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ANALYSIS OF
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GREENHOUSE GASES
EMISSIONS IN SURINAME

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ANALYSIS OF AGRICULTURAL & FISHERY POLICIES AND AGRICULTURE-RELATED GREENHOUSE GASES EMISSIONS IN SURINAME

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ABSTRACT

The agriculture and fisheries sectors account for 9 percent of Suriname's GDP. Transition to a modern and innovative agri-food system is among the goals of Suriname's government. Suriname's agricultural policies include a combination of trade regulations, budget support, and direct participation in agricultural production by the state-owned companies. In 2016-2018, high inflation and currency depreciation impacted agricultural producers and consumers, while the budget funds for support to agriculture were substantially cut. In 2018, the annual value of support to individual producers in Suriname was SRD \$267 million, or 16% of total farm receipts. This figure reflects strong market price support to livestock producers at the expense of consumers, while rice producers receive disincentives due to agricultural policies. Between 2015 and 2018, support to general services for agriculture, the most efficient way to promote innovative development, decreased from 44% to only 6% of the total support to the agricultural sector. The fisheries sector was mainly supported through the fuel tax concessions. The amount of the general services support to fisheries was less than the cost of the fishing licenses. While agriculture contributes 19% to the Suriname's greenhouse gas emissions, the study found that agricultural policies do not favour climate-affecting activities in agriculture.

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ACRONYMS

ACE	Agricultural Carbon Equivalent
ACP	African, Caribbean, and Pacific group of States
AKF	Agricultural Credit Fund
ADRON	Anne van Dijk Rice Research Centre
CBvS	Central Bank of Suriname
CARICOM	Caribbean Community and Common Market
CELOS	Center for Agricultural Research in Suriname
CEVIHAS	Centrale Visaanvoer Haven Suriname
CIF	Cost, Insurance and Freight
CO₂E	Carbon Dioxide Equivalent
CR	Cost-Recovery charges
CSE	Consumer Support Estimate
ERP	Effective Rate of Protection
FAI	Food and Agriculture Industries NV
FAO	Food and Agriculture Organization of the United Nations
FOB	Free on Board
FSE	Fisheries Support Estimate
GDP	Gross Domestic Product
GNI	Gross National Income
GHG	Greenhouse Gases
GSSE	General Services Support Estimate
IAP	Innovative Agro-Processing Industries NV
IDB	Inter-American Development Bank
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
LVV	Ministry of Agriculture, Livestock and Fisheries, Suriname
MCP	Melk Centrale Paramaribo NV
MPS	Market Price Support
MSC	Marine Stewardship Council

- NSV** | Net Social Value
- OECD** | Organisation for Economic Cooperation and Development
- PCST** | Producer Commodity Specific Transfers
- PSE** | Producer Support Estimate
- SBA** | IMF Stand By Agreement
- SBBS** | Foundation for Conservation of Banana Production in Suriname
- SCT** | Single Commodity Transfers
- SRD** | Surinamese Dollars
- TIF** | Transfers to Individual Fishers
- TFC** | Tax Fuel Concessions
- TSE** | Total Support Estimate
- UN** | United Nations
- UNFCCC** | United Nations Framework Convention on Climate Change
- VKI** | Fish Inspection Institute
- VMS** | Vessel Monitoring System
- VoP** | Value of Production, or Production Value
- VSMB** | Association of Surinamese Milk Farmers
- WEF** | World Economic Forum
- WTO** | World Trade Organization

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INTRODUCTION

In 2016, the Inter-American Development Bank (IDB) conducted a study on government policy support to the agricultural sector in Suriname, based on the OECD's Producer Support Estimate (PSE) Methodology. Covering the period from 2012 to 2014, the study examined how Suriname's agri-food sector was impacted by government policy affecting producer prices and budget transfers to individual producers, as well as transfers to general services across the sector. The following report provides an updated analysis of the impact of Suriname's public policy framework on its agri-food sector, covering the period 2015-2018. Significantly, this report details the first Fishery Support Estimate (FSE) conducted in Suriname, using the OECD's FSE methodology. The FSE measures government policy support to Suriname's fisheries sector, and includes both explicit transfers and the effect of tax concessions for the sector. Finally, the study analyzed the relationship between Suriname's policy incentives and its agriculture sector's impact on climate change. The study applied the IDB-Josling methodology to compare transfers to agricultural commodities, measured by PSE, with the monetary estimate of greenhouse gas (GHG) emissions from agriculture.

**THE FOLLOWING REPORT
PROVIDES AN UPDATED
ANALYSIS OF THE IMPACT
OF SURINAME'S PUBLIC
POLICY FRAMEWORK
ON ITS AGRI-FOOD SECTOR,
COVERING THE PERIOD
2015-2018**

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1. OVERVIEW OF AGRICULTURE, LIVESTOCK AND FISHERY IN SURINAME



1.1. OVERVIEW OF SURINAME'S ECONOMY

Suriname is a middle-income country located on the Northeast coast of South America. The country has a largely open economy, and sizeable public sector, but is heavily dependent on natural resources. Oil, bauxite, and gold form the backbone of Suriname's economy, while in 2018, the agricultural sector accounted for a 9% share of the country's GDP, a 7% share of total employment, and a 3.7% share of export value (or foreign currency generation). Suriname's dependency on natural resources, and the lack of diversity in its economy, has left the country particularly vulnerable to external economic shocks.

A study of Suriname's economy over the last three decades highlights this vulnerability. After a period of highly volatile growth and near hyperinflation in the 1990s, Suriname's economy stabilized. GDP growth rates averaged 4.1% between 2006 and 2012, gradually slowing to 0.3% in 2014, before contracting by 5.6% in 2016, and recovering afterwards (Table 1).

In 2015, falling international prices on Suriname's key export commodities forced Suriname into recession. The country's alumina refinery closed, and Suriname was faced with significant fiscal and trade deficits.

Due to depreciation of the Surinamese dollar, the inflation rate peaked in 2016 at 55%, before dropping again to 6.8% in 2018, see Table 1. High inflation and an unstable currency impacted consumers heavily, as Suriname is dependent on imports for many basic commodities. Depreciation of the national currency did however, lead to an increase in the value of exports in 2017.

TABLE 1: KEY INDICATORS, SURINAME, 2014-2018

ECONOMIC INDICATORS	UNIT	2014	2015	2016	2017	2018
GDP, PPP	BILLION USD	8.61	9.28	8.76	8.91	9.08
GNI PER CAPITA	SRD	30,831.38	29,174.18	33,719.79	35,103.37	41,462.71
REAL GDP GROWTH RATE	%	0.26	-3.41	-5.56	1.69	1.90
EXPORT OF GOODS AND SERVICES	BILLION USD	2.35	1.84	1.61	2.17	2.27
POPULATION	000 PERSONS	553	559	565	570	576
AGRICULTURAL INDICATORS	UNIT	2014	2015	2016	2017	2018
RICE SHARE IN VALUE OF EXPORTS	%	2.4	2.0	2.6	1.3	0.94
BANANAS SHARE IN VALUE OF EXPORTS	%	3.7	4.3	3.3	1.9	1.91
FISH AND PROCESSED PRODUCTS SHARE IN VALUE OF EXPORTS	%	5.15	8.27	5.40	4.50	3.73
AGRICULTURE, FORESTRY AND FISHING (% OF GDP)	%	9.4	9.3	9.9	12.6	9.0
MANUFACTURING (% OF GDP)	%	16.4	9.9	13.3	14.6	15.3
RICE PRODUCTION	000 TONS	276	276	278	289	274
MONETARY INDICATORS	UNIT	2014	2015	2016	2017	2018
INFLATION (YEAR AVERAGE)	%	3.4	6.9	55.5	22	6.8
OFFICIAL EXCHANGE RATE	SRD/USD	3.30	3.47	6.29	7.40	7.40
GOVERNMENT DEBT (% OF GDP)	%	26.58	42.87	57.33	86.9	81.4

Source: World Development Indicators; Central Bank of Suriname. 2020.;
Bureau of Statistics, Government of Suriname. 2019.

In 2016, the government embarked on a two-year IMF stand-by arrangement (SBA)¹. Under the SBA, the IMF provided Suriname with USD \$478 million of assistance, paid over a 24-month period. This assistance was meant to: (a) finance fiscal reforms, including the phasing out of electricity subsidies, wage restraints for the public sector, and increases in fuel taxes, (b) increase social cash transfers to soften the negative impacts of adjustments for low-income households, (c) enable a transition to a floating exchange rate system to increase foreign currency reserves and mitigate inflation, and lastly (d) implement structural reforms to improve the business environment, and enhance the productivity and competitiveness of the agricultural sector². The agreement with the IMF was then cancelled, as few reforms were executed.

The IMF country report for December 2019 applauded the decreasing inflation rate, but called for urgently needed fiscal reforms and an increase in the credibility of the monetary framework³. Gross debt is expected to grow from 56.2% of GDP in 2018, to 67.9% in 2020.

