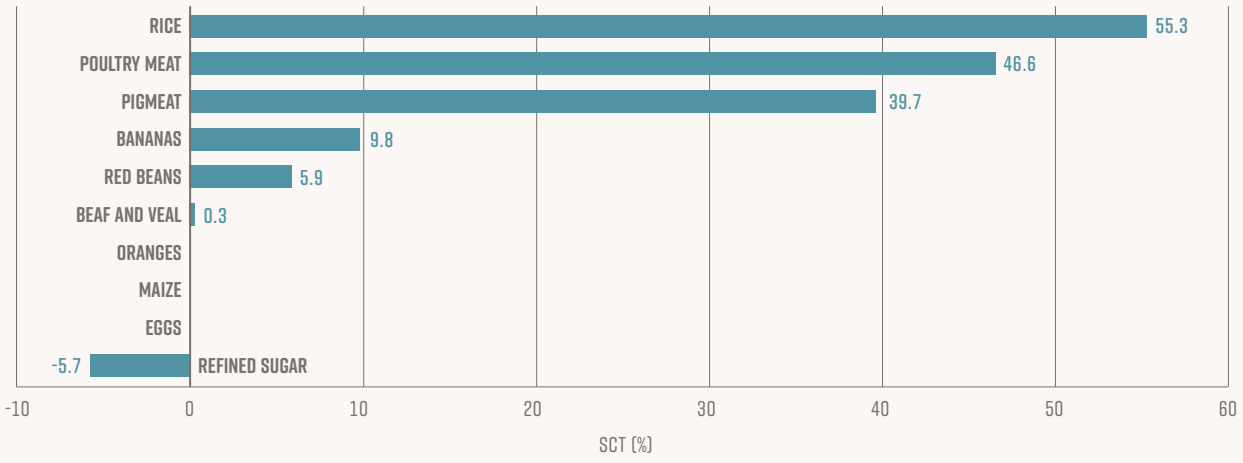
- **Insufficient physical infrastructures** such as rural roads, irrigation systems and storage facilities, which escalate production and transportation costs.
- **Limited technological advancements** in the processing industry, which hinders value addition within the sector.
- **Low levels of production concentration and inefficiencies** along the value chain, leading to information asymmetries, weakened producers' bargaining power, and subsequently, lower prices received and higher margins for intermediaries.

The price gap method is based on the underlying principle of comparing "like with like" prices, which requires adjustments for weight, quality and marketing margins, such as processing, transportation and handling costs (OECD, 2016). However, the absence of detailed marketing margin data poses a challenge to factor in all value chain characteristics, potentially distorting MPS estimates.

As illustrated in **Table 13**, between 2015 and 2022 poultry meat producers continued to receive most of the MPS. Producers of poultry meat, rice, pigmeat and bananas consistently received higher prices than they would have got in the absence of any public policy, which is consistent with explicit public policies in place at the time. Price gaps for red beans and refined sugar, on the other hand, were positive in some years and negative in others, which could also be explained by explicit public policies in place at the time. For the remaining commodities (maize, eggs, oranges and beef and veal), price gaps were set to zero since no associated explicit public policies could be identified.

Bananas, and to a lesser extent rice, poultry meat and beef and veal, were the only commodities receiving commodity-specific support via budgetary transfers between 2015 and 2022. For the remaining commodities, the SCT equaled the MPS. **Figure 9** shows the average SCT expressed as a share of each commodity's production value (%SCT), ranging from -5.7% for refined sugar to +55.3% for rice. The MPS and SCT indicators are discussed in more depth in the rest of this section.

FIGURE 9: AVERAGE SCT AS A PERCENTAGE OF FARMGATE PRODUCTION VALUE, 2015-2022

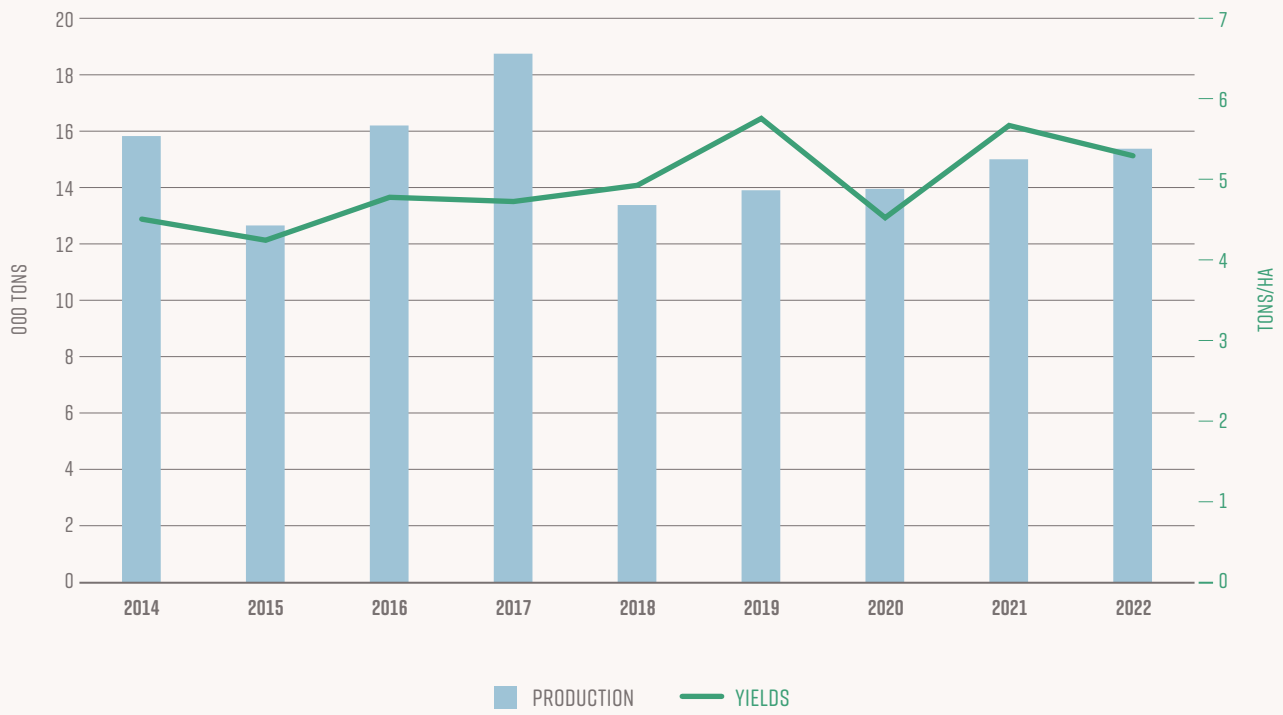


Source: Author's estimations based on data from the Ministry of Agriculture, Food Security and Enterprise, the Statistical Institute of Belize, UN Comtrade and FAOSTAT.

A) SUPPORT TO RICE

As illustrated in **Figure 10**, paddy rice production remained relatively stable between 2014 and 2022, despite an increase in yields from 4.5 t/ha to 5.3 t/ha. As shown previously in **Figure 5**, rice increased from an average of 2.8% over the period 2011-2014 (Foster *et al.*, 2017) to 4.6% over the period 2015-2022 in share of total agricultural production value.

FIGURE 10: PADDY RICE PRODUCTION (IN 1,000 T) AND YIELDS (IN T/HA) (2014-2022)



Source: Author's estimations based on data from the Ministry of Agriculture, Food Security and Enterprise, the Statistical Institute of Belize, UN Comtrade and FAOSTAT.

Regarding trade, rice is one of the major export crops. However, Belize tends to export larger volumes of lower value paddy rice and to import smaller volumes of higher value milled or semi-milled rice **(Table 14)**. Between 2015 and 2022, 61% of rice exports, on average, consisted of paddy rice and 7% of milled or semi-milled rice. Conversely, 36% of rice imports consisted of paddy rice and 55% of milled or semi-milled rice (UN Department of Economic Affairs, 2024).

TABLE 14: RICE EXPORTS AND IMPORTS IN VOLUME (T) AND VALUE (BZ$), 2015-2022

		2015	2016	2017	2018	2019	2020	2021	2022
VOLUME	EXPORTS	1,124	862	511	1,917	856	1,316	500	116
	IMPORTS	960	738	739	733	743	326	453	258
VALUE	EXPORTS	156,068	121,904	87,446	157,141	91,505	98,985	9,250	32,838
	IMPORTS	1,686,025	1,288,104	1,997,751	1,593,868	2,321,796	853,628	1,767,831	2,675,415

Source: UN Department of Economic Affairs, 2024. HS 1006.

Public policy support for rice production in Belize includes several measures aimed at regulating imports and stabilizing prices. Firstly, there are restrictions on rice imports, requiring import licenses, the payment of import duties (25%) and imposing price controls, particularly on lower-grade rice, under the 1987 Supplies Control Regulations. Additionally, a price stabilization program has been implemented in southern Belize, guaranteeing a minimum price for paddy. While this program primarily targets lower-grade rice and serves more as a social program, it has provided stability for rice producers in the region (Ministry of Agriculture, 2015).

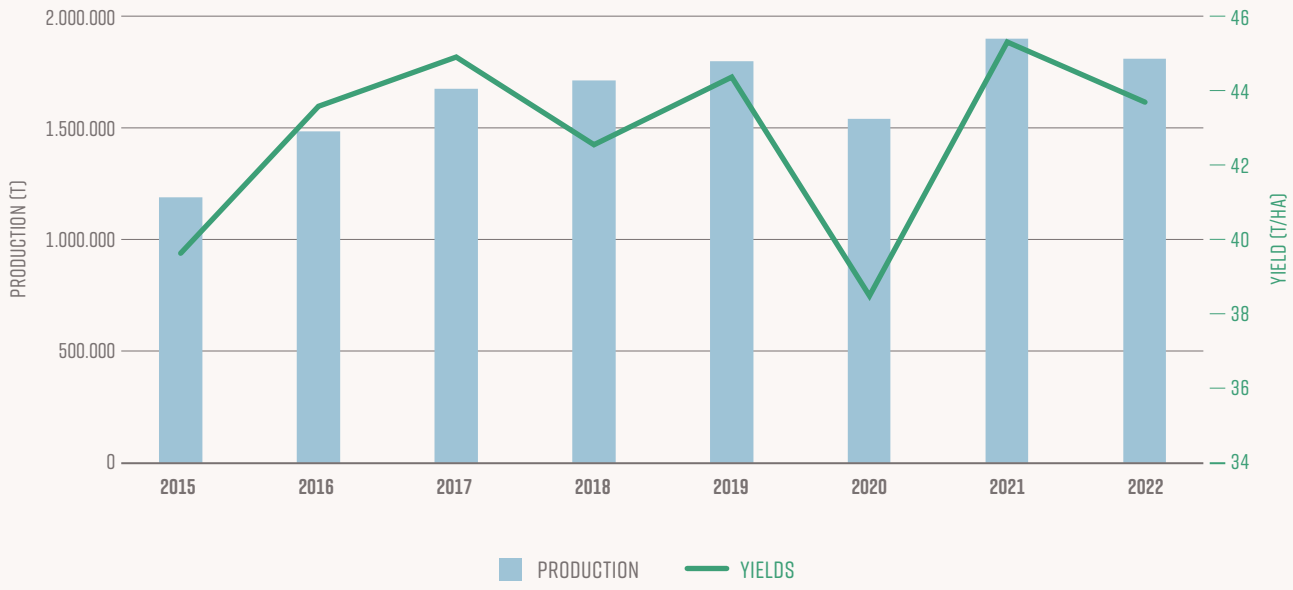
Furthermore, the BMDC plays a significant role in supporting rice production, particularly in the Toledo District, one of the largest rice-producing areas. BMDC assists farmers with training on agricultural practices, has started providing access to machinery for land preparation and harvesting since 2022 and offers a price premium as well as upfront payments for paddy rice delivered to its rice mill facility in Toledo (the Big Falls Facility). This premium, which is approximately 60% higher than prices from two years ago, benefits a substantial portion of rice producers in southern Belize, including both small-scale producers and large-scale mechanized ones (Ministry of Agriculture, personal communication, 2024). Moreover, BMDC manages the distribution and marketing of the rice it mills under the brand "Big Falls Premium Rice" for domestic consumption across urban areas in Belize.

Between 2015 and 2022, rice producers received prices higher than reference prices (positive MPS). Overall, support estimates over the period 2015-2022 indicate that policies had a large positive effect for rice producers with an average SCT of 55.3% **(Figure 9)**, indicating that transfers to producers resulting from agricultural policies amount to more than half of the producers' receipts. This reflects an effect of the policies described above, namely, import duties and restrictions, price regulations and marketing by BMDC.

B) SUPPORT TO SUGAR

Sugar is considered Belize's most important industry in the agricultural sector. As of 2022, it contributes to approximately 2% of Belize's GDP and is the country's largest agricultural product in terms of value, volume and commodity export (Guzmán Hidalgo, 2021). As illustrated in **Figure 11**, sugarcane production increased significantly from 1,186,154 tons in 2015 to 1,803,634 tons in 2022 (+52%). This growth was primarily attributable to the expansion of cultivated land (Ministry of Agriculture, Food Security and Enterprise, 2021) which rose from 30,000 ha in 2015 to 41,000 ha in 2022. Over this period, yields also increased, more modestly, from 39.6 t/ha in 2015 to 43.6 t/ha in 2022 (+10%). Nevertheless, in comparison to other countries in the region, Belize's sugarcane yields remained relatively low, merely half of those seen in countries like Guatemala and Nicaragua (Guzmán Hidalgo, 2021). Several factors contribute to these lower yields, including issues of drainage, a sub-standard road network (even more so in sugarcane producing areas than in other parts of Belize), insufficient management of pests and diseases, limited extension services, vulnerability to natural disasters, and challenges in accessing credit (Guzmán Hidalgo, 2021; Ministry of Agriculture, 2015).