TABLE 2: INVESTMENT MEASURES OF STABILISATION AND RECOVERY PLAN, RESULTS 2019

MEASURES	ACTIONS
TRANSFORMING THE COMPANY REGISTRATION AND LICENSING REGULATIONS TO IMPROVE THE INVESTMENT CLIMATE	IN PROGRESS, A DEVELOPMENT PLAN FORMULATED, SOME TRANSACTION FACILITATING LAWS ADOPTED
INVESTMENT IN GROWTH AND DIVERSIFICATION OF EXPORT IN AGRO-PROCESSING, WOOD PROCESSING AND FISHERIES	NO SIGNIFICANT ACTIONS ON AGRICULTURE AND FISHERIES
DEVELOPMENT OF THE LIVESTOCK SECTOR	NO BUDGET ATTRIBUTED IN THE LAST 3 YEARS
REHABILITATION AND RESTRUCTURATION OF STATE COMPANY ALLIANCE (CITRUS PRODUCTION)	NO RESTRUCTURATION DONE BECAUSE OF LACK OF BUDGET
REHABILITATION OF WAGENINGEN PUMPING STATION	EXECUTED BY LVV BUDGET
DEVELOPMENT OF COCOA PRODUCTION	NO ACTIONS TAKEN
DEVELOPMENT OF COCONUT PRODUCTION	NO INCREASE IN HECTARES USED OR PRODUCTION DURING 2016-2018. A REGIONAL CARIBBEAN PROJECT FUNDED BY THE EU IS SUPPOSED TO INCREASE COCONUT PRODUCTION
ESTABLISHING 20 HECTARES OF PRODUCTION OF <i>ALOE VERA</i> TO PROCESSED TO ALOE GEL	NO ACTIONS TAKEN

Source: IMF, 2019.

1. IMF, 2016 (press release).

2. Ibid.

3. IMF, 2019.

Furthermore, the overall competitiveness of Suriname's economy is low. Suriname ranked 106 out of 144 countries analyzed by the World Economic Forum (WEF) in 2014, and has not met the minimum requirement to be ranked since⁴. Notwithstanding these limitations, the country made progress in 2015 when its automated customs data management system (ASYCUDA) became fully operational. This system allows businesses to complete all customs procedures electronically, reducing the export cost of key agricultural commodities, including rice and bananas. The Corruption Perception Index 2018, ranks Suriname at 73 of 180 countries, two places lower than 2017, and seven places lower than in 2015.⁵

A new oil discovery on the coast of Suriname in 2020, worth an estimated 300 million barrels, is expected to increase Suriname's economic growth in the coming years. However, the start of 2020 also saw a USD \$100 million-corruption scandal at the Central Bank, a further collapse of the currency, and a severe devaluation of Suriname's credit rating to junk status.⁶

1.2. THE AGRICULTURAL SECTOR

1.2.1. ECONOMIC AND SOCIAL IMPORTANCE OF AGRICULTURE

Suriname's agricultural sector is led by rice and banana production, but also consists of crops, including vegetables, plantains, citrus, fruits and cassava. The livestock sector remains important, with products such as poultry meat, beef, pork, milk and eggs (Figure 1).

The relative importance of agriculture in Suriname's economy has declined over the last two decades, from around 18% of GDP in the mid-1990s to 9% in 2018⁷. Suriname's most important crops —rice and bananas— face challenges to improving their cost structures and remaining competitive. The banana industry faces strong competition from other Latin American producers, - due to changes in the EU's preferential tariff regime, high production costs, low labor productivity, and frequent crop diseases. In the rice industry, high transportation and input costs undermine Suriname's competitiveness in international markets.

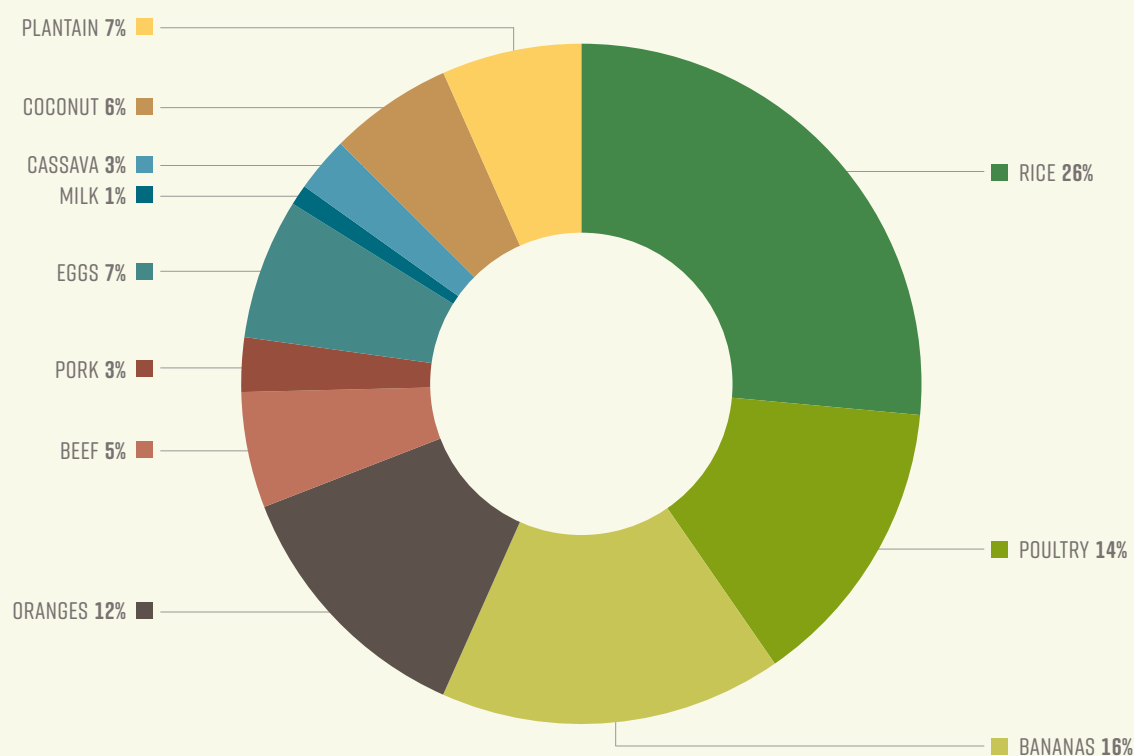
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4. World Economic Forum. 2015.

5. Transparency International. 2020.

6. See also: The Guardian. 2020.

7. WDI. 2020.

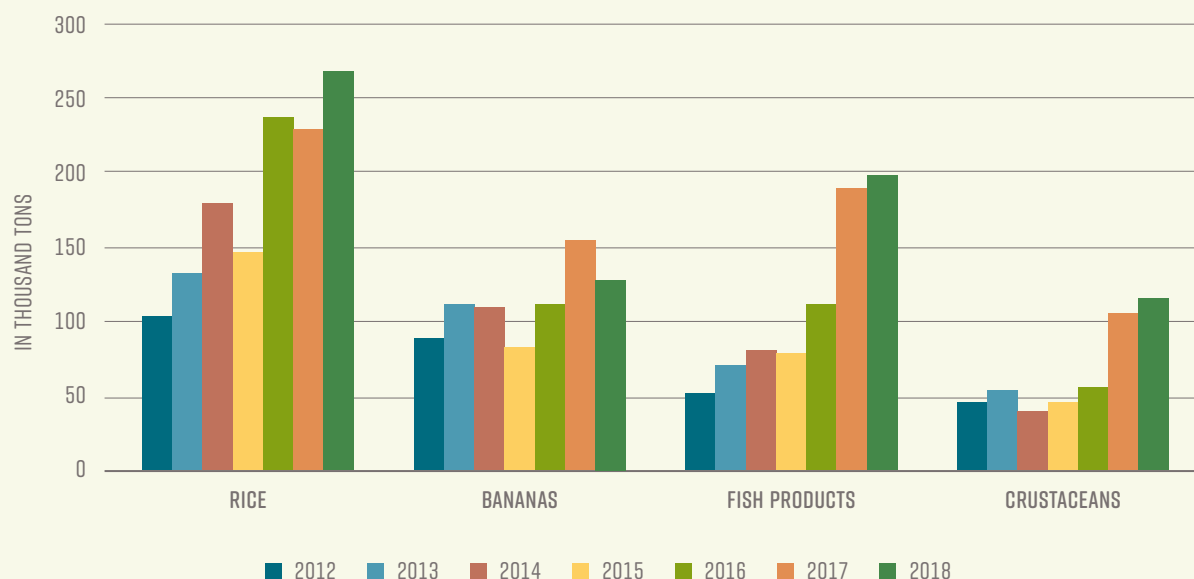
FIGURE 1: SHARE OF GROSS PRODUCTION VALUE PER COMMODITY, 2015-2018, % OF TOTAL

Source: LVV agricultural statistics. 2019.

In spite of the decreasing relative importance of agriculture in the economy, the total export value has more than doubled between 2012 and 2018, partly due to depreciation of the Surinamese dollar. The total value of rice exports has gradually increased, while the banana export value has been more volatile, peaking at SRD \$110 million in 2012, before falling to SRD \$83 million in 2014, and increasing again to SRD \$155 million in 2017. Exports of fish and crustaceans have also increased in volume and value (Figure 2).

The potential for agricultural development remains strong, with 1.5 million hectares considered suitable for agricultural production, of which only an estimated 120,000 hectares are currently being used. Agriculture accounts for 7% of national employment⁸ and is a large employer in rural areas. The agricultural sector is also a key contributor to food security through the production of rice, which is the population's staple food.

8. WDI. 2020.

FIGURE 2: EXPORT VALUE PER YEAR, 2012-2018, MLN SRD

Source: LVV agricultural statistics, 2019.

1.2.2. SURINAME'S AGRICULTURAL POLICIES

The Ministry of Agriculture, Animal Husbandry, and Fisheries (LVV) defines Suriname's agricultural policies. The Ministry consists of five departments: (i) crops, (ii) livestock, (iii) fisheries, (iv) research, marketing and processing and (v) administrative services.

The Ministry has the administrative responsibility for a series of foundations and state-owned companies that are active in the agricultural sector. This includes the central fishing port, *Centrale Voor Visserijhaven in Suriname* (Cevihav), the fruit plantation company, *Landsbedrijf Alliance* (Alliance), the Anne van Dijk Rice Research Centre (ADRON), and the milk producer, *Melkcentrale Paramaribo* (MCP). No privatization of state-owned enterprises was accomplished during the period under review, but the government acquired the cassava processing company, Innovative Agro Processing (IAP) NV, in 2015.

The 2010-2015 policy note, expanded the number of agricultural policy strategic objectives from three in the previous plan, to seven. The agricultural policy strategic objectives are now: (i) guarantee the food security of the population of Suriname, (ii) secure agricultural health and food safety, (iii) develop a sustainable agricultural sector, (iv) transform the agricultural sector into the primary food producer and supplier of the Caribbean region,

(v) increase the agricultural sector's contribution to the national economy, (vi) create the spatial conditions necessary for sustainable development of the agricultural sector, and (vii) manage the preconditions and risks involved in the implementation of agricultural policy⁹.

In addition to the 2010–2015 policy note, White Papers were drafted in 2011 for the following subsectors: rice; bananas; livestock; horticulture; fisheries and aquaculture; agribusiness; agricultural health and food safety; and agricultural development of the interior. Despite the fact that the White Papers were initially prepared for a five-year period, new versions have not yet been drafted.

Building on its previous general policy for the agricultural sector (*Beleidsnota*) LVV 2010–2015, the government has since developed a new plan for the years 2016–2025. Titled 'The National Master Plan for Agricultural Development in Suriname', the plan was prepared with support from the government of Israel and adopted by LVV in December 2015.

The National Master Plan for Agricultural Development in Suriname has the overarching goal of accelerating Suriname's transition to a modern and knowledge intensive agricultural system. In doing so, Suriname aims to increase the agricultural sector's contribution to the nation's GDP, trade balance, employment and food security. In order to achieve these objectives, the plan requires government support of up to USD \$40 million per year.

This amount is necessary to execute 10 specific priorities¹⁰:

1. Developing agricultural risk insurance solutions
(USD \$5 million per year)
2. Credit for disadvantaged smallholder farmers
(USD \$8 million per year)
3. Infrastructure construction, in particular drainage and irrigation networks (USD \$4 million per year)
4. Establishing an extension framework
(USD \$4 million per year)
5. Agricultural Service & Training Centre (ASTC)
(USD \$4 million per year)
6. Stimuli to encourage agricultural settlements, to increase the attractiveness of working in agriculture (USD \$3 million per year)

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9. The Ministry of Agriculture, Animal Husbandry, and Fisheries. 2015.

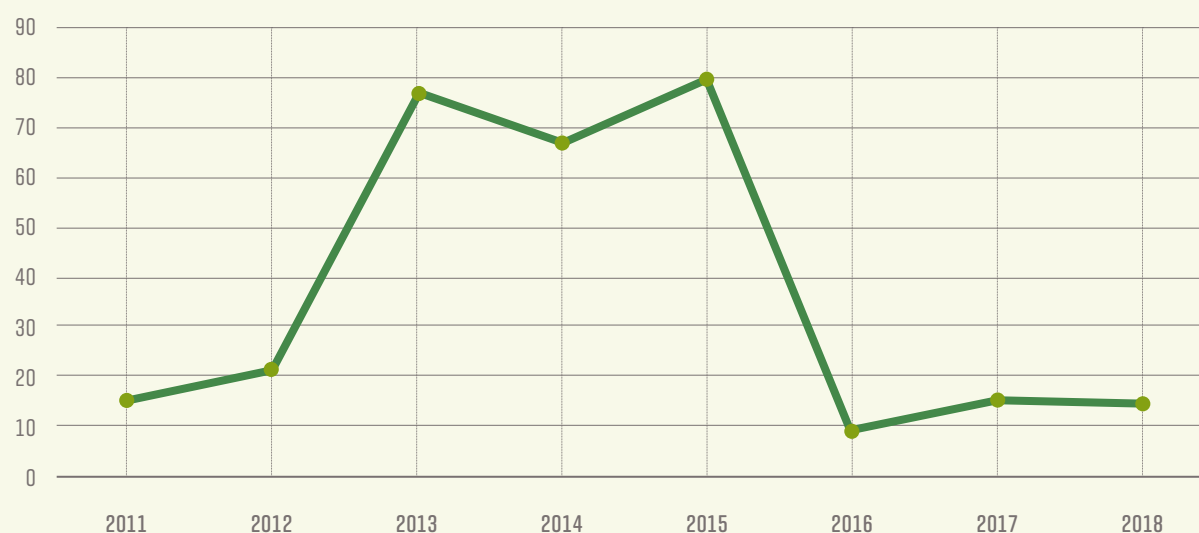
10. Ibid.

7. Quality assurance and promotion of international standards (USD \$2 million per year)
8. Export policy, to support export development (USD \$3 million per year)
9. Construction of agri-processing factories, in collaboration with the private sector (USD \$4 million per year)
10. Applied research (USD \$3 million per year)

The government's 2017-2021 Policy Development Plan aims for diversification and sustainable growth, with less dependency on imports. The Plan includes separate measures for small-scale and large-scale agriculture, providing mostly general services for small-scale agriculture, while aiming to reduce high production costs for large-scale agriculture (predominantly the banana and rice subsectors). The Agricultural Innovation Strategy aims to reform Suriname's research and extension services and promote innovation.

The total budget of LVV consists of administrative costs and the program budget. Figure 3 shows that the program budget of LVV (excluding staff and administration costs) has been drastically reduced since the recession of 2016.

FIGURE 3: PROGRAM BUDGET OF LVV, 2011-2018, MLN SRD



Source: Staatsbegroting, 2011-2019, LVV Budget.

While in 2015, the program budget was SRD \$79.4 million, in 2018, it was only SRD \$14.7 million. All program budgets were cut, especially that of the National Rice Institute, and technical support in new and existing cultures were severely reduced.

The main subsidies provided to state-owned companies through the LVV budget were to ADRON (SRD \$0.557 million) and the citrus company, Alliance, (SRD \$0.405 million). In 2015, all state-owned companies together with services of the LVV, accounted for only SRD \$54,000 of the total SRD \$6.2 million non-tax income of the Ministry. The majority of non-tax revenue collected by the Ministry came from slaughterhouse inspection and certification (SRD \$3.2 million in 2015) and commercial fishing licenses (SRD \$1.8 million in 2015).