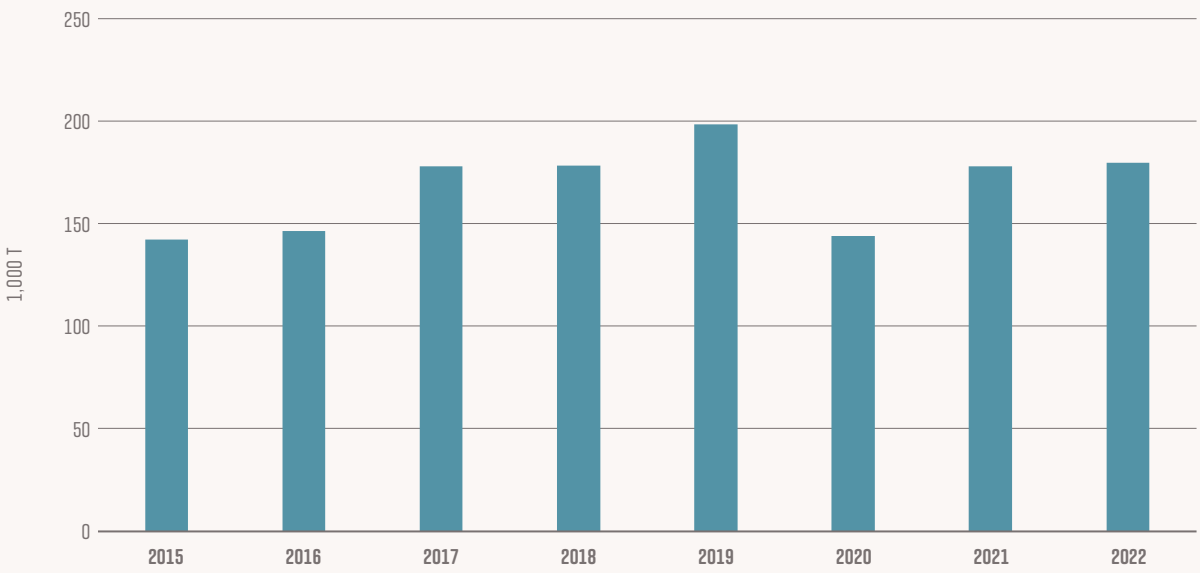
FIGURE 11: SUGARCANE PRODUCTION (T) AND YIELDS (T/HA), 2014-2022



Source: Author's estimations based on data from the Ministry of Agriculture, Food Security and Enterprise, the Statistical Institute of Belize, UN Comtrade and FAOSTAT.

Most sugarcane in Belize is cultivated by approximately 5,000 small-scale and independent farmers, the majority of whom operate on less than 5 ha of land. These farmers are primarily located in the north of Belize (USDA Foreign Agriculture Service, 2019). The agri-processing sector is dominated by two private companies: Belize Sugar Industries (BSI) and the Santander Sugar Group. BSI, owned by the ASR Group, operates Belize's main sugar mill and annually processes approximately 1.3 Mt of sugarcane (Guzmán Hidalgo, 2021). It holds the exclusive authorization to supply sugar products to the domestic market and contributes significantly to the country's energy sector by supplying about 15% of Belize's energy needs through sugar by-products (Guzmán Hidalgo, 2021; USDA Foreign Agriculture Service, 2019). Santander, on the other hand, is a relatively new player (2016) and processes approximately 0.6 Mt of sugarcane per year. It operates out of an Export Processing Zone (EPZ) and its operations are geared towards international sugar markets (Guzmán Hidalgo, 2021). According to the Sugar Industry Research and Development Institute (SIRDI, 2014), agri-processors pay farmers 65% of the "net stripped value" of sugar (i.e.: gross revenues net of costs incurred in getting the sugar from factory to market such as transportation, handling and freight). Between 2015 and 2022, Belize's total sugar (or refined sugar) production increased from 142,000 t to 179,000 t **(Figure 12)**.

FIGURE 12: SUGAR PRODUCTION (1,000 T), 2014-2022



Source: Author's estimations based on data from the Ministry of Agriculture, Food Security and Enterprise, the Statistical Institute of Belize, UN Comtrade and FAOSTAT.

Regarding trade, sugar exports increased both in terms of volume (+23%) and value (+21%) between 2015 and 2022 **(Figure 13)**, despite the liberalization of the EU's sugar market in 2017 which left Belize without a preferential quota (USDA Foreign Agricultural Service, 2019). In 2019, Belize's sugar exports remained highly concentrated in two markets (Guzmán Hidalgo, 2021): the United Kingdom (77%) and the United States (14%).

FIGURE 13: SUGAR EXPORTS IN VOLUME (1,000 T) AND VALUE (MILLION BZ$), 2015-2022

Source: Author's estimations based on data from the Ministry of Agriculture, Food Security and Enterprise, the Statistical Institute of Belize, UN Comtrade and FAOSTAT.

Public policy support for the sugar industry in Belize includes an import license scheme, which acts effectively as an import prohibition, and a quota for Belize's sugar to be sold at capped prices on the domestic market (Guzmán Hidalgo, 2021). Most of Belize's sugar, however, is exported (86% in 2022, for example).

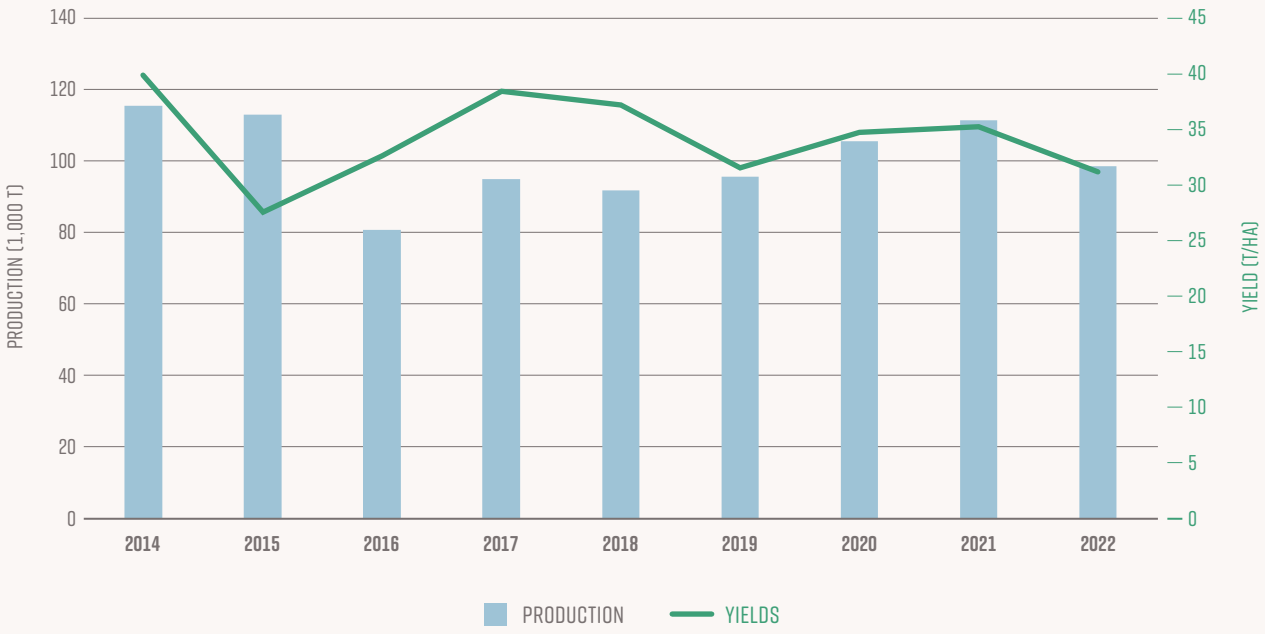
Overall, support estimates over the period 2015-2022 indicate that policies had a negative effect for sugar producers with an average SCT of -5.7% **(Figure 9)**. During this period, sugar producers obtained prices which were mostly lower than reference prices (negative MPS, except in 2020 and 2022), which suggests that they were implicitly taxed. This could be the result of several factors: public policies (hidden export taxes, for instance; taxes on

sugar export were instituted in 2000 but according to WTO (2004) have since been officially repealed); the industry's oligopsonistic structure with only two buyers (including one —BSI— which is owned by ARS, the world's largest refiner and marketer of cane sugar) which could lead to excessive profits and/or costs (Guzmán Hidalgo, 2021); value chain constraints such as poor infrastructure and the price restrictions depressing domestic prices.

C) SUPPORT TO BANANAS

Between 2015 and 2022, bananas were Belize's second most valuable agricultural commodity, representing 17% of the total production value on average **(Table 3)**, and its second largest foreign exchange earner **(Table 5)**. It also played a significant role in employment, providing direct jobs for nearly 4,000 individuals and indirect ones for 20,000 individuals (Guzmán Hidalgo, 2021). However, production levels declined by 13% over the same period **(Figure 14)** and with average yields of 34 t/ha, the productivity of Belize's banana industry was significantly lower than neighboring banana producing countries such as Nicaragua (62 t/ha) and Guatemala (48 t/ha).

FIGURE 14: BANANA PRODUCTION (1,000 T) AND YIELDS (T/HA), 2014-2022



Source: Author's estimations based on data from the Ministry of Agriculture, Food Security and Enterprise, the Statistical Institute of Belize, UN Comtrade and FAOSTAT.

Challenges in Belize's banana industry include underinvestment in rural roads leading to higher costs and losses, droughts and heavy rainfalls which have intensified because of climate change, access to inputs such as fertilizer, fungicide and seedlings, lack of access to credit, and limited research, innovation and extension (Guzmán Hidalgo, 2021). The Banana Growers Association (BGA) is responsible for overseeing the development of Belize's banana industry. However, its financial means, derived from a cess imposed on each exported banana box, are inadequate to sustain its operational expenses including on-farm research and extension (Ministry of Agriculture, 2015).

Approximately 87% of Belize's banana production is exported. BGA purchases all export-quality bananas and sells them to a single buyer: Fyffes PLC, a Japanese-owned company with headquarters in Switzerland. Belize's bananas are then distributed in Europe (Guzmán Hidalgo, 2021), primarily in the United Kingdom (53%) and Ireland (40%). Producer prices are determined through negotiations between Fyffes and BGA. In 2019, for example, Fyffes and BGA signed an agreement which included a fixed price of BZ$20 per 40-pound banana box.

FIGURE 15: BANANA EXPORTS IN VOLUME (1,000 T) AND VALUE (MILLION BZ$), 2014-2022

Source: Author's estimations based on data from the Ministry of Agriculture, Food Security and Enterprise, the Statistical Institute of Belize, UN Comtrade and FAOSTAT.

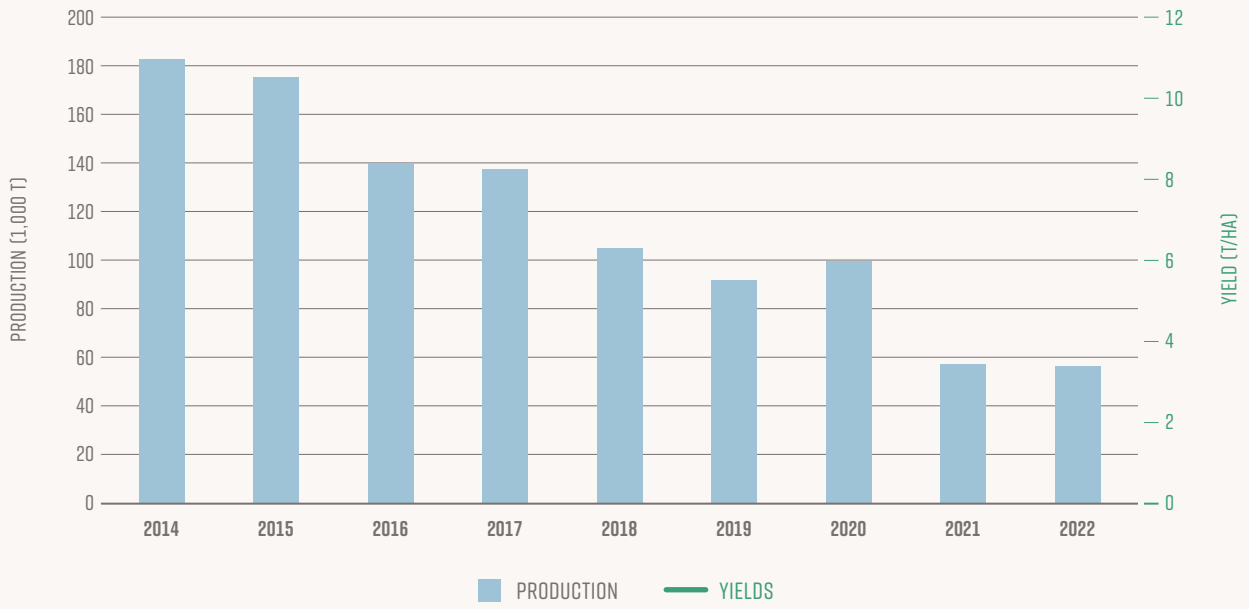
In terms of policy support, Belize's banana industry received extensive support from the EU-financed Banana Accompanying Measures between 2016 and 2019. Between 2015 and 2022, Belize's banana producers also received prices higher than reference prices (positive MPS). This can be attributed to the industry's monopolistic-monopsonistic structure that appeared to benefit producers during this period with the consistent payment of price premiums (Guzmán Hidalgo, 2021). The substantial 80% duty (CET) imposed on banana imports —Belize's highest import duty among PSE commodities **(Table 7)** also might have played a role. Even though imports of bananas are non-existent, at such a high level the duty acts as an import ban shielding the domestic producers from any potential external supply. Overall, support estimates from 2015 to 2022 suggest that policies created a positive transfer to the banana producers, with an average SCT of 9.8% **(Figure 9)**.

D) SUPPORT TO ORANGES

Belize has approximately 300 orange growers and about 95% of their production is exported, primarily in the form of orange concentrate. These growers market their produce through the Belize Citrus Growers Association (BCGA) to two processing companies —Citrus Products of Belize Ltd. (CBPL) and Texbel. Subsequently, these companies export the final product predominantly to the CARICOM region. Between 2015 and 2022, Belize's orange industry continued to decline, with production plummeting by 68% **(Figure 16)**. Whereas oranges represented 9.2% of the total agricultural production value in 2015, this figure dwindled to a mere 2.9% by 2022 **(Table 3)**. Exports, which mainly consisted of orange concentrate, also saw a sharp decline, with a 66% decrease in value and a 68% decrease in volume **(Figure 17)**. This collapse can be attributed to a combination of factors including natural disasters, low international prices, and notably, the emergence of new pests and diseases such as Citrus Greening Disease or Huánglóngbìng (HLB), the Mexican Fly and the Citrus Tristeza Virus (Guzmán Hidalgo, 2021).

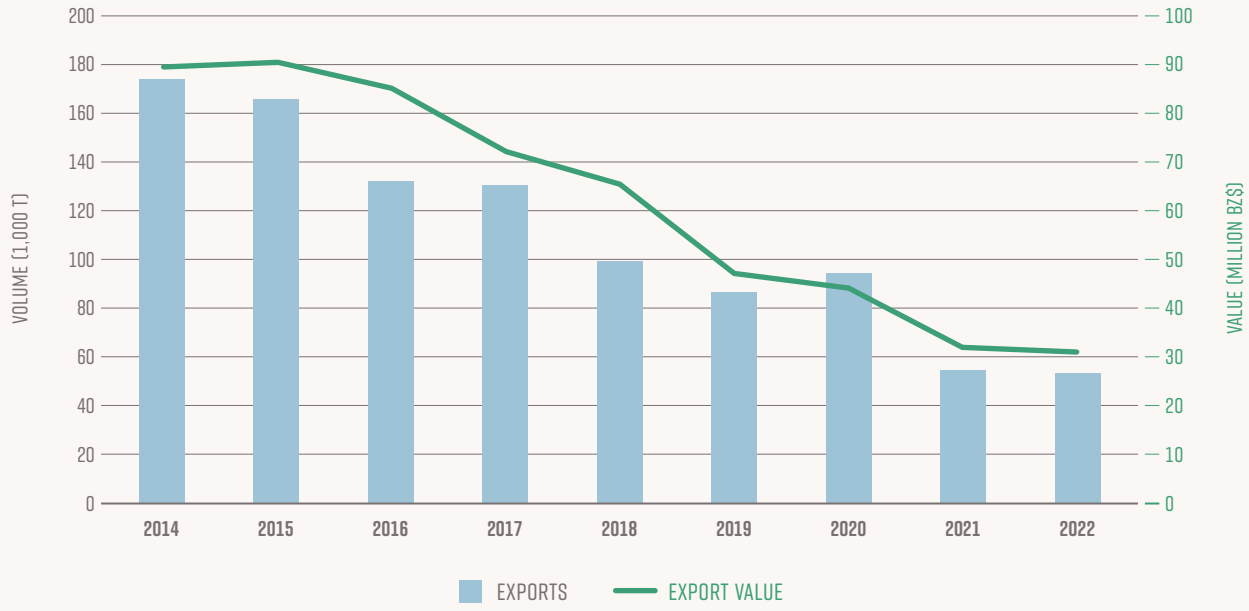
Between 2015 and 2022, orange growers received prices below reference prices, yet no explicit policy accounted for this gap. Consequently, the MPS for oranges was set at zero. With a SCT of 0% during the same period, the policy effects on orange growers remained neutral.

FIGURE 16: ORANGE PRODUCTION (1,000 T) AND YIELD (T/HA), 2014-2022



Source: Author's estimations based on data from the Ministry of Agriculture, Food Security and Enterprise, the Statistical Institute of Belize, UN Comtrade and FAOSTAT.

FIGURE 17: ORANGE EXPORTS IN VOLUME (1,000 T) AND VALUE (MILLION BZ$), 2014-2022



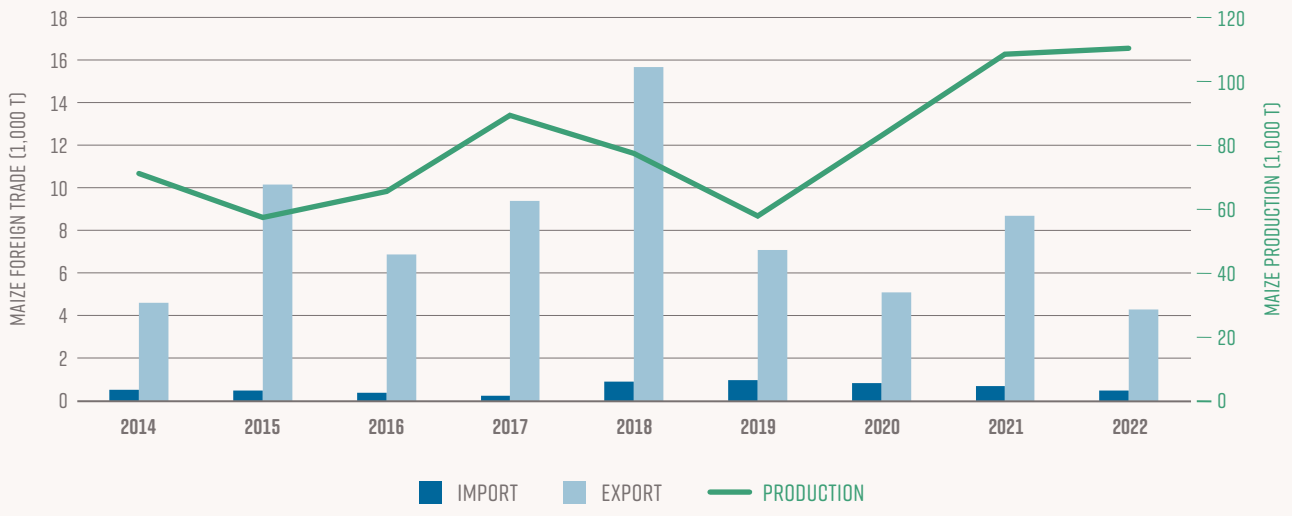
Source: Author's estimations based on data from the Ministry of Agriculture, Food Security and Enterprise, the Statistical Institute of Belize, UN Comtrade and FAOSTAT.

E) SUPPORT TO OTHER CROPS

Between 2015 and 2022, maize and red beans were export commodities. Regarding maize, the data reveals a substantial price gap favoring domestic producers. However, this gap exceeded the potential impact of explicit public policies in place during that period, notably the 40% import duty on maize. Since maize is an overwhelmingly exported commodity **(Figure 18)**, the import duty does not contribute to the price gap. No other price policies affecting maize were identified. As a result, the MPS for maize was set to zero. Overall, the policy effects on maize producers were neutral, with an average SCT of 0% over the period 2015-2022. It is however worth noting that while from 2011 to 2014 MPS for maize was volatile —high in some years and negative in others—, Foster *et al.* (2017) noted very high level of support due to lower prices on inputs for maize production (imported agrochemicals and fuels). The analysis of support to inputs is beyond the scope for this study, but it possibly remains high and affects maize producers.

Conversely for red beans, the MPS remained positive (except in 2021). Several policy factors contributed to this, including the 40% import duty, import licenses and price controls imposed by the 1987 Supplies Control Regulations. Overall, support estimates indicate that policies had a beneficial impact on red bean producers, with an average SCT of 5.9% between 2015 and 2022 **(Figure 9)**.

FIGURE 18: MAIZE PRODUCTION (RIGHT AXIS), EXPORTS AND IMPORTS IN VOLUME (1,000 T), 2014-2022



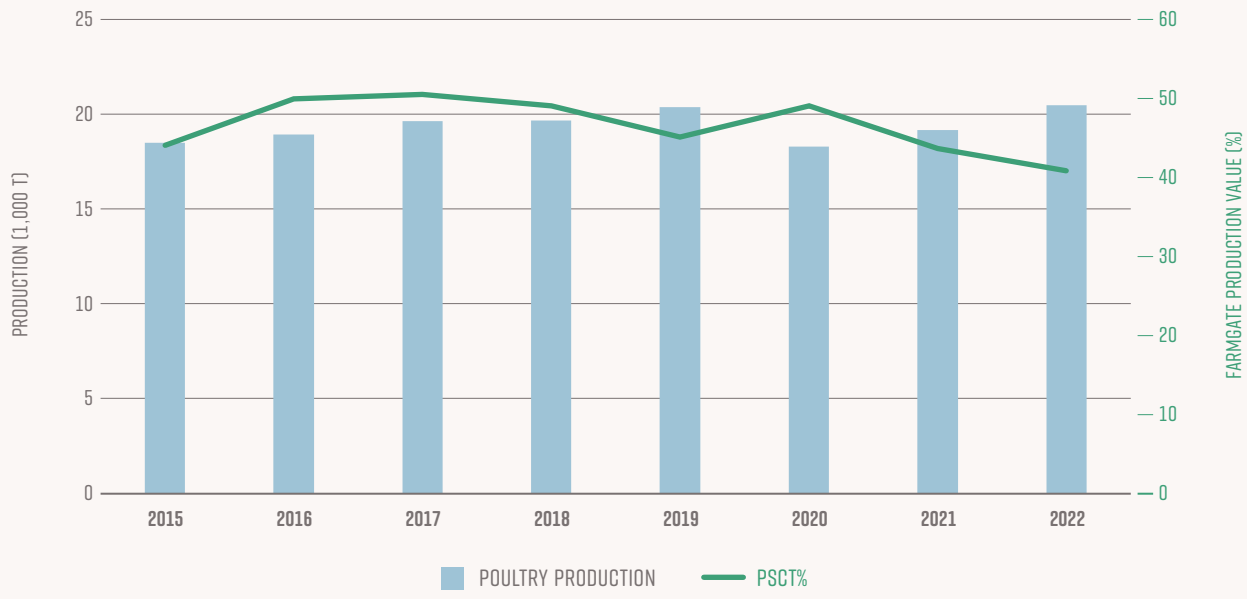
Source: Author's estimations based on data from the Ministry of Agriculture, Food Security and Enterprise, the Statistical Institute of Belize, UN Comtrade and FAOSTAT.

F) SUPPORT TO POULTRY

Between 2015 and 2022, poultry meat emerged as Belize's most valuable agricultural commodity, accounting for an average of 19.2% of the total production value **(Table 3)** and 2.2% of the country's GDP. Over this period, poultry meat production witnessed an 11% increase, rising from 18,495 t in 2015 to 20,470 t in 2022 **(Table 2)**. With an estimated 2,500 employees, the industry predominantly caters to the domestic market, meeting nearly all of the country's demand for poultry meat. Imports, which primarily consist of processed meat, are minimal and Belize is starting to export some of its poultry. One of the comparative advantages of the Belize poultry subsector is that it uses domestically produced feed.

The poultry meat industry continued to dominate Belize's MPS, accounting for an average of 62% of Belize's total MPS from 2015 to 2022. This substantial MPS can be attributed to various factors, including the 40% duty on poultry meat imports and the requirement for import licenses. While this policy ensures market protection for domestic producers, it also translates into higher prices for consumers. Overall, support policies exerted significant and enduring effects on the poultry meat industry, as indicated by an average SCT of 46.6% over the period 2015-2022 **(Figure 19)**.

FIGURE 19: POULTRY PRODUCTION (1,000 T) AND PSCT AS A SHARE OF FARMGATE PRODUCTION VALUE (%), 2015-2022



Source: Author's estimations based on data from the Ministry of Agriculture, Food Security and Enterprise, the Statistical Institute of Belize, UN Comtrade and FAOSTAT.

At present we do not identify any policies that might contribute to the increased domestic prices of feed, however, before 2015 maize support was volatile, with prices higher than non-policy levels in some years (Foster *et al.*, 2017). Any policies affecting maize market should consider their potential impact on the poultry subsector. The sector's greatest concern is animal health, which cannot be addressed through the price and trade policies and requires public investments in the services for the sector.