1.2.3. COMMODITY SPECIFIC MEASURES

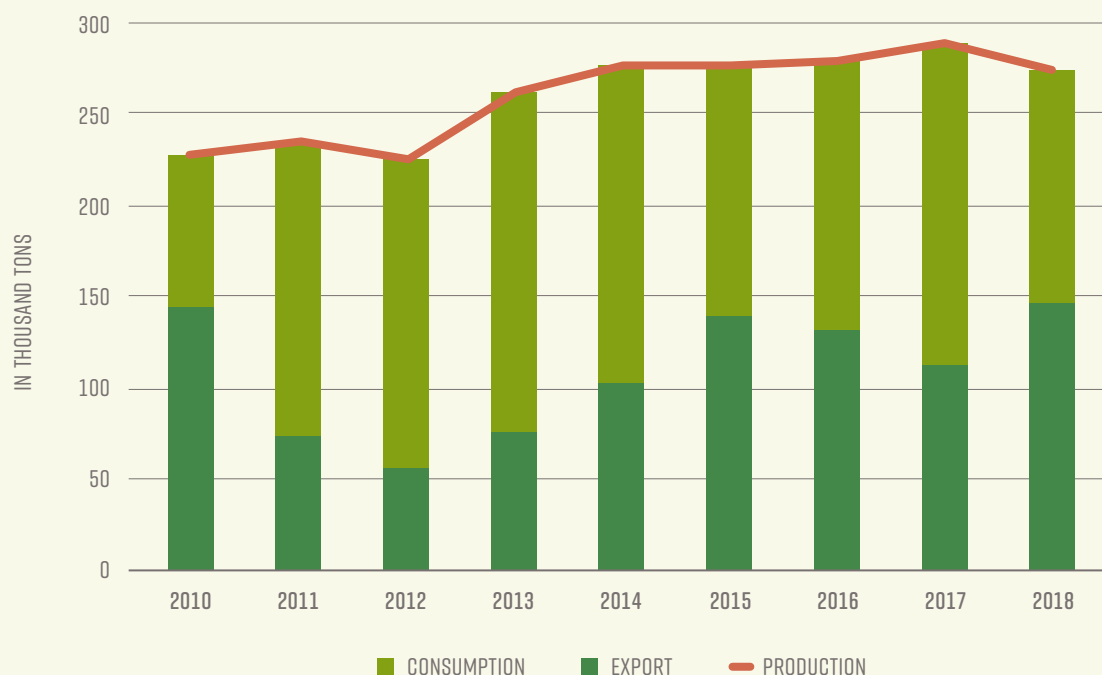
RICE

Rice is the most important agricultural crop in Suriname, occupying most of the area currently under cultivation. It has the highest production quantity and value, amounting to 273,916 tons, worth SRD \$309.5 million in 2018. Rice is a staple food in the diet of the Surinamese people, resulting in a high share of local consumption of the crop (40%-50%). The commodity is also an important export crop and foreign exchange earner, accounting for 37% of the country's export value in 2018.

Production and export quantities in Suriname fluctuate depending on the weather and the area cultivated. Rice production is strongly concentrated in the western coastal districts of Nickerie, Coronie, and Saramacca, with the Nickerie district alone representing approximately 80% of the area under cultivation. Rice is mostly produced by medium and large-sized farms, with medium-sized farms harvesting between 1 and 12 hectares, or about 45% of the rice production area, and large-size farms harvesting an average size of over 12 hectares, or about 55% of rice production area. Rice production is currently trending upward, and since 2009, paddy production has consistently achieved above 200 000 tons. There was a small decline in production quantity in 2018, due to a water shortage in some areas, but 2019 shows a continuation of the increasing trend in planted hectares.¹¹

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11. See also: SR Herald. 19/08/2019.

FIGURE 4: RICE PRODUCTION, CONSUMPTION AND EXPORT, 2010-2018, 000 TONS

Source: LVV agricultural statistics, 2019.

Given its key economic and social importance, the rice subsector is the main focus of Suriname's agricultural policy. The 2011 Rice Subsector White Paper¹², is the primary document establishing the government's policy priorities for rice, and includes direct payments to producers, fuel subsidies, export taxes, and government support for irrigation, water management, input access, and rice research. The government's policy objectives for the rice sector also include improving infrastructure and access to inputs, improving product quality, and increasing access to finance for producers and processors. Support for the rice subsector has however, decreased since 2015, due to overall budget cuts.

In 2014 and 2015, small and medium-sized farmers received support based on land area. This came into place after a fuel tax of SRD \$2/litre was applied. In 2014, small and medium-sized farmers, with 1 to 200 hectares in production, received an area payment of SRD \$480 per hectare. For this payment, no distinction was made between farmers based on productivity. The payment was funded from the "export promotion" budget line of LVV and support for the Government budget amounted to SRD \$12 million. An area payment was suggested in 2013, as a more effective mea-

12. Ministry of Agriculture, Animal Husbandry and Fisheries. 2010.

sure to reduce producers' debt-burden than a payment based on output. Essentially, it argued that farmers with low productivity levels need liquidity most for productivity-enhancing investments. However, payments based on output primarily benefit farmers whose productivity is already relatively high. Furthermore, a direct income payment based on acreage was said to be less price distorting.¹³

In 2015, LVV reached an agreement with the Association of Surinamese Paddy Farmers and other farmer organizations to provide support of SRD \$431 per hectare. This support consisted of an area payment of SRD \$230 (USD \$60) per hectare, a bag of fertilizer, and a bag of urea. However, in September 2015, LVV had to withdraw from this agreement when its budget did not allow for the USD \$60 per hectare payment. Since 2016, no producer subsidies have been paid out.

Another important element of the government's support for the rice subsector is the parastatal National Rice Research Foundation, in particular ADRON. The main focus of ADRON's research program is on seed development, pest and disease control, and crop management.

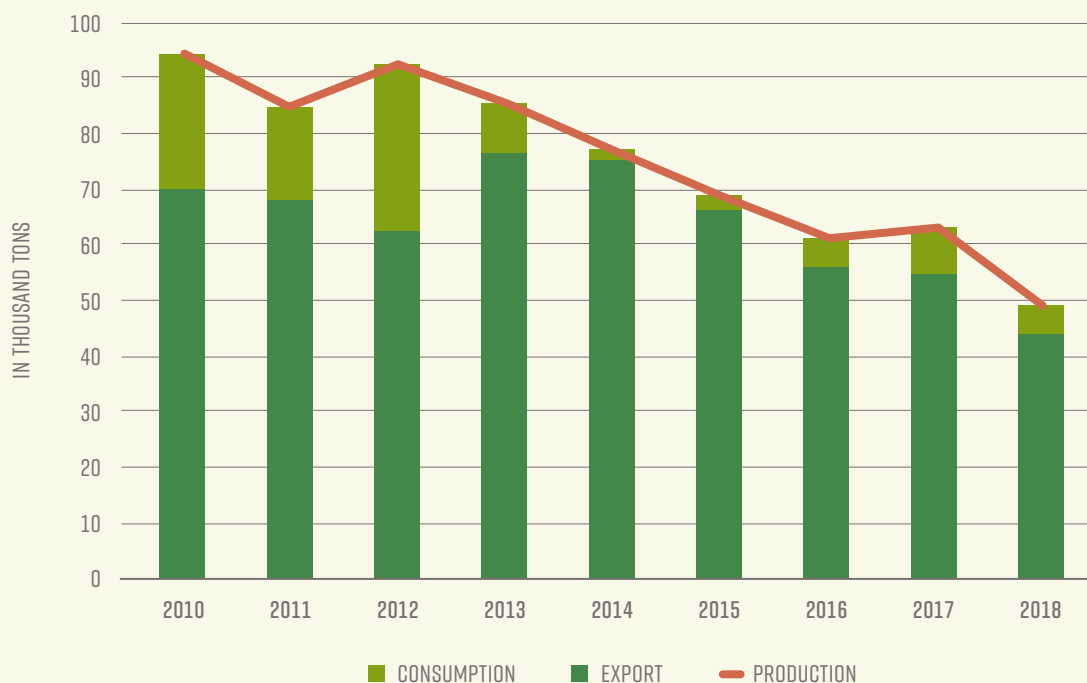
BANANAS

Bananas are Suriname's most important agricultural export product in terms of the quantity exported. However, the sub-sector is facing several major problems that jeopardize the long-term sustainability of banana production in Suriname.

Between 2002 and 2013, the banana sector was state-owned. Though the cultivation of bananas goes back to the 1960s, the subsector's production collapsed dramatically following the bankruptcy of the state-owned banana company, Surland N.V., in 2002. Before the collapse of Surland, production stood at around 40,000 tons per year. Given the importance of the banana subsector for Suriname's economy in general, and its foreign exchange earnings in particular, the government decided to implement a restructuring plan for the viable long-term development of a banana subsector that could compete in a liberalized world market. Surland's assets and activities were brought under the Stichting Behoud Bananen Sector (SBBS), a newly established state-owned banana company.

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13. Derlagen, C., Tas, J., Boyce, R.A., Shik, O., de Salvo, C. P. 2017.

FIGURE 5: BANANA PRODUCTION, CONSUMPTION AND EXPORT, 2010-2018, 000 TONS

Source: LVV agricultural statistics, 2019.

External stakeholders, SBBS management, and the government repeatedly stated that privatization of the SBBS was the only sustainable way to ensure the company's future. The privatisation of SBBS was finalized in 2014, when Belgian Univeg —part of the Greenyard group— acquired 90% of the shares of SBBS under the new company name, Food and Agriculture Industries (FAI) N.V. In the years following privatisation, production dropped by 20% from 80,559 tons in 2013, to 62,937 tons in 2015. FAI recorded losses of up to USD \$10 million in 2014 and USD \$13 million in 2015, for both internal and external reasons. In 2020, after reporting losses and growing debt, FAI closed down its operations in Suriname, and the subsector returned to state ownership.