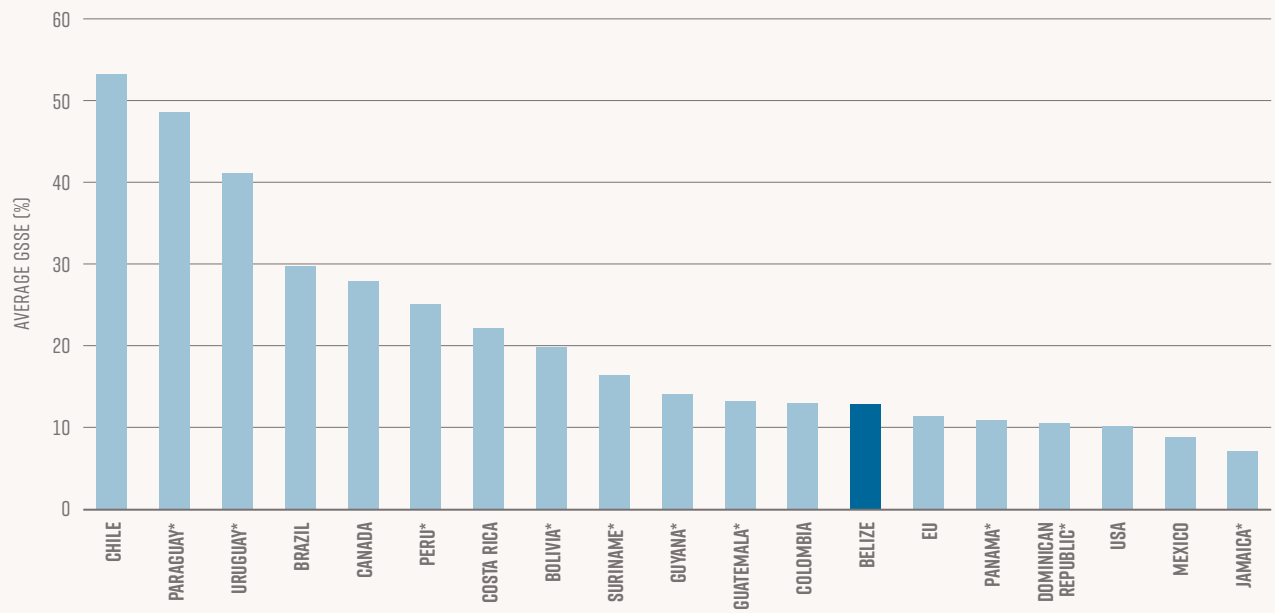
G) SUPPORT TO OTHER LIVESTOCK

Belize's beef, pigmeat and eggs industries share similarities in production volume **(Table 2)** and value **(Table 3)**. They also predominantly cater to the domestic market and benefit from substantial trade protection measures, including a 40% import duty and stringent requirements for import licenses which, reportedly, are seldom granted for beef and pigmeat (USDA Foreign Agricultural Service, 2019). However, between 2015 and 2022, the MPS for beef and eggs were negative (except in 2019 for beef), contradicting the prevailing trade protection policies. Consequently, the MPS for both commodities were set to zero. During this period, the SCT for beef remained minimal at 0.3% and the SCT for eggs was null **(Figure 9)**. In contrast, the MPS for pigmeat consistently remained positive and its average SCT reached 39.7%, making it Belize's third largest during this period (**Figure 9)**.

ESTIMATES OF SUPPORT TO GENERAL SERVICES

The General Services Support Estimate (GSSE) is a measure of budget transfers for services provided to producers collectively. In 2022, Belize's GSSE amounted to BZ$4.6 million **(Table 13)**. As a share of the Total Support Estimate (TSE), the percentage GSSE dropped from 26.8% in 2015 to 4.7% in 2022, primarily due to the end of the EU-funded Sugar Accompanying Measures. With an average %GSSE of 12% over the period 2015-2021, Belize falls between Guatemala (13%) and Panama (11%) in Central America **(Figure 20)**.

FIGURE 20: AVERAGE GSSE AS A PERCENTAGE OF TSE IN BELIZE AND IN SELECTED COUNTRIES, 2015-2021



Source: Author's estimations based on data from the Ministry of Agriculture, Food Security and Enterprise, the Statistical Institute of Belize, UN Comtrade and FAOSTAT;
* Data was not available for all the years of interest.

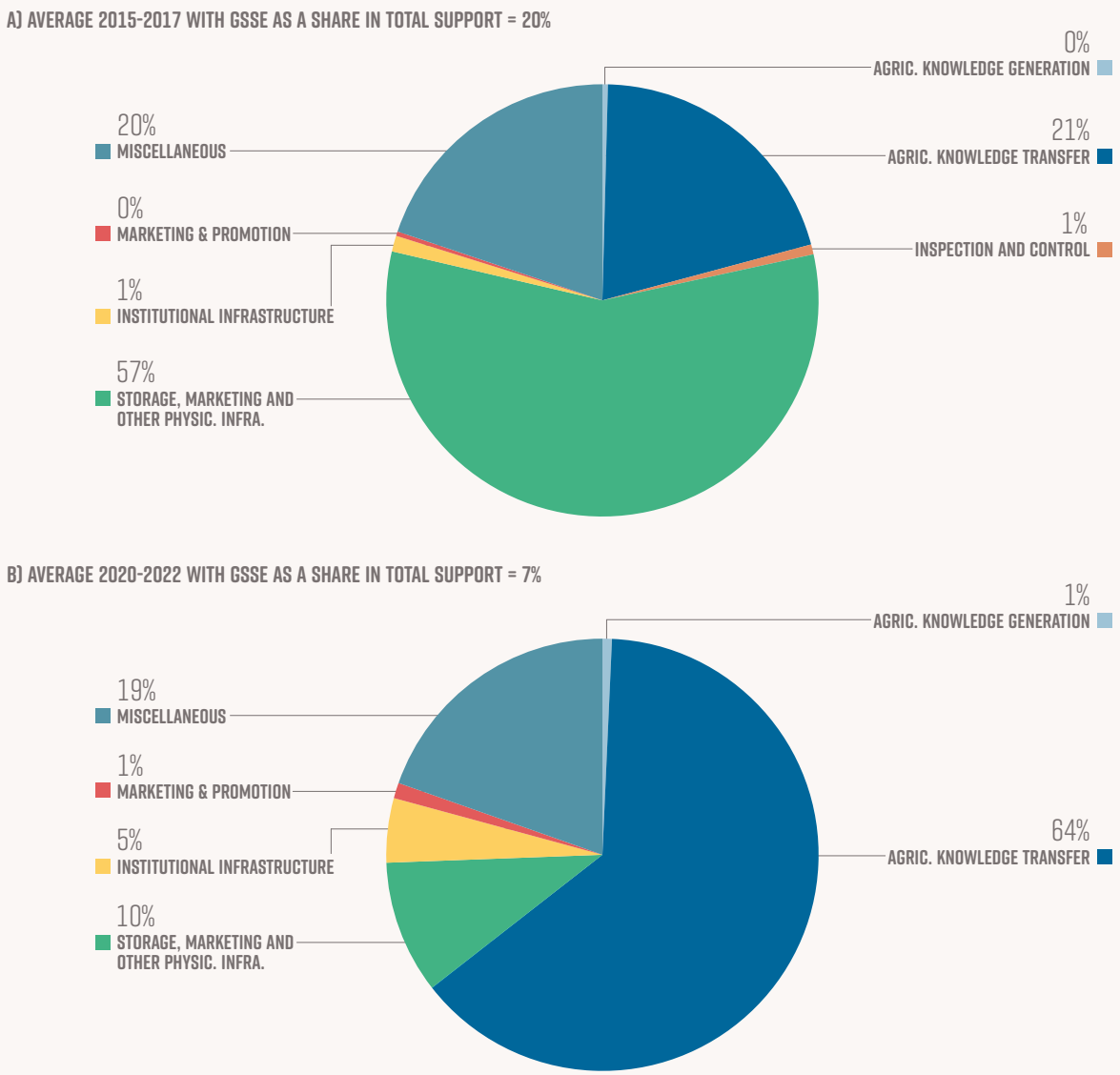
The average breakdown of Belize's GSSE during 2015-2022 is depicted in **Figure 21**. A significant portion of the GSSE was allocated to support storage, marketing and other physical infrastructures, predominantly through initiatives like the Sugar Accompanying Measures. However, the financing of this program ended in 2017, bringing the share of the infrastructure support in GSSE down to 10%. Agricultural knowledge transfer, mainly via the National Agriculture Extension Program, accounted for the larger part of the GSSE (64%) after the expansion of the EU -funded program. The Miscellaneous category (18%) encompassed diverse programs and projects, including the EU-funded Belize Rural Development Project II (more details on those projects can be found in Annex II).

The expiration of the EU-funded programs (namely, support to banana and sugar sub-sectors, and Belize rural development project) has significantly affected the level and structure general services support in Belize. While agricultural policy strategy of the Ministry of Agriculture is considering the creation of a conducive environment for the development of an Agriculture and Food Sector as a main policy goal, the effectiveness of implementing general services measures is hampered by the lack of budget. The

reliance on donor support while inevitable, given limited public financing capacity, makes the sector's crucial general services support programs vulnerable to foreign policy decisions.

Agricultural knowledge generation is crucial for enabling sustainable agricultural development, yet it receives negligible funding in Belize. Similarly, inspection and control services face minimal funding, thereby increasing vulnerability to plant and animal diseases.

FIGURE 21: AVERAGE GSSE COMPOSITION, 2015-2022



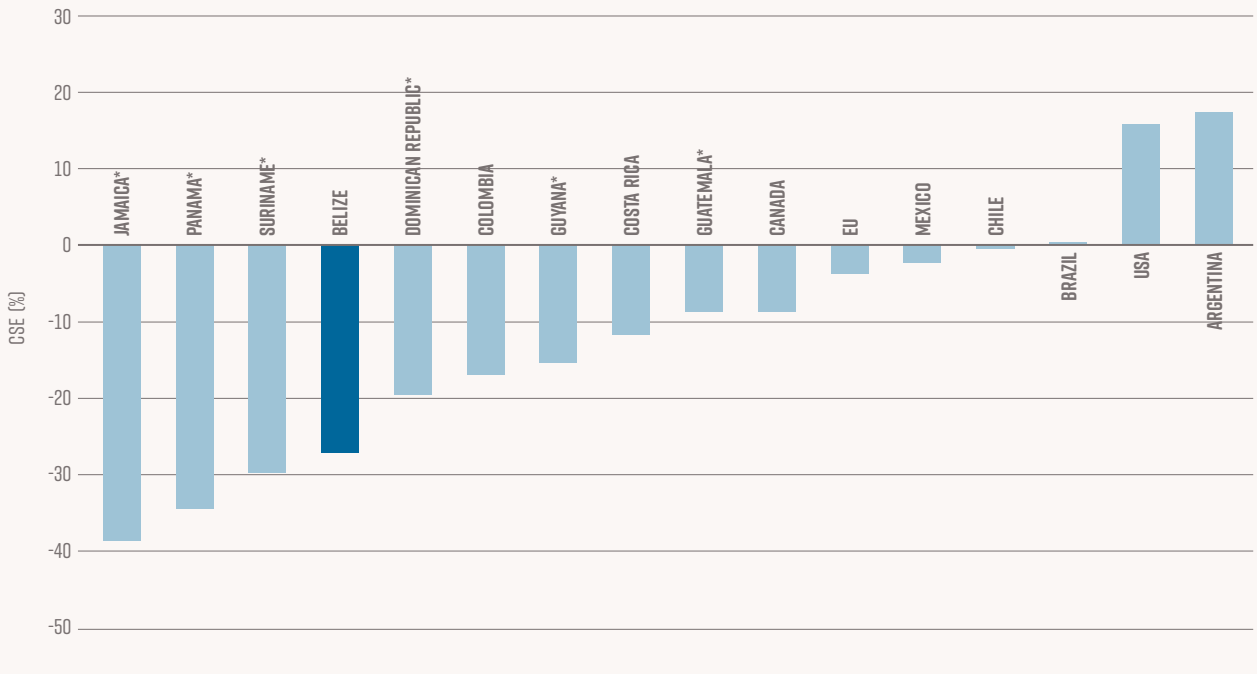
Source: Author's estimations based on data from the Ministry of Agriculture, Food Security and Enterprise, the Statistical Institute of Belize, UN Comtrade and FAOSTAT.

ESTIMATES OF SUPPORT TO CONSUMERS

In 2022, Belize's Consumer Support Estimate (CSE) amounted to a negative BZ$78.3 million, indicating that support to producers in Belize continued to rely primarily on transfers from consumers **(Table 13)**. In other words, because of public policies in place, consumers in Belize paid higher prices for agricultural commodities, with potential negative implications for food security. The primary factor behind negative CSE was the protection afforded to the poultry meat industry. High levels of transfers from consumers to producers of poultry negatively affect food security as poultry is an important source of protein.

Belize's percentage CSE, which represents CSE as a proportion of total consumption expenditures at farm-gate, net of taxpayer transfers to consumers, averaged -27% over the 2015-2022 period. This value was lower than Panama's (-34%) but higher than Costa Rica's (-12%) and Guatemala's (-9%) **(Figure 22)**. As depicted in **Figure 23**, Belize's %CSE shifted from -26.6% in 2015 to -20.3% in 2022. However, this change was driven by a decrease in the share of PSE commodities relative to Belize's total agricultural

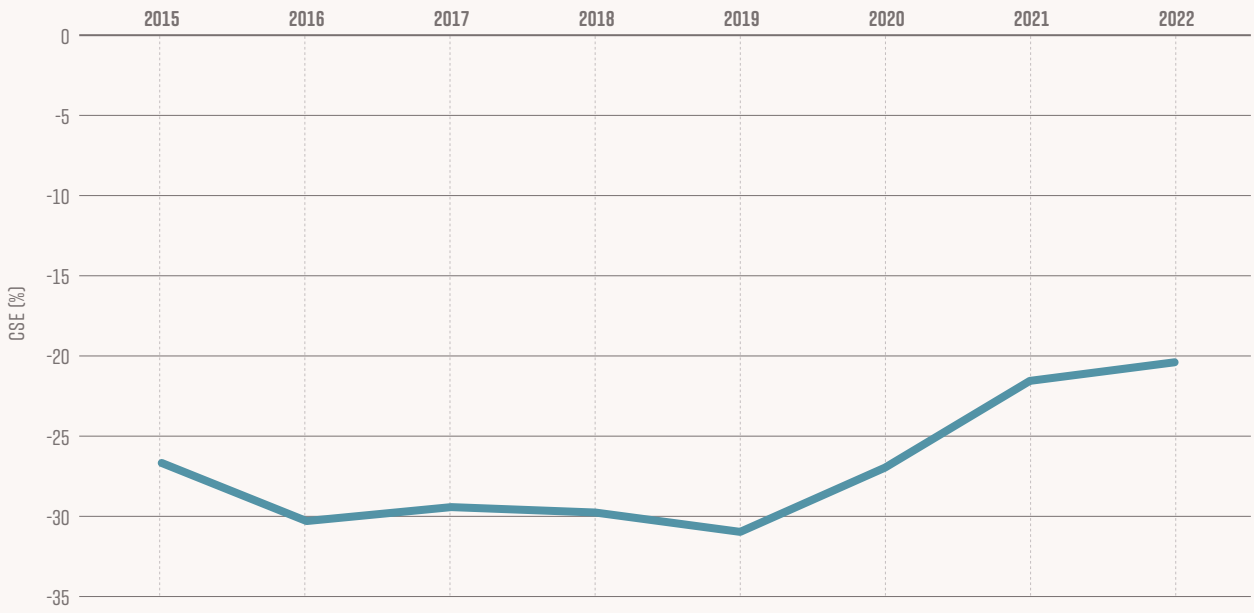
FIGURE 22: AVERAGE CSE AS A SHARE OF TOTAL CONSUMER EXPENDITURE IN BELIZE AND IN SELECTED COUNTRIES, 2015-2021



Source: Author's estimations based on data from the Ministry of Agriculture, Food Security and Enterprise, the Statistical Institute of Belize, UN Comtrade and FAOSTAT;
* Data was not available for all the years of interest.

production value —from 82% in 2015 to 75% in 2022— rather than policies aimed at compensating consumers via taxpayer-funded transfers, such as food assistance programs. For instance, the budget of the School Feeding and Nutrition Program declined from BZ$86,000 in 2015 to BZ$29,000 in 2022, remaining insufficient to offset the higher prices paid by Belizean consumers.

FIGURE 23: CSE AS A SHARE OF TOTAL CONSUMER'S EXPENDITURE IN BELIZE (%), 2015-2022

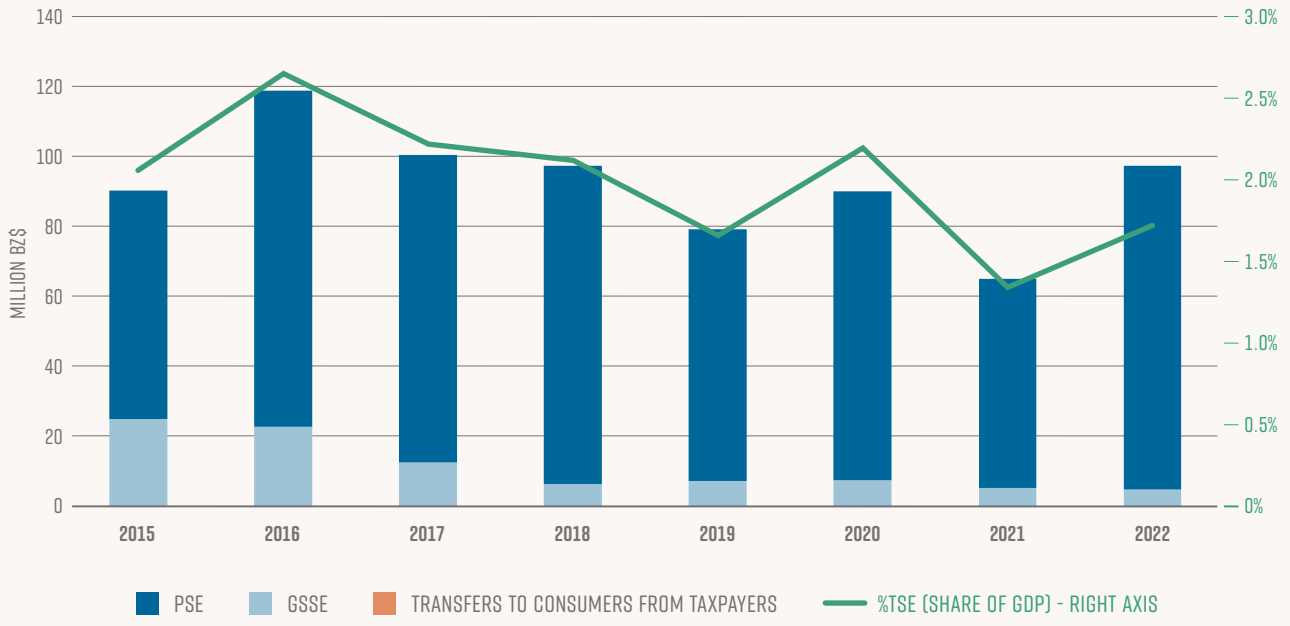


Source: Author's estimations based on data from the Ministry of Agriculture, Food Security and Enterprise, the Statistical Institute of Belize, UN Comtrade and FAOSTAT.

ESTIMATES OF TOTAL SUPPORT TO AGRICULTURE

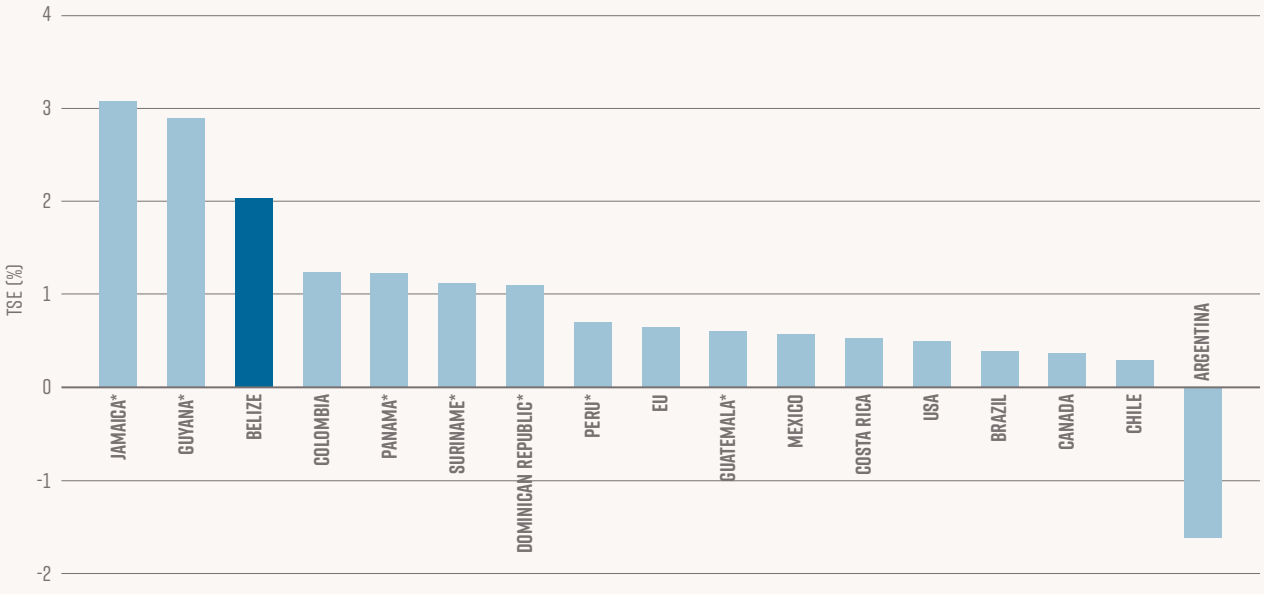
The Total Support Estimate (TSE) is the sum of the PSE, the GSSE and transfers to consumers from taxpayers. Between 2015 and 2022, it increased from BZ$90.5 million to BZ$97.5 million, primarily fueled by a rise in the PSE **(Figure 24)**. However, Belize's average percentage TSE (%TSE) —representing the TSE as a share of GDP— declined from 2.1% in 2015 to 1.7% in 2022, mainly due to GDP growth outpacing TSE growth during this period. Nonetheless, Belize maintained a comparatively high level of sector support over the 2015-2021 timeframe relative to other countries **(Figure 25)**, and most of this support is provided in the form of transfers from consumers, with adverse effect on food security.

FIGURE 24: TSE COMPOSITION IN MILLION BZ$, 2015-2022



Source: Author's estimations based on data from the Ministry of Agriculture, Food Security and Enterprise, the Statistical Institute of Belize, UN Comtrade and FAOSTAT.

FIGURE 25: AVERAGE %TSE AS A SHARE OF GDP IN BELIZE AND IN SELECTED COUNTRIES, 2015-2021



Source: Author's estimations based on data from the Ministry of Agriculture, Food Security and Enterprise, the Statistical Institute of Belize, UN Comtrade and FAOSTAT;
* Data was not available for all the years of interest.

4. ESTIMATE OF SUPPORT TO FISHERIES

4.1. METHOD

According to the OECD's Fisheries Support Estimate Manual (2024), a policy measure is to be included in the analysis "if it generates transfers to fishers, either individually or collectively, regardless of the nature, objectives or impacts of the policy measure." This includes budgetary transfers to fishers individually, budgetary transfers to fishers collectively and non-budgetary transfers such as MPS and fuel-tax concessions (FTC). The Manual further specifies that recurrent administrative expenditures such as salaries should be incorporated only if the policy with which they are associated "is actually delivering a service that benefits fishers individually (e.g., training) or collectively (e.g., management or research)".

Based on this, the following **policy measures** have been included in the analysis:

- **Recurrent Expenditure by the Belize Fisheries Department** as this was used for enforcement, training, regulation and research.
- **Three of Belize Fisheries Department's projects**, namely "Sustainable Development of Belize's Fishery Resources", "Institutional Strengthening" and "Conservation Compliance Unit". Conservation projects such as "Conservation Management" were not included as they generally do not generate transfers to fishers.
- **Recurrent Expenditure by the Aquaculture Program** (or Unit) because it was used to provide training and equipment to fish farm workers and owners.
- **The project "Expanding Small Scale Fish Farming for Rural Communities"** implemented by the Agricultural Research and Development Program (or Unit) of the Ministry of Agriculture, Food Security and Enterprise.

The list of projects supporting Belize's fisheries sector and included in the FSE analysis is provided in Annex 2. There was no FTC in place during the period of reference. Moreover, the MPS for Belize's main fisheries (lobster, conch and up until 2015/2016, farmed white shrimps) were not calculated due to the absence of data on domestic market prices.

In addition, fees paid for by fishers for resource access right such as fishing licenses and fishing boat licenses are also incorporated into the analysis as "cost-recovery items" and deducted from the total fishery support estimate. Rents from fisheries management such as revenues generated by BHSFU's high seas quota system would also fall under that category but were not included in the absence of data.

4.2. RESULTS

The results of the FSE for Belize over the period 2015-2022 are presented in **Table 15**.

During the period of reference, support to fisheries was positive. It almost entirely consisted of budgetary transfers to fishers collectively (GSSE as a share of FSE was 98%, on average, over the period of reference), which were driven, for the most part,

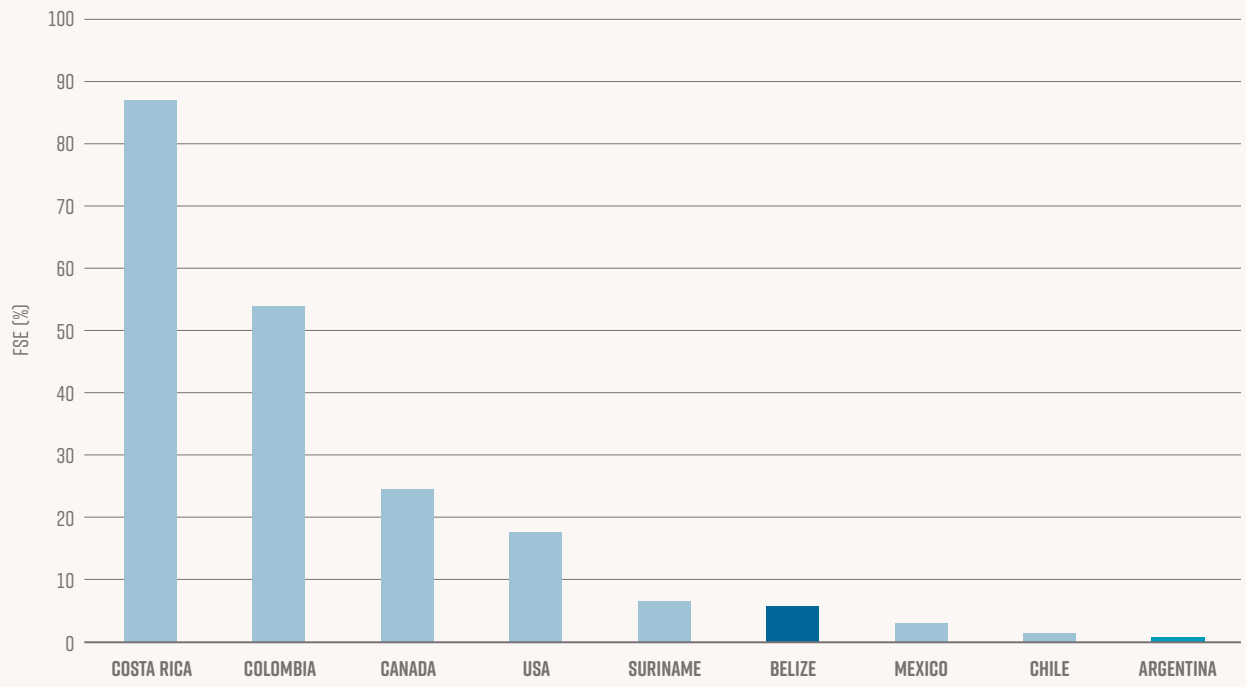
by the Belize Fisheries Department's recurrent expenditures in the areas of enforcement (in **Table 15**: II.G. Management of resources), training (II.E. Education and training), regulation (II.G. Management of resources) and research (II.F. Research and development). As a share of total landings (estimated using the total value of marine domestic exports as a proxy; also referred to as the %FSE), Belize's FSE ranged from less than 3% in 2015 to almost 7% in 2020. Compared to other countries for the latest year available on the Agrimonitor platform (IDB, 2018), Belize's %FSE (5.9%) ranked between Mexico (3.2%) and Suriname (6.7%) and significantly lower than other countries of the region such as Colombia (53.9%) and Costa Rica (87.1%) **(Figure 26)**.