FAI's decision to close down its operations follows a decline of 34% in production between 2012 and 2018 and a general decline in productivity by 27% in the same period. With FAI's departure, the future of the sector is now unknown.

According to the 2017-2021 Policy Development Plan of Suriname, banana production in the country should benefit from natural advantages, including the low incidence of hurricanes, land availability, access to preferential markets, and the availability of

external financing. Further details can be found in Annex I of this report, which includes a more specific overview of the characteristics and costs of the banana value chain in Suriname.

TABLE 3: KEY BANANA INDICATORS, 2015-2018

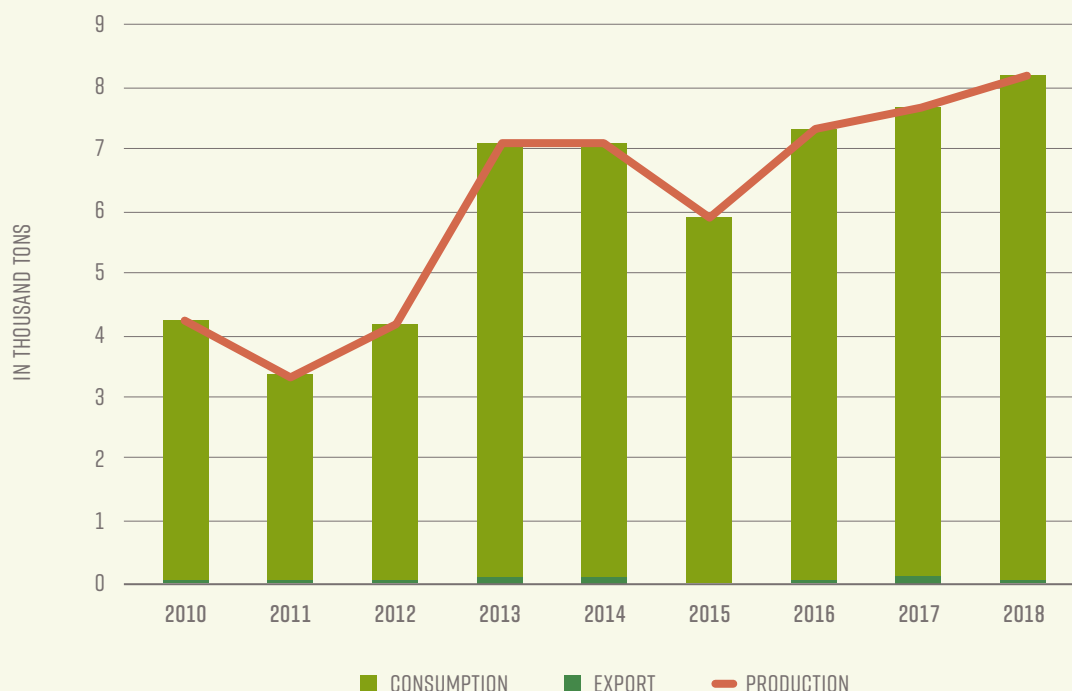
QUANTITY (TONS)	2015	2016	2017	2018
PRODUCTION	68,991	61,073	62,887	48,835
EXPORT	66,178	56,099	54,993	43,755
TOTAL NATIONAL CONSUMPTION	2,810	4,970	7,890	5,080
PRODUCTIVITY (PROD/HECTARES HARVESTED HECTARES)	34.9	32.0	32.5	28.5
VALUE (SRD \$ 000)				
TOTAL PRODUCTION VALUE	94,518	152,683	191,680	251,500
TOTAL EXPORT VALUE	83,273	111,867	155,039	128,725
EXPORT VALUE PER TON	1,258	1,994	2,819	2,942
LAND AREA (HECTARE)				
TOTAL PLANTATION AREA	2,051	2,173	2,164	1,993
SMALL-SCALE FARMING	183	183	179	175
FAI AREA	1,810	1,810	1,774	1,555
HARVESTED AREA	1,975	1,908	1,933	1,713

Source: LVV agricultural statistics. 2019.

CASSAVA

Historically, Cassava was mainly produced as a staple food in the interior of Suriname. Since 2015, production has steadily increased to 8,000 tons in 2018, nearly double the volume of 2010.

Innovative Agro Processing Industries NV (IAP) established a cassava flour factory, with a government-backed loan. It opened in 2012, and was transferred to the Government in 2013. The factory can process up to 30 tons of raw cassava per day. The government announced that fresh produce would be procured from small producers at a “guaranteed” price of USD \$0.60 per kg, which is higher than the international market price. It is unknown if the guaranteed price scheme was ever implemented. According to LVV, the average cassava farm gate prices were also significantly lower than USD \$0.60 per kg, at SRD \$1.22 (USD \$0.37) on average in 2014.

FIGURE 6: CASSAVA PRODUCTION AND CONSUMPTION, 2010-2018, 000 TONS

Source: LVV agricultural statistics, 2019.

In 2014, the Ministry of Finance provided a SRD \$2.4 million loan to IAP for procuring and processing cassava. However, news reports repeatedly indicated that the factory was not, or only minimally operating. The LVV then reported that a lack of cooperation between the Ministry of Finance and Ministry of Agriculture left the factory technically deficient for cassava processing. Since then, cassava processing has only been performed by smaller communities, such as *Wi! Uma Fu Srana*.

Unifood, a private company, has exported cassava in frozen and block versions since 2015. Another potential market for the cassava industry is animal feed, which could reduce Suriname's dependency on imported feed. This market has not yet been explored.

In 2018, the Caribbean Development Bank launched a USD 1.2 million research grant, 'Cassava Industry – Market Assessment and Technology Validation and Dissemination'. The grant focused on the development of the cassava industry in Trinidad, Suriname and Dominica. The project is coordinated by FAO and will investigate how to increase competition and produce value-added products from cassava. So far, this has included the provision of

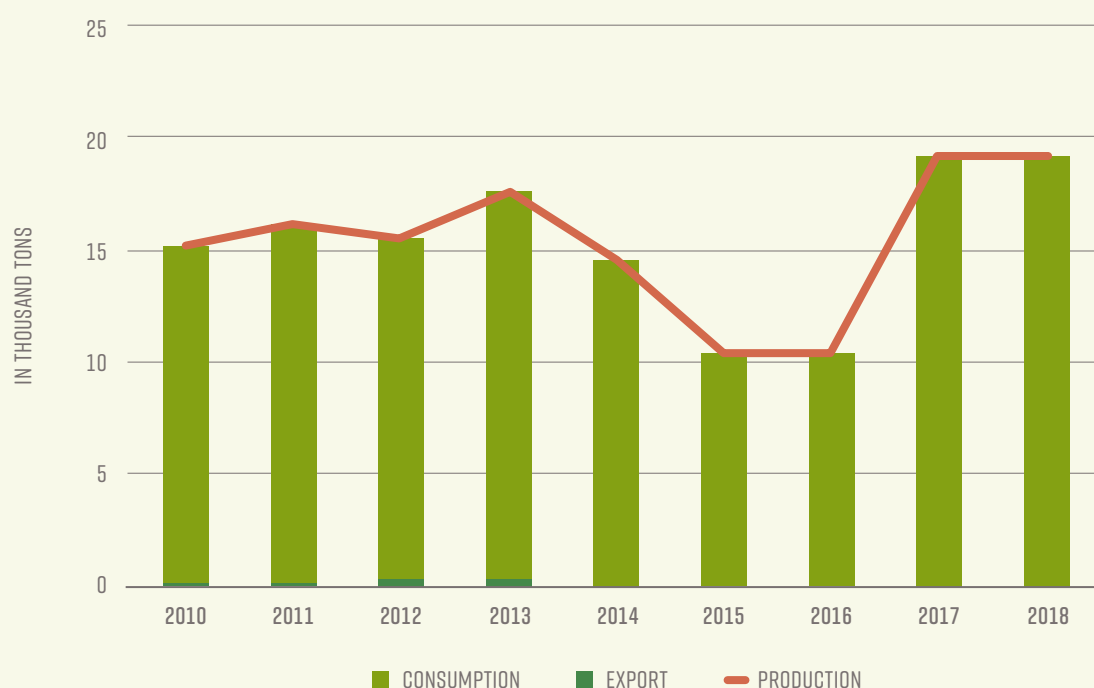
trainings in November 2017, designed to teach bakeries how to make bread from cassava flour. Farmer field schools were also organised to promote eco-efficient soil and crop management technologies.¹⁴

The Government's current goal is to have the Surinamese cassava subsector take part in fulfilling the growing demand for cassava in the European market.¹⁵ However, there have been no support measures provided for the cassava industry, beyond the recent Caribbean Development Bank initiative.

ORANGES

In general, fruits and vegetables are grown by small and part-time producers on approximately 1000 hectare, with small farms ranging from 0.5-2 hectares in size. Oranges and citrus fruits produced in Suriname are almost entirely for domestic consumption (Figure 7).

FIGURE 7: ORANGES PRODUCTION, CONSUMPTION AND EXPORT, 2010-2018, 000 TONS



Source: LVV agricultural statistics, 2019.

14. See also: De Boodschap, and Today CARICOM. 27/11/2018.

15. See also: De Waterkant. 6/2/2020.

Two state companies are active in the citrus production: Alliance NV and Stichting Landbouw Ontwikkeling Commewijne. Alliance NV is focused on citrus and orange production, but has experienced a decrease in production for some years, and with now only 80 hectares in production, it represents a minor share of Suriname's production capacity. Alliance NV receives a yearly budget provided by LVV to pay its current expenses. Stichting Landbouw Ontwikkeling Commewijne also produce and sell a variety of vegetables, fruit seeds, and plants.

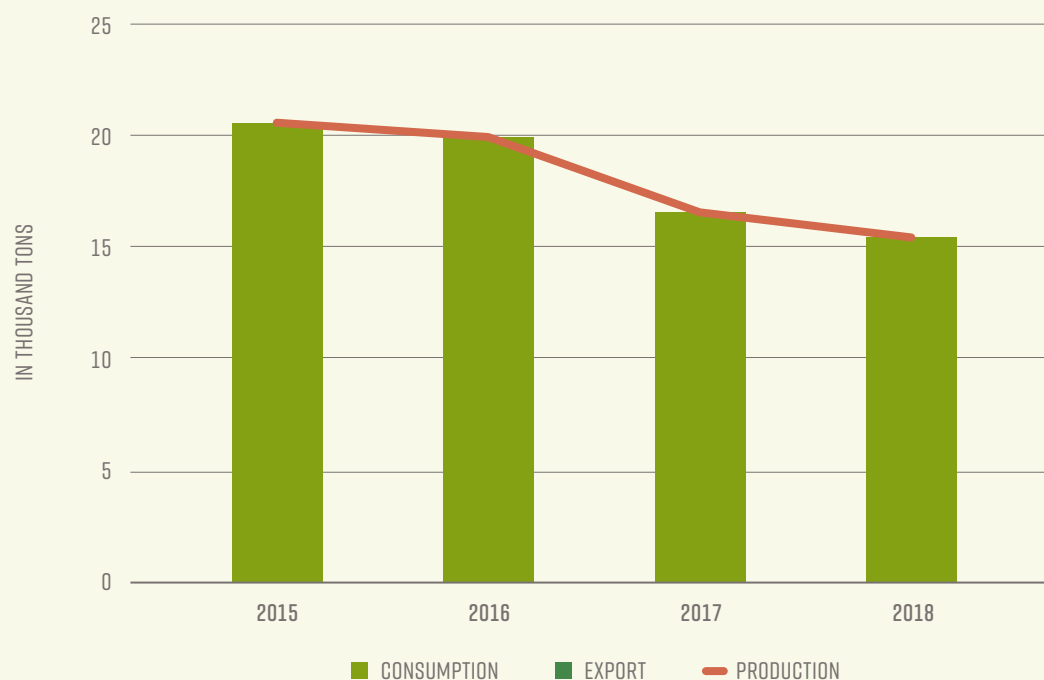
Despite the government's efforts to revive the production of oranges by state companies, the recent growth in acreage has occurred in the private sector. Goliath NV, a private company located in Tibiti, cultivated 500 additional hectares for orange production. The company produces pera-oranges, a variety from Brazil, harvested for the first time in Suriname in 2016¹⁶, with the aim to commence export in 2020. After a decline in orange production to 10,000 tons in 2016, the introduction of pera-oranges saw orange production grow by 9,000 tons in 2017.

PLANTAINS

The production area and quantity of plantains has steadily decreased, standing at 483 hectares and 15,500 tons in 2018. Farm gate prices have not increased along with depreciation of the currency, instead moving from SRD \$3.57/kg in 2012, to SRD \$2.15/kg in 2015, and SRD \$4.16/kg in 2018, with a similar trend in consumer prices. Export is very small, fluctuating between 0 and 50 tons a year. No product-specific policy was detected for the plantain subsector.

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16. See also: De Waterkant. 12/09/2016.

FIGURE 8: PLANTAINS PRODUCTION AND CONSUMPTION, 2015-2018, 000 TONS

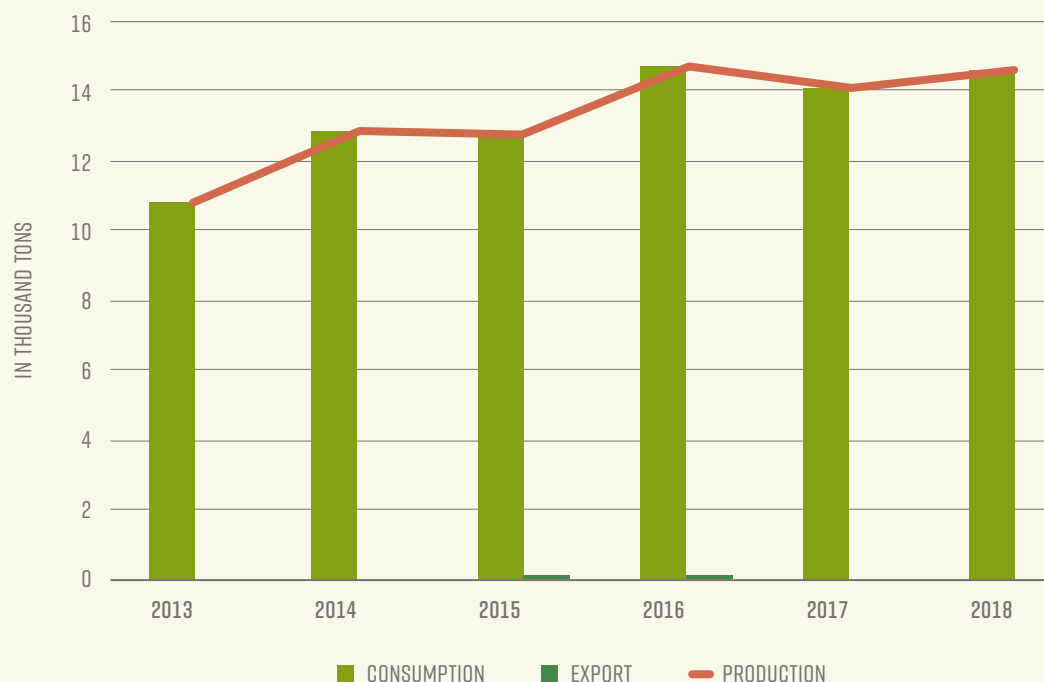
Source: LVV agricultural statistics, 2019.

COCONUTS

The largest portion of Suriname's coconut production occurs in Coronie, which in 2014, supplied 61%, or 12,500 tons, of Suriname's total coconut production. Coconut production in Coronie increased to 14,500 tons in 2018, while the hectares under cultivation have remained at a stable 1,110 hectares since 2015. Farm gate prices have risen from SRD \$2.63/kg in 2015, to SRD \$4.96/kg in 2018, a trend seen with almost all farm gate prices in the country, due to currency depreciation.

The 2016 National Master Plan for Agricultural Development, identified coconut as a high-value crop, ideal for increasing diversity in Suriname's agricultural sector. However, many of the coconut plantations have been abandoned due to low profitability, and the extreme height of older trees makes harvesting difficult.

The creation of value-added products in the coconut subsector currently occurs in small, local factories with rudimentary equipment. Investment in larger, better-equipped processing facilities that cater for value-added products is therefore, required.

FIGURE 9: COCONUT PRODUCTION AND CONSUMPTION, 2013-2018, 000 TONS

Source: LVV agricultural statistics, 2019.; UNCOMTRADE database.

LIVESTOCK

In the early 1990s, Suriname's self-sufficiency rate for livestock products stood at nearly 100%. Today, Suriname is a net importer of all livestock products, as currently, local production does not meet the domestic demand. Overall, the livestock sector attracts low levels of investment compared to crops, and struggles to compete with imports, primarily due to the high cost of imported feed, which drives up overall production costs. In several subsectors, including beef cattle, dairy cattle, and poultry, the number of farms has steadily decreased. For the vast majority of farms, animal husbandry is now a part-time economic activity.¹⁷

The total number of pigs however, has remained stable, as the sector is less dependent on imported feed and as such, less vulnerable to depreciation. Pigs do not need grasslands (all are kept indoors in Suriname) and have a better feed conversion rate, needing little feed for quick weight gain. Pork is partly imported

17. Stichting Planbureau Suriname. 2007.

to meet local demand. Exact data on the quantity of imported pork was not received from LVV and so, the data used may be an underrepresentation of the true total.

The number of cattle has steadily decreased since 2012. Female cattle are increasingly sent to slaughterhouses, as maintaining the herd for production is no longer profitable. To address this issue, a new law to prevent the slaughtering of female cattle, except in specific circumstances, is currently in the making.