TABLE 15: FISHERIES SUPPORT ESTIMATE, 2015-2022

INDICATORS	UNITS	2015	2016	2017	2018	2019	2020	2021	2022
FISHERIES SUPPORT ESTIMATE - TOTAL	**MBZ$**	**2.39**	**2.44**	**2.37**	**2.49**	**2.71**	**2.64**	**2.47**	**2.62**
FISHERIES SUPPORT ESTIMATE - NON-BUDGETARY	MBZ$	–	–	–	–	–	–	–	–
0. TRANSFERS TO INDIVIDUAL FISHERS - NON-BUDGETARY	MBZ$	–	–	–	–	–	–	–	–
0.A. MARKET PRICE SUPPORT	MBZ$								
0.B. FUEL TAX CONCESSIONS	MBZ$								
FISHERIES SUPPORT ESTIMATE - BUDGETARY	MBZ$	2.39	2.44	2.37	2.49	2.71	2.64	2.47	2.62
I. TRANSFERS TO INDIVIDUAL FISHERS - BUDGETARY	MBZ$	0.10	0.09	0.14	0.17	0.15	0.15	0.12	0.14
I.A. TRANSFERS BASED ON INPUT USE	MBZ$	0.10	0.09	0.14	0.17	0.15	0.15	0.12	0.14
I.B. TRANSFERS BASED ON FISHERS' INCOME	MBZ$	–	–	–	–	–	–	–	–
I.C. TRANSFERS BASED ON THE REDUCTION OF PRODUCTIVE CAPACITY	MBZ$								
I.D. MISCELLANEOUS TRANSFERS TO FISHERS	MBZ$								
II. GENERAL SERVICE SUPPORT ESTIMATE	MBZ$	2.36	2.43	2.32	2.41	2.65	2.59	2.44	2.59
II.A. ACCESS TO OTHER COUNTRIES' WATERS	MBZ$								
II.B. PROVISION OF INFRASTRUCTURE	MBZ$	–	–	–	–	–	–	–	–
II.C. MARKETING AND PROMOTION	MBZ$								
II.D. SUPPORT TO FISHING COMMUNITIES	MBZ$								
II.E. EDUCATION AND TRAINING	MBZ$	0.68	0.69	0.70	0.74	0.79	0.77	0.71	0.76
II.F. RESEARCH AND DEVELOPMENT	MBZ$	0.53	0.55	0.52	0.53	0.59	0.58	0.55	0.58
II.G. MANAGEMENT OF RESOURCES	MBZ$	1.15	1.19	1.10	1.14	1.28	1.24	1.18	1.25
II.H. MISCELLANEOUS TRANSFERS TO GENERAL SERVICES	MBZ$								
III. COST RECOVERY CHARGES	MBZ$	(0.07)	(0.08)	(0.09)	(0.09)	(0.08)	(0.09)	(0.10)	(0.11)

Source: Author's estimations based on data from the Ministry of Finance and the Belize Fisheries Department.

FIGURE 26: PERCENTAGE OF FSE AS A SHARE OF TOTAL FISH LANDINGS PER COUNTRY IN BELIZE AND SELECTED COUNTRIES (2018)



Source: Author's estimations based on data from the Ministry of Finance, the Belize Fisheries Department and Agrimonitor.

5. GREENHOUSE GAS EMISSIONS AND AGRICULTURAL POLICY

5.1. INTRODUCTION

The aim of this chapter is **to discuss the effect of the commodity-specific policies laid out above Belize's greenhouse gas (GHG) emissions**. The Government of Belize has a mandate to communicate GHG emission levels to the United Nations (UN), under the provisions of the UN Framework Convention on Climate Change (UNFCCC). Belize submitted its Nationally Determined

Contribution in 2016. In 2022, Belize submitted its Fourth National Communication to the UNFCCC, which included a GHG inventory by sector up until 2019. According to this document, Belize is a net sink for GHGs thanks largely to its forests (National Climate Change Office, 2022). In 2019, for instance, forests and wetlands combined absorbed an estimated 13,871 Gg of carbon dioxide (CO_2), while the country emitted approximately 6,406 Gg CO_2 (including non-CO_2 GHGs expressed in CO_{2eq}). Emissions were caused, mainly, by (i) land conversions to grassland (2,947 Gg CO_{2eq}, or 46% of the country's total CO_{2eq} emissions), (ii) land conversions to cropland (2,086 Gg CO_{2eq}, or 33% of the country's total CO_{2eq} emissions), (iii) the energy sector (846 Gg CO_{2eq}), (iv) agriculture (336 Gg CO_{2eq}), (v) the industrial sector (164 Gg CO_{2eq}) and (vi) the waste sector (28 Gg CO_{2eq}). In addition, Belize is highly exposed to the effects of climate change and ranks 8th in climate risk among 167 countries globally (World Bank, 2024). The country is exposed to the risk of droughts, which could negatively impact its agricultural activities and exacerbate other natural hazards the country already faces, such as storms, hurricanes and flooding.

5.2. METHOD

The method used for this analysis has been developed by the IDB and Professor Tim Josling (Josling *et al.*, 2017). It is the first time that it is applied in Belize. Data on GHG field emissions comes from Belize's Fourth National Communication. The emissions are expressed in monetary values, as suggested by the method developed by Josling *et al.*, after which they are matched with data on policy transfers, using the Producer Single Commodity Transfer (SCT) indicators estimated previously.

Matching GHG field emissions data with policy transfers is an estimation, inherently limited in precision.[5] Emissions are indeed dependent on farming practices and other conditions that can vary. Similarly, policy impact is influenced by market conditions as well as policy administration details. Nevertheless, the findings presented in this study offer a valuable foundation for further in-depth research into the relationship between agriculture policy and climate change in Belize.

5. This is why GHG emissions data is here presented as an average over several years, instead of per year.

MAIN ASSUMPTIONS

GHG EMISSIONS DATA

Data on GHG field emissions in Belize's Fourth National Communication was not disaggregated by commodity; instead, it was grouped by categories. Due to the unavailability of GHG field emissions data for all relevant years, estimates for missing years were calculated by considering the annual changes in production levels of the main crop or livestock responsible for these emissions. The total annual GHG field emissions from agriculture were estimated for the period 2015-2022 using this approach.

ALLOCATION OF GHG FIELD EMISSIONS TO PSE COMMODITIES

Using the approach described in Josling *et al.*, (2017), the total GHG field emissions from agriculture listed in **Table 16** were allocated to individual PSE commodities to facilitate the matching with SCT indicators. The allocation of the emissions data by commodity, where this data was not available in the source, was made by using emission factors and data on land area under cultivation, production weights and livestock numbers for the commodities in the Agrimonitor policy support database.

SEQUESTRATION OF GHG EMISSIONS BY AGRICULTURAL PRODUCTS

The positive contribution of crops, which absorb GHGs, needed to be factored in. Following Josling (2017), preliminary estimates of sequestration by sugar cane, bananas and oranges were incorporated.

CARBON PRICING

A carbon price was required to compare the cost of GHG emissions to the cost of financial transfers to producers of specific commodities. In the absence of a single carbon market, two different carbon prices were used and compared with each other: 10 US$/t $CO_{d\ eq}$ and 45 US$/t $CO_{d\ eq}$.[6]

6. The prices were selected to reflect the range of carbon taxes currently applied across the world.

5.3. RESULTS

Total field emissions from agriculture were estimated at 367 Gg CO_{2eq} per year, on average, for the period 2015-2022 **(Table 16)** and the main contributors were enteric fermentation from livestock (65% of total crop and livestock emissions), direct N_2O emissions from managed soils (18%) and biomass burning (4%).

TABLE 16: AVERAGE TOTAL FIELD EMISSIONS FROM AGRICULTURE, 2015-2022

LIVESTOCK		
ENTERIC FERMENTATION	CH_4+N_2O, CO_{2EQ} (Gg)	239.81
MANURE MANAGEMENT	CH_4, CO_{2EQ} (Gg)	13.35
AGGREGATE SOURCES		
BIOMASS BURNING (AGRICULTURE)	CH_4+N_2O, CO_{2EQ} (Gg)	15.37
LIMING	CO_{2EQ} (Gg)	0.48
UREA APPLICATION	CO_{2EQ} (Gg)	11.46
DIRECT N_2O EMISSIONS FROM MANAGED SOILS	N_2O, CO_{2EQ} (Gg)	67.35
INDIRECT N_2O EMISSIONS FROM MANAGED SOILS	N_2O, CO_{2EQ} (Gg)	10.98
RICE CULTIVATIONS	CH_4, CO_{2EQ} (Gg)	7.85
TOTAL	GG CO_{2EQ}	366.64

Source: Author's own calculations using data from Belize's Fourth National Communication to the UNFCCC (2022).

The share of emissions by commodity is shown in **Table 17**. The commodity that emitted the most over the period of interest was beef (43.5% of total crop and livestock emissions), followed by sugar (13.1%) and maize (5.1%).

TABLE 17: AVERAGE GHG FIELD EMISSIONS BY PSE COMMODITY, 2015-2022

COMMODITY	CO_{2EQ} (GG)	SHARE
RICE	10.42	1.8%
RED BEANS	5.53	3.6%
REFINED SUGAR	48.09	19.4%
BANANAS	2.53	1.6%
MAIZE	18.60	11.3%
EGGS	0.17	0.0%
ORANGES	9.97	6.5%
BEEF	159.54	28.4%
PIGMEAT	1.52	0.3%
POULTRY MEAT	1.15	0.2%
OTHERS	109.12	26.9%
TOTAL	366.64	100.0%

Source: Author's own calculations using data from Belize's Fourth National Communication to the UNFCCC (2022).

The first results of this analysis are presented in **Table 18**. Agricultural Carbon Emissions (ACE) include direct GHG field emissions from livestock and crop cultivation plus operational emissions associated with the use of fuel and energy inputs in field operations, harvesting and processing (estimated here using the approach described in Josling *et al.*, 2017), minus carbon sequestered.

Over the period of interest and among PSE commodities, poultry meat had the highest production value (19% of the total value of agricultural production) and benefited from the highest level of support (average SCT of 58.7%), which was exclusively provided in the form of price support. However, it represented only 0.3% of GHG field emissions. Sugar, which was implicitly taxed during the period of interest (average SCT of -5.8%), represented the second largest commodity both in terms of production value (16.9%) and GHG field emissions (13.1%). Its ACE, however, was negative (-1.53%) thanks to sugarcane's ability to sequester carbon. Beef represented Belize's largest commodity in terms of GHG field emissions (43.5%) despite accounting for only 2.5% of its total value of agricultural production and receiving no support.

Overall, most policy support (87.5%) was concentrated in four commodities (poultry meat, bananas, rice and pigmeat), which only represented a small fraction of Belize's GHG field emissions (4.26%) and ACE (4.36%).

TABLE 18: AVERAGE SUPPORT AND EMISSIONS FROM PSE COMMODITIES, 2015-2022

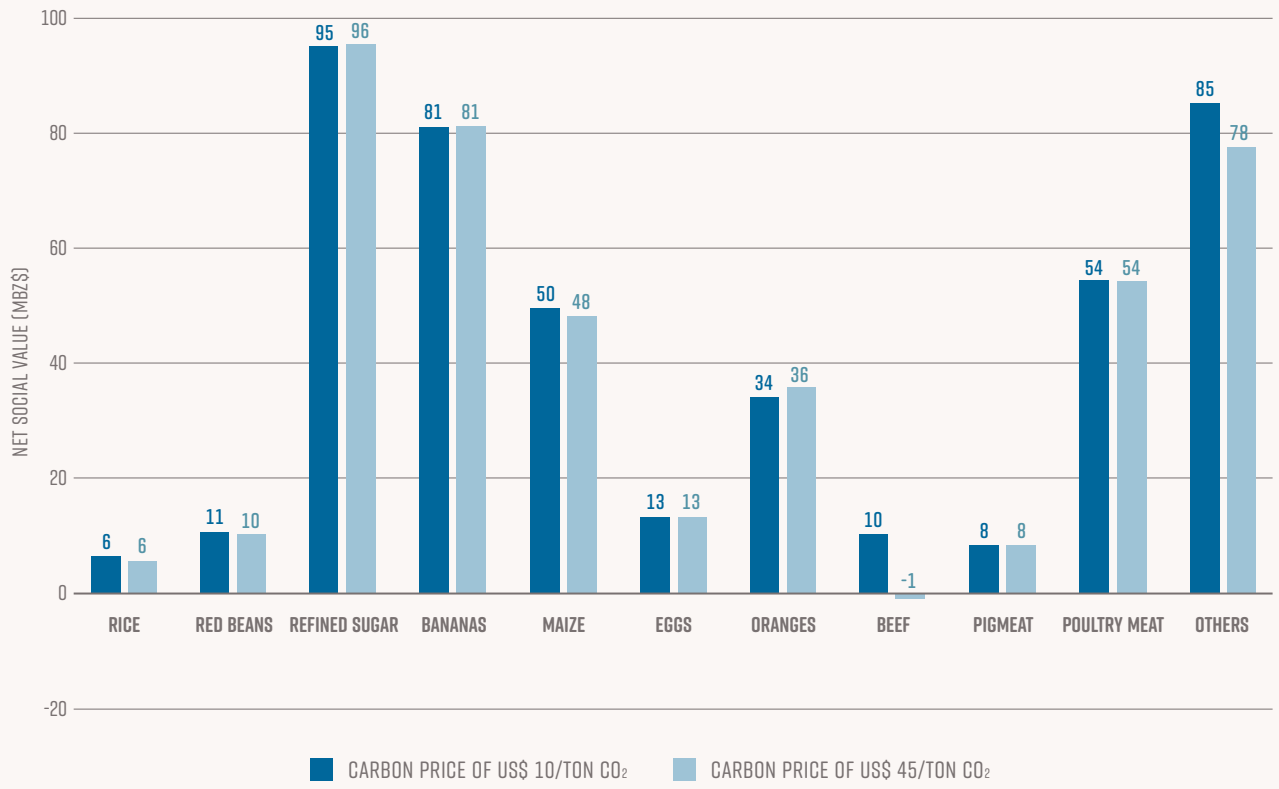
COMMODITY	VALUE OF PRODUCTION (VOP)	SINGLE COMMODITY TRANSFERS (SCT)	GREENHOUSE GAS FIELD EMISSIONS	AGRICULTURAL CARBON EMISSIONS (ACE)
RICE	2.8%	10.4%	2.8%	3.8%
RED BEANS	2.1%	0.7%	1.5%	2.0%
REFINED SUGAR	16.9%	-5.8%	13.1%	-1.5%
BANANAS	16.9%	11.4%	0.7%	-0.4%
MAIZE	9.4%	0.0%	5.1%	8.0%
EGGS	2.5%	0.0%	0.0%	0.1%
ORANGES	6.3%	0.0%	2.7%	-8.7%
BEEF	2.5%	0.0%	43.5%	56.9%
PIGMEAT	2.6%	7.0%	0.4%	0.5%
POULTRY MEAT	19.0%	58.7%	0.3%	0.4%
OTHERS	19.0%	17.6%	29.8%	38.9%
TOTAL	100.0%	100.0%	100.0%	100.0%

Source: Author's own calculations using data from Belize's Fourth National Communication to the UNFCCC (2022).

The Net Social Value (NSV) represents the total production value net of the cost of carbon emissions (ACE) and transfers from agricultural policies (SCT). If producers had to pay for the GHG emissions associated with the commodities they produce and were not receiving any policy transfers, the total production value would equal the NSV.

In **Figure 27**, the NSV is computed for PSE commodities using two distinct carbon prices (10 US$/t $CO_{d\ eq}$ and 45 US$/t $CO_{d\ eq}$). At the US$ 10 price, sugar exhibited the highest NSV (BZ$95 million), followed by bananas (BZ$81 million), poultry meat (BZ$54 million) and maize (BZ$50 million). With the US$ 45 price, the landscape did not shift except for beef, whose NSV turned negative due to its elevated emission costs.

FIGURE 27: AVERAGE NET SOCIAL VALUE FOR DIFFERENT CARBON PRICES IN MILLION BZ$, 2015-2022



Source: Author's own calculations using data from Belize's Fourth National Communication to the UNFCCC (2022).

In **Table 19**, the column "VoP-SCT/ACE" calculates the ratio of production value, net of policy transfers, to its environmental cost (ACE). This ratio indicates how much social value is generated per unit of environmental costs.[7] Eggs, poultry meat and pigmeat exhibited the highest ratios, signifying their greater social value relative to environmental costs. Conversely, beef and rice had the lowest ones. Using a price of carbon of US$ 45 per t, for instance, the social value of producing eggs exceeded its ACE by over 841 times, while for beef, it approached zero.

7. Ratios for sugar, bananas and oranges were not calculated because of their negative ACEs.

TABLE 19: AVERAGE GHG AND ACE PER UNIT OF COMMODITY, 2015-2022

COMMODITY	GHG EMISSIONS	ACE				ACE / VOP		VOP-SCT/ACE	
	$T CO_{2EQ}/HA$	MBZ$		BZ$/HA		%		RATIO	
		10 US$/ $T CO_{D EQ}$	45 US$/ $T CO_{D EQ}$	10 US$/ $T CO_{D EQ}$	45 US$/ $T CO_{D EQ}$	10 US$/ $T CO_{D EQ}$	45 US$/ $T CO_{D EQ}$	10 US$/ $T CO_{D EQ}$	45 US$/ $T CO_{D EQ}$
RICE	3.47	0.21	0.95	69.39	312.26	1.40%	6.29%	31.79	7.06
RED BEANS	0.87	0.11	0.51	17.43	78.45	0.99%	4.47%	95.46	21.21
REFINED SUGAR	1.62	(0.09)	(0.39)	(2.33)	(10.48)	(0.09%)	(0.43%)	–	–
BANANAS	1.65	(0.02)	(0.09)	(6.97)	(31.37)	(0.02%)	(0.10%)	–	–
MAIZE	1.03	0.45	2.02	20.51	92.31	0.89%	4.01%	112.13	24.92
EGGS	N/A	0.00	0.02	N/A	N/A	0.03%	0.12%	3,786.14	841.36
ORANGES	1.19	(0.49)	(2.20)	(42.47)	(191.12)	(1.45%)	(6.52%)	–	–
BEEF	75.04	3.19	14.36	1,500.83	6,753.75	23.57%	106.05%	4.23	0.94
PIGMEAT	N/A	0.03	0.14	N/A	N/A	0.22%	0.97%	276.50	61.44
POULTRY MEAT	N/A	0.02	0.11	N/A	N/A	0.02%	0.11%	2,210.77	491.28
OTHERS	5.87	2.18	9.82	117.43	528.42	2.15%	9.66%	40.10	8.91

Source: Author's own calculations using data from Belize's Fourth National Communication to the UNFCCC (2022).

The main objective of this analysis was to gauge how policy transfers influenced GHG emissions in Belize. As illustrated in **Table 18**, the bulk of policy support in Belize was directed towards poultry meat production, accounting for 59% of total support on average between 2015 and 2022. Bananas (11%), rice (10%) and pigmeat (7%) also received some level of support. As indicated in **Table 19**, these commodities emitted relatively low levels of GHGs. In sum, agricultural policy transfers in Belize over the period 2015-2022 did not contradict GHG mitigation efforts. Instead, these transfers were primarily allocated to four commodities the production processes of which were not environmentally inefficient.

6. CONCLUSIONS AND POLICY RECOMMENDATIONS

Between 2015 and 2022, agriculture remained a cornerstone of Belize's economy, employing 17% of the labor force and contributing an average of 8.4% to GDP. Poultry meat emerged as the leading contributor to the agricultural sector, accounting for 19.2% of its total value, followed by bananas at 17.0% and refined sugar at 16.8%. **The Total Support Estimate (TSE) for agriculture averaged 2% of Belize's GDP, a significant ratio within the Latin America and Caribbean (LAC) region. Market Price Support (MPS) dominated Belize's agricultural policy, constituting an average of 94% of the total Producer Support Estimate (PSE) from 2015 to 2022.** MPS support was concentrated on poultry meat (62%), rice (11%),

pigmeat (7%) and bananas (6%). Until 2019/2020, the banana industry also received extensive budget transfers through the EU-funded Banana Accompanying Measures. Conversely, sugar, Belize's largest commodity export, experienced negative policy support, with an average Single Commodity Transfer (SCT) of -5.7%. Meanwhile, the General Services Support Estimate (GSSE) declined notably, dropping from 26.8% of TSE in 2015 to 4.7% in 2022, primarily due to the end of the EU-funded Sugar Accompanying Measures.

In the fisheries sector, which contributed nearly 2% to Belize's GDP in 2022, the expansion of wild capture fisheries, especially spiny lobster and queen conch, offset the collapse of farmed white shrimp production and exports following the 2014 EMS outbreak. **Support to fisheries was positive, with the Fisheries Support Estimate (FSE) averaging 5.9% of total landings between 2015 and 2022** —higher than Mexico (3.2%) but significantly lower than Colombia (53.9%) and Costa Rica (87.1%). The support was given primarily through budgetary transfers to fishers collectively (GSSE), comprising 98% of the FSE, including enforcement, training, regulation and research conducted by the Belize Fisheries Department.

Regarding greenhouse gas (GHG) emissions, policy transfers were not linked to increased emissions. Commodities receiving the most support, such as poultry meat, bananas, rice and pigmeat, were associated with relatively low GHG emissions. In contrast, beef, the largest contributor to GHG emissions (43.5%), did not receive any support.

THE TOTAL SUPPORT ESTIMATE (TSE) FOR AGRICULTURE AVERAGED 2% OF BELIZE'S GDP, A SIGNIFICANT RATIO WITHIN THE LATIN AMERICA AND CARIBBEAN (LAC) REGION

POLICY RECOMMENDATIONS

1. DECREASE RELIANCE ON MPS:

Belize's agriculture is predominantly export-oriented, and high tariffs no longer play a significant role in market protection for most products. However, in some sectors, commercial protection remains important, with import restrictions such as permits, licenses, duties and price controls disproportionately impacting domestic consumers via domestic prices. Over-reliance on these measures could also hinder the long-term efficiency of the industries they aim to support. Therefore, gradual and carefully managed trade liberalization could reduce transfers from consumers to producers while considering the social and economic impacts on affected stakeholders.

2. INVEST IN LESS DISTORTIVE FORMS OF SUPPORT:

Redirecting support towards GSSE could help address yield gaps in commodities like sugar, bananas and oranges, as well as challenges in aquaculture. Investments in research and development (R&D), extension services, agricultural health (particularly for poultry), and physical infrastructure (e.g., roads, irrigation) would likely reduce production costs and enhance competitiveness. With the end of EU-funded general services programs, financing services that create an enabling environment for agriculture should become a priority for national policymakers and international development partners. Evidence suggests that support for general services contributes more to long-term growth and competitiveness in agriculture compared to MPS. A 2016 study in the LAC region estimated that reallocating 10% of the agricultural budget from private goods (transfers to individual producers) to public goods (general services) could increase value added per capita by 5%, while maintaining the same total level of spending. Achieving the same increase without changing budget allocations would require a 25% or greater increase in total spending (Anriquez *et al.*, 2016).

A 2016 STUDY IN THE LAC REGION ESTIMATED THAT REALLOCATING 10% OF THE AGRICULTURAL BUDGET FROM PRIVATE GOODS (TRANSFERS TO INDIVIDUAL PRODUCERS) TO PUBLIC GOODS (GENERAL SERVICES) COULD INCREASE VALUE ADDED PER CAPITA BY 5%, WHILE MAINTAINING THE SAME TOTAL LEVEL OF SPENDING

3. ENHANCE AGRICULTURAL DATA COLLECTION, DISSEMINATION AND POLICY EVALUATION:

Improving the collection and dissemination of agricultural statistics is essential for effective policy monitoring and analysis. Enhancing tools like the PSE and FSE and analyzing GHG emissions associated with agricultural policies could provide valuable inputs for evidence-based policymaking. Additionally, rigorous impact evaluation of current policy initiatives would increase the availability of scientific evidence to inform future policy decisions.

4. STRENGTHEN CLIMATE CHANGE RESILIENCE:

Given that Belize is highly vulnerable to the effects of climate change, particularly in its agricultural sector, which faces increased exposure to droughts, floodings and hurricanes, it is key to strengthen the country's climate resilience. By implementing comprehensive adaptation and mitigation strategies, policymakers could support the agricultural sector to effectively respond to these challenges and safeguard its long-term sustainability.

REFERENCES

- **Anriquez, G., W. Foster, J. Ortega, C. Falconi and C. P. De Salvo. (2016).** *Public Expenditures and the Performance of Latin American and Caribbean Agriculture.* IDB Working Paper Series Nº IDB-WP-722.
- **Belize Customs and Excise. (January 2023).** *Tariff and Trade Classification.* https://www.customs.gov.bz/ttpg.html
- **Belize Marketing and Development Corporation. (n.d.).** *Big Falls Rice Mill.* Retrieved 2024. https://bmdc.bz/big-falls-rice-mill/
- **Daly, J. (2018).** *Personal Communication.* Ministry of Trade, Investment and Commerce.
- **Daly, J. and K. Fernandez-Stark. (2018).** *Belize in the Shrimp Global Value Chain.* Duke Global Value Chains Center.
- **Food and Agricultural Organization. (2016).** *The State of World Fisheries and Aquaculture 2016. Contributing to food security and nutrition for all.* Food and Agricultural Organization.
- **Food and Agricultural Organization, European Union and Centre de Coopération Internationale en Recherche Agronomique pour le Développement. (2022).** *Food Systems Profile – Belize. Catalysing the sustainable and inclusive transformation of food systems.* https://doi.org/10.4060/cc0072en
- **Food and Agricultural Organization. (2024).** *Belize. National Aquaculture Sector Overview Fact Sheets.* Retrieved from National Aquaculture Sector Overview: https://firms.fao.org/fi/website/FIRetrieveAction.do?dom=countrysector&xml=naso_belize.xml&lang=en#tcN9002A
- **Foster, W., A. Valdés, P. Martel and C. P. De Salvo. (2017).** *Analysis of Agricultural Policies in Belize.* Inter-American Development Bank.
- **Guzmán Hidalgo, J. C. (2021).** *Belize Agri Food Value Chains.*
- **Inter-American Development Bank. (n.d.).** *Agricultural Policies Monitoring System.* Retrieved 2024. https://agrimonitor.iadb.org/
- **Josling, T., G Alleng, C. P. De Salvo, R. Boyce, A. Mills and S. Valero. (2017).** *Agricultural Policy and Greenhouse Gas Emissions in Jamaica.* IDB Agricultural Policy Report.
- **Ministry of Agriculture (2015).** *National Agriculture and Food Policy of Belize: 2015 to 2030.* https://www.agriculture.gov.bz/wp-content/uploads/2017/05/National-Agriculture-and-Food-Policy-of-Belize-2015-2030.pdf
- **Ministry of Economic Development. (2016).** *Belize 2016-2019 Growth and Sustainable Development Strategy.* https://observatorioplanificacion.cepal.org/sites/default/files/plan/files/BelizeGSDS.pdf
- **Ministry of Agriculture, Food Security and Enterprise (2021).** *Annual General Meeting 2021 Report.* https://www.agriculture.gov.bz/wp-content/uploads/2023/01/AGM-Report-2021.pdf

- **National Climate Change Office. (2022).** *Belize's Fourth National Communication to the United Nations Framework Convention on Climate Change.* Ministry of Sustainable Development, Climate Change and Disaster Risk Management.