The main objective of the pork and beef sectors is to meet local demand by increasing competitiveness. Beef is partly imported to Suriname to meet local demand. Exact numbers on the quantity of imported beef were not received from LVV.

Poultry meat is the most popular source of animal protein in Suriname. With a consumption rate of almost 50 kg per capita, the Surinamese are the highest per-capita consumers of poultry meat in the world.

FIGURE 10: PORK PRODUCTION, CONSUMPTION AND IMPORT, 2010-2018, 000 TONS

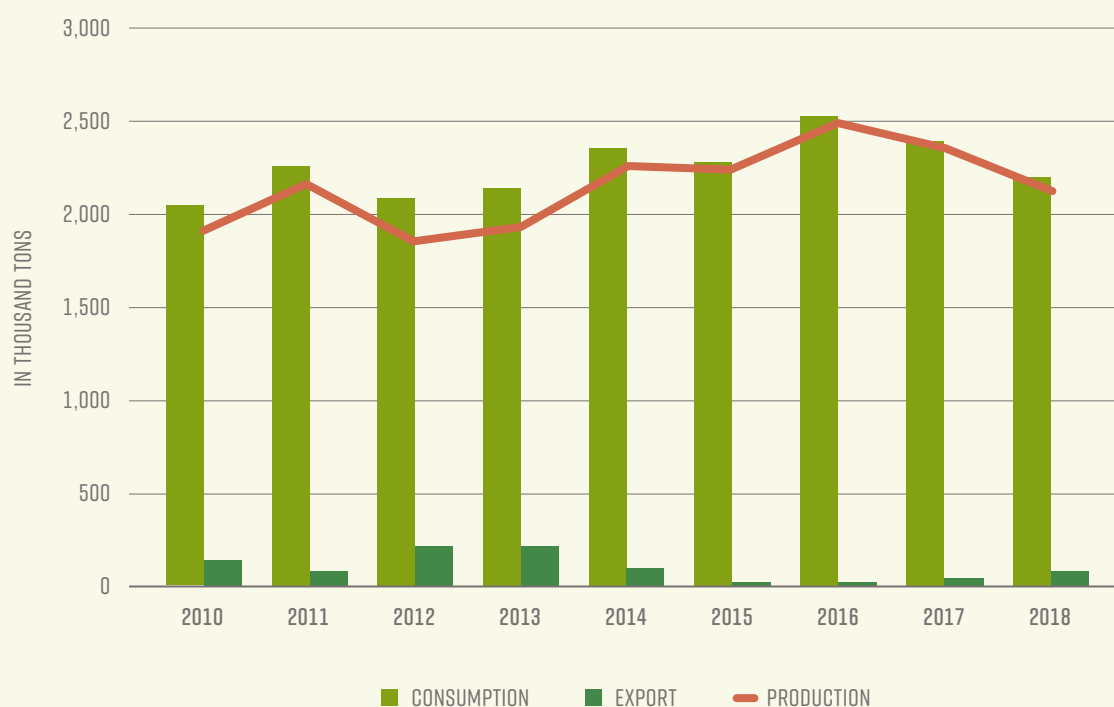
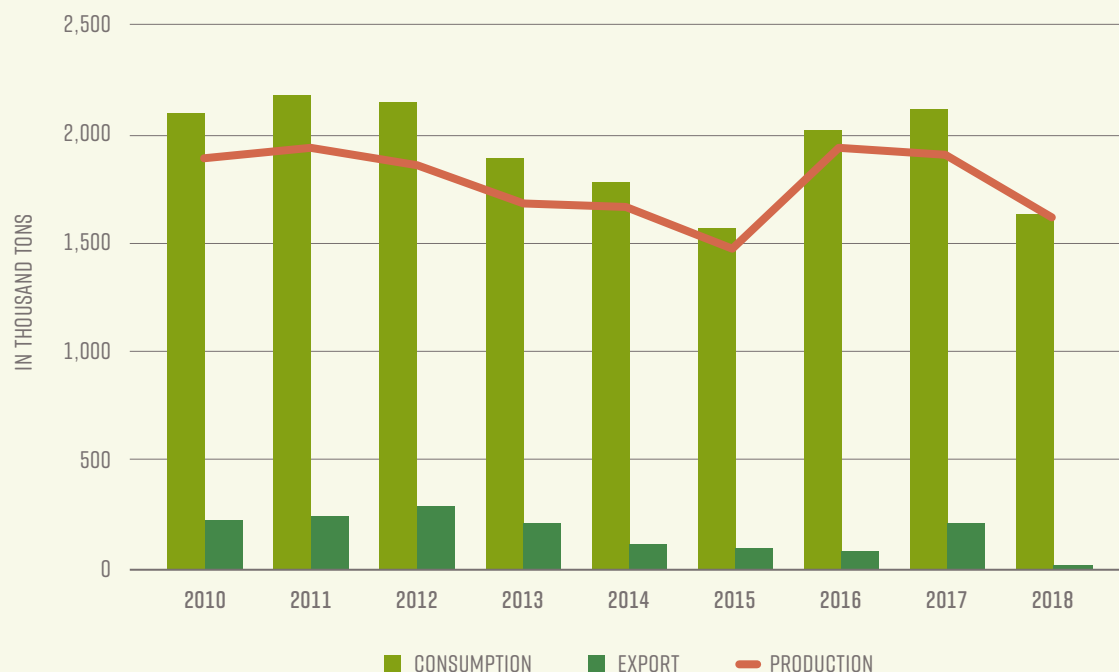


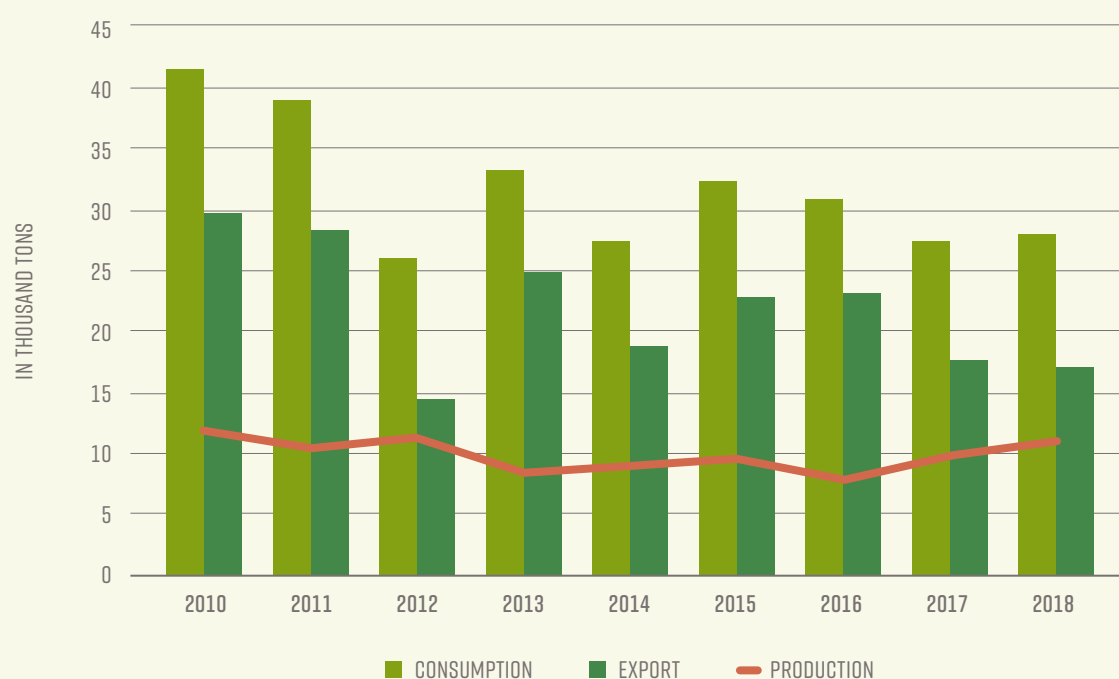
FIGURE 11: BEEF PRODUCTION, CONSUMPTION AND IMPORT, 2010-2018, 000 TONS

Source: LVV agricultural statistics, 2019; UNCOMTRADE database.

The macro-economic imbalances and foreign exchange shortages of the 1980s and 1990s, have had a significant effect on the Surinamese poultry subsector. With the sector dependent on imported feed, farmers in the early 90s faced limited availability of foreign exchange to purchase chicken feed and medicines, which together constitute the main cost component of poultry production. This led to a scarcity of poultry meat and high consumer prices. To ensure the availability of affordable chicken for the population, the government lifted the import ban on poultry meat and the first bulk shipment of leg quarters was imported in 1992. This resulted in lower market prices for consumers. Notably, poultry prices in Suriname are now lower than those of other countries in the region that maintain high protection levels for poultry, including Jamaica, which has a 260% tariff in place, while the tariff in Barbados is 184%, and in neighboring Guyana, 100%. The growing demand for lower-priced imported chicken was reflected in solid growth in the share of imported poultry meat. As described in the value chain analysis on poultry in Annex III, however, the poultry market in Suriname remains divided; imported products are not considered perfect substitutes for domestically raised chicken. Consumers have a strong preference for domestic chicken, which sells at a premium over poultry meat imported from the United States.