- **OECD. (2016).** *OECD's Producer Support Estimate and Related Indicators of Agricultural Support: Concepts, Calculations, Interpretation and Use (The PSE Manual).* Organization for Economic Co-operation and Development.

- **OECD. (2024).** *Fisheries Support Estimate Manual.* Organization for Economic Co-operation and Development.

- **Perez A. and O. D. Garcia. (2012).** *Socioeconomic assessment of the sea cucumber fishery in Belize.* In collaboration with the Belize Fisheries Department. University of Belize Environmental Research Institute.

- **Sugar Industry Research and Development Institute. (October 2014).** *Sugar Industry News 3,1-8.* https://www.sirdi.bz/wp-content/uploads/2014/10/Industry-Newsletter-Volume-3-English.pdf

- **United States Department of Agriculture Foreign Agricultural Service. (2019).** *Belize Agricultural Brief.* Global Agricultural Information Network Report 1901,1-3. https://apps.fas.usda.gov/newgainapi/api/report/downloadreportbyfilename?filename=Belize%20Agricultural%20Brief_Belize%20City_Belize_5-3-2019.pdf

- **UN Department of Economic and Social Affairs. (n.d.).** *UN COMTRADE Database.* Retrieved 2024. https://comtradeplus.un.org/

- **World Bank. (2024).** *Climate Change Knowledge Portal for Development Practitioners and Policy Makers.* https://climateknowledgeportal.worldbank.org/country/belize/vulnerability#:~:text=Belize%20is%20also%20at%20risk,167%20countries%20for%20climate%20risk

- **WTO. (2004).** *Trade Policies and Practices by Measure. In Trade Policy Review. Belize.* Report by the Secretariat. https://docs.wto.org/dol2fe/Pages/SS/directdoc.aspx?filename=q:/WT/TPR/S134-3.pdf&Open=True

- **WTO, ITC and UNCTAD. (2024).** *World Tariff Profiles 2024.* https://www.wto.org/english/res_e/booksp_e/world_tariff_profiles24_e.pdf

ANNEXES

ANNEX 1: MAIN PROGRAMS AND PROJECTS SUPPORTING AGRICULTURE

PROJECT NAME	TIMELINE	EXECUTING ENTITY	FUNDING	DESCRIPTION
AVIAN INFLUENZA EMERGENCY PREPAREDNESS AND RESPONSE POLICY PLAN	Started in 2022	Ministry of Agriculture, Food Security and Enterprise	Domestically financed expenditure (Capital II)	Review and update the Avian Influenza Emergency Preparedness and Response Policy Plan to be prepared in the event of an incursion of Avian Influenza into Belize.
HURRICANE EARL RELIEF PROGRAM	2016-2018	Ministry of Agriculture, Food Security and Enterprise	Domestically financed expenditure (Capital II)	Relief program.
INFLUENZA A-H1N1 VIRUS	Ended in 2015	Ministry of Agriculture, Food Security and Enterprise	Domestically financed expenditure (Capital II)	—
SCHOOL FEEDING & NUTRITION PROGRAM	N/A (continuous)	Ministry of Agriculture, Food Security and Enterprise	Domestically financed expenditure (Capital II)	This feeding program comes through the collaboration of the Governments of Belize and Mexico and the Food and Agriculture Organization of the United Nations (FAO), as part of a program where 488 primary school students are receiving a free, healthy meal daily.
SUPPORT TO FARMER (DISASTER RISK RECOVERY)	Started in 2019	Ministry of Agriculture, Food Security and Enterprise	Domestically and foreign financed (CDB) expenditure (Capital II and III)	Disaster risk recovery.
BELIZE RURAL DEVELOPMENT PROJECT II	Started in 2013	Ministry of Agriculture, Food Security and Enterprise	Domestically and foreign financed (EU) expenditure (Capital II and III)	Promote economic growth and reduce the incidence of poverty in the rural communities of Belize
RESILIENT RURAL BELIZE	2019-2026	Ministry of Agriculture, Food Security and Enterprise	Domestically and foreign financed (IFAD, CDB and GCF) expenditure (Capital II and III)	The project will increase resilience of smallholder farmers in Belize to climate change impacts that have negative consequences on agricultural yields of important commodities for the country (budget: US$ 25 million)
BANANA ACCOMPANYING MEASURES	Ended in 2019/20	Ministry of Agriculture, Food Security and Enterprise	Foreign financed (EU) expenditure (Capital III)	Help Belize's banana industry become competitive in global markets, in context of end of EU preferential tariffs and quotas for ACP (Africa, the Caribbean and Pacific) countries (including Belize) banana by 2017
SUGAR ACCOMPANYING MEASURES	2008-2018	Ministry of Agriculture, Food Security and Enterprise	Foreign financed (EU) expenditure (Capital III)	Help Belize's sugar industry become competitive in global markets, in context of end of EU preferential tariffs and quotas for ACP (Africa, the Caribbean and Pacific) countries (including Belize) sugar by 2017
AGRICULTURE SERVICES PROGRAM	2009-2015	Ministry of Agriculture, Food Security and Enterprise	Foreign financed (IDB) expenditure (Capital III)	The Program objective is to strengthen the core public agricultural services that provide access to applied production technology corresponding to market opportunities, while reducing the risks derived from threats to plant and animal health and food safety. This in turn will contribute to the broader goal to enhance the competitive productive base upon which Belizeans can increase their incomes (budget: US$ 5.5 million)

Source: Ministry of Finance (Approved Estimates of Revenue and Expenditure).

ANNEXES

ANNEX 2: MAIN PROGRAMS AND PROJECTS SUPPORTING FISHERIES

PROJECT NAME	TIMELINE	EXECUTING ENTITY	FUNDING	DESCRIPTION
EXPANDING SMALL SCALE FISH FARMING FOR RURAL COMMUNITIES	Started in 2021/22	Ministry of Agriculture, Food Security and Enterprise	Domestically financed expenditure (Capital II)	*Detailed information about this project was not found.*
INSTITUTIONAL STRENGTHENING	Started in 2020/21	Belize Fisheries Department (Ministry of the Blue Economy and Civil Aviation)	Domestically financed expenditure (Capital II)	*Detailed information about this project was not found.*
SUSTAINABLE DEVELOPMENT OF BELIZE'S FISHERY RESOURCES	Started in 2019/20	Belize Fisheries Department (Ministry of the Blue Economy and Civil Aviation)	Domestically financed expenditure (Capital II)	To support and develop an enabling environment for expansion of Managed Access, and to continue to provide oversight for the successful national implementation of the Managed Access Program.
CONSERVATION COMPLIANCE UNIT	N/A (continuous)	Since 2021/22: Belize Fisheries Department (Ministry of the Blue Economy and Civil Aviation)	Domestically financed expenditure (Capital II)	The Belize Fisheries Department's unit responsible for the enforcement of fisheries regulations, the issuance of registration and licenses, and community education.
CONSERVATION COMPLIANCE UNIT	N/A (continuous)	Since 2021/22: Belize Fisheries Department (Ministry of the Blue Economy and Civil Aviation)	Domestically financed expenditure (Capital II)	The Belize Fisheries Department's unit responsible for the enforcement of fisheries regulations, the issuance of registration and licenses, and community education.

Source: Ministry of Finance (Approved Estimates of Revenue and Expenditure).

ANNEXES

ANNEX 3: PSE METHOD DEFINITIONS

All definitions follow OECD (2016).

Producer Support Estimate (PSE): the annual monetary value of gross transfers from consumers and taxpayers to agricultural producers, measured at the farm-gate level, arising from policy measures that support agriculture, regardless of their nature, objectives or impacts on farm production or income.

Percentage PSE (PSE%): PSE as a share of gross farm receipts.

General Services Support Estimate (GSSE): the annual monetary value of gross transfers to general services provided to agricultural producers collectively (such as research, development, training, inspection, marketing and promotion), arising from policy measures that create enabling conditions for the primary agricultural sector through development of private or public services, institutions and infrastructure, regardless of their objectives and impacts on farm production and income, or consumption of farm products. The GSSE does not include transfers to individual producers.

Consumer Support Estimate (CSE): the annual monetary value of gross transfers from (to) consumers of agricultural commodities, measured at the farm gate level, arising from policy measures that support agriculture, regardless of their nature, objectives or impacts on consumption of farm products.

Percentage CSE (CSE%): CSE as a share of consumption expenditure (measured at farm gate) net of taxpayer transfers to consumers.

Total Support Estimate (TSE): the annual monetary value of all gross transfers from taxpayers and consumers arising from policy measures that support agriculture, net of associated budgetary receipts, regardless of their objectives and impacts on farm production and income, or consumption of farm products.

Percentage TSE (TSE%): TSE as a share of GDP.

Single Commodity Transfers (SCT): the annual monetary value of gross transfers from consumers and taxpayers to agricultural producers, measured at the farm gate level, arising from policies linked to the production of a single commodity such that the producer must produce the designated commodity in order to receive the transfer.

Percentage Single Commodity Transfers (SCT%): the commodity SCT as a share of gross farm receipts for the specific commodity.

Reference price: is the price that domestic producers could have received for their products in the absence of any domestic or trade policy affecting the commodity's market. Border prices of imports or exports are often used as reference prices. Another option is to use specific border prices in neighbouring countries or in countries that play a major role in international trade in that commodity, or prices on securities exchanges.

Reference price and producer's price for MPS calculations: must be measured at the same level of processing and at the same market. Therefore, reference prices (border prices) must be adjusted for marketing margins to make them comparable to farm-gate producer prices. The adjustment is made for the cost of processing, handling and transportation to the market where domestically produced commodity encounters the commodity from the foreign market.

Price adjustment for imported commodity:

CIF price + costs of transporting the product from the border to the internal wholesale market (T1) = price of imports at domestic market level – cost of transporting the product from the wholesale market to the farm gate (T2) – costs of processing farm product into imported product (S) = price of imports in farm gate equivalent.

Price adjustment for exported product:

FOBprice – handling and transportation costs between border and domestic wholesale market (T1) – handling and transportation costs between wholesale market and the farm gate (T2) – costs of processing of farm product into exported product (S) = price of exports adjusted to the farm gate level.

Budget Transfers (BTs): for calculating coefficients of support estimation can exist in the form of transfers to producers, financing of general services, or transfers to consumers. Thus, all budget transfers need to distinguish between PSE, CSE and GSSE.

PSE categories: indicate the way the policy program is implemented by indicating the base on which the transfer or subsidy is calculated, such as value of production, number of animals, input use, services provided, income, or non-commodity criteria **(Table A)**.

Budget transfers to fund general services have been separated from PSE and have instead been calculated as a separate indicator since 1998: **General Services Support Estimate (GSSE)** **(Table B)**. In 2014, the OECD changed its method for estimating GSSE.

TABLE A: CLASSIFICATION OF BUDGET TRANSFERS IN PSE, ACCORDING TO OECD METHOD

CATEGORIES	
A.	SUPPORT BASED ON COMMODITY OUTPUTS
	A.1. MARKET PRICE SUPPORT
	A.2. PAYMENTS BASED ON OUTPUT
B.	PAYMENTS BASED ON INPUT USE
	B.1. VARIABLE INPUT USE
	B.2. FIXED CAPITAL FORMATION
	B.3. ON-FARM SERVICES
C.	PAYMENTS BASED ON CURRENT A (AREA) / AN (ANIMAL NUMBER) / R (RECEIPTS) / I (INCOME), PRODUCTION REQUIRED
	C.1. BASED ON CURRENT RECEIPTS/INCOME
	C.2. BASED ON CURRENT AREA/ANIMAL NUMBER
D.	PAYMENTS BASED ON NON-CURRENT A/AN/R/I, PRODUCTION REQUIRED
E.	PAYMENTS BASED ON NON-CURRENT A/AN/R/I, PRODUCTION NOT REQUIRED
	E.1. VARIABLE RATES (VARY WITH RESPECT TO LEVELS OF CURRENT OUTPUT OR INPUT PRICES, OR PRODUCTION/YIELDS AND/OR AREA)
	E.2. FIXED RATES
F.	PAYMENTS BASED ON NON-COMMODITY CRITERIA
	F.1. LONG-TERM RESOURCE RETIREMENT
	F.2. SPECIFIC NON-COMMODITY OUTPUT
	F.3. OTHER NON-COMMODITY CRITERIA
G.	MISCELLANEOUS PAYMENTS

Source: OECD, 2016.

TABLE B: CLASSIFICATION OF GSSE BUDGET TRANSFERS, ACCORDING TO OECD METHOD

GENERAL SERVICES SUPPORT ESTIMATE (GSSE)	
H.	AGRICULTURAL KNOWLEDGE AND INNOVATION SYSTEM
	H.1. AGRICULTURAL KNOWLEDGE GENERATION
	H.2. AGRICULTURAL KNOWLEDGE TRANSFER
I.	INSPECTION AND CONTROL
	I.1. AGRICULTURAL PRODUCT SAFETY AND INSPECTION
	I.2. PEST AND DISEASE INSPECTION AND CONTROL
	I.3. INPUT CONTROL
J.	DEVELOPMENT AND MAINTENANCE OF INFRASTRUCTURE
	J.1. HYDROLOGICAL INFRASTRUCTURE
	J.2. STORAGE, MARKETING AND OTHER PHYSICAL INFRASTRUCTURE
	J.3. INSTITUTIONAL INFRASTRUCTURE
	J.4. FARM RESTRUCTURING
K.	MARKETING AND PROMOTION
	K.1. COLLECTIVE SCHEMES FOR PROCESSING AND MARKETING
	K.2. PROMOTION OF AGRICULTURAL PRODUCTS
L.	COST OF PUBLIC STOCKHOLDING
M.	MISCELLANEOUS

Source: OECD, 2016.


IDB