In 2020, the Surinamese Government signed a contract with LR group to set-up a new state-owned farm, with LR group as the development and operating partner. LR Group is an Israeli company operating in Africa and South America in the Agriculture, Water, Energy & Power, Telecom, Health, and Construction sectors. The objective of the project is to produce 4.2 million litres of milk, 2,000 tons of poultry meat and 5 million eggs. The project will be financed by a government-guaranteed loan. The plan does however, seem contradictory to LVV's stated aim of stimulating private sector investments and reducing state ownership, and has been criticized by the Federation of Surinamese Farmers (FSA), for a lack of information, and fear it could create more competition for local farmers.¹⁸

FIGURE 12: POULTRY PRODUCTION, CONSUMPTION AND IMPORT, 2010-2018, 000 TONS



Source: LVV agricultural statistics. 2019.; UNCOMTRADE database.

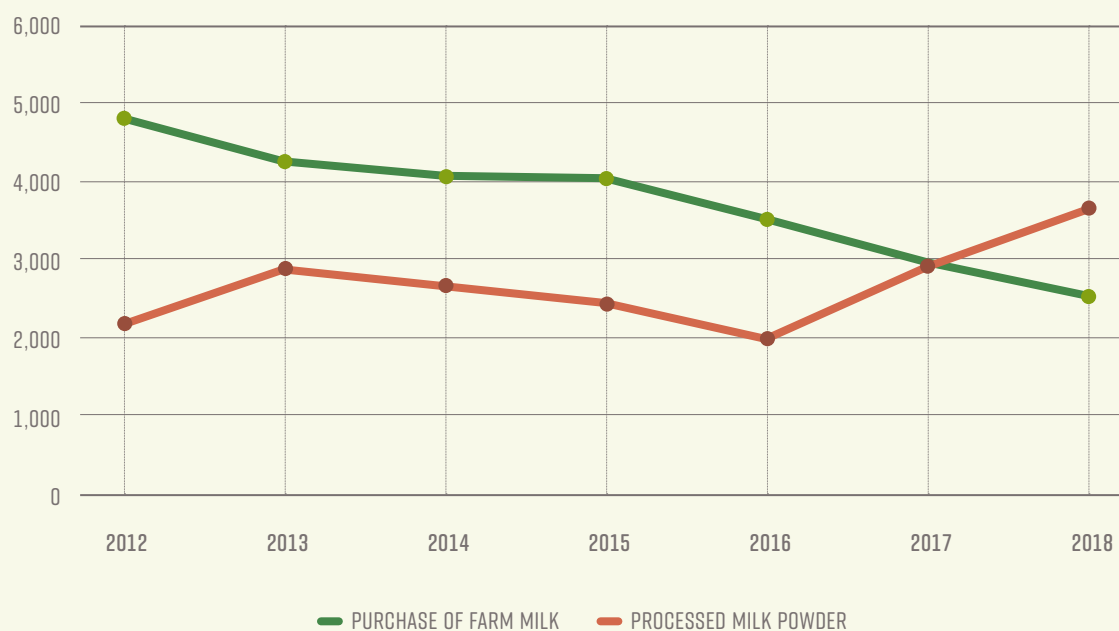
18. See also: SR Herald. 09/10/2019.

MILK

The milk subsector is the most regulated subsector of Surinamese agriculture. The *Melkcentrale Paramaribo* (MCP) is state-owned and bound to buy all raw milk offered by farmers at a fixed price. It is estimated that approximately 580 producers, or almost 60% of all dairy farmers, sell to MCP, and the processing plant produces 80% of all domestically produced milk.

MCP was established in 1960 and led to a flourishing sector, which peaked in 1996, selling 20,000 litres of fresh milk per day, when most milk farmers were still based in Paramaribo. Later, the low milk price, urbanisation and labor shortage, led to a shift from milk to meat production. As a result of the low purchasing price, which has been maintained for many years, dairy farming has increasingly become a part-time occupation, and in 1992, milk deliveries reached their lowest level. Prior to 1995, the MCP operated at a loss and depended on subsidies. After an adjustment of the milk price on the basis of a specially applied exchange rate in 1995, the MCP began to operate profitably, and continues to do so today.¹⁹

FIGURE 13: TYPE OF MILK PROCESSED AT MCP, 000 LITERS



Source: LVV agricultural statistics. 2019.

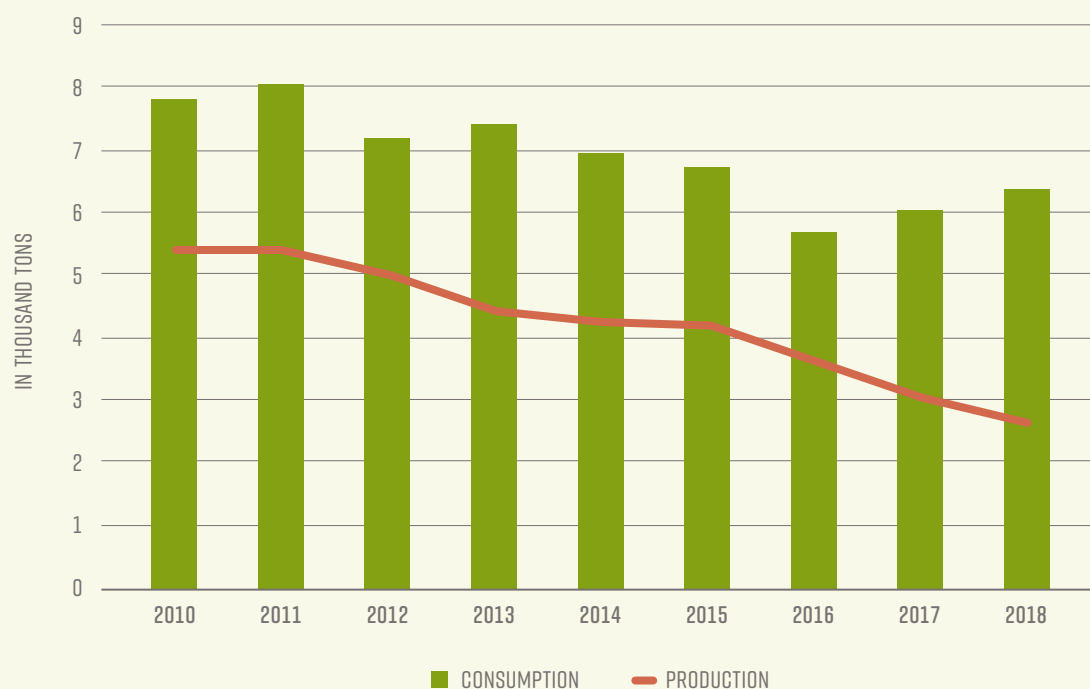
19. Stichting Planbureau Suriname. 2007.

The total quantity of raw milk sold to MCP has steadily declined since 2012 (Figure 14). The MCP purchased 4.2 million litres of farm milk in 2012 and only 2.5 million litres in 2018. The association of Surinamese Milk Farmers (VSMB) state that the decrease of production is due to low prices, which are not adapted for inflation, with prices at SRD \$3.5/litre in 2018, compared to SRD \$2.5/litre in 2013. Farmers also depend on imported products, such as feeding, medicines and milking machines, the prices of which have increased in recent years, due to depreciation of the local currency. The price of milk both at retail and farm gate levels is set by LVV and the Ministry of Trade and Industry and is normally based on the cost price of milk. However, there is no shared model to calculate the cost price.

Additionally, there are three private dairy processors, however, they only process imported milk powder.

Fresh milk is increasingly replaced by imported milk powder, and in 2018, milk powder represented 59% of the total milk supply in Suriname. This was the first time milk powder accounted for more than 50% of Suriname's milk supply.

FIGURE 14: MILK PRODUCTION AND CONSUMPTION, 2010-2018, 000 LITERS



Moreover, the amount of dairy cows has more than halved between 2012 and 2018, from 26,000 to 11,500. When the price is too low, farmers decide to decrease their herd and sell milk locally, as the farmers themselves have to cover transport costs.

The low regulated purchase price clearly hampers the profitability of local milk production, and the sub-sector might disappear if price regulation is not reviewed. The Ministry of Trade and Industry and LVV fear that abandoning the low fixed price of milk could increase consumer prices of an important dietary product for the Surinamese population.

The productivity of Suriname's dairy cows (a local Criollo breed) is low, hygiene needs improvement, and the quality of local milk often does not meet MCP standards. In 2019, the Ministry of Finance concluded a loan agreement of USD \$11.13 million with India, for the rehabilitation of the Melkcentrale, primarily aimed at improving the preservation of milk products.²⁰

EGGS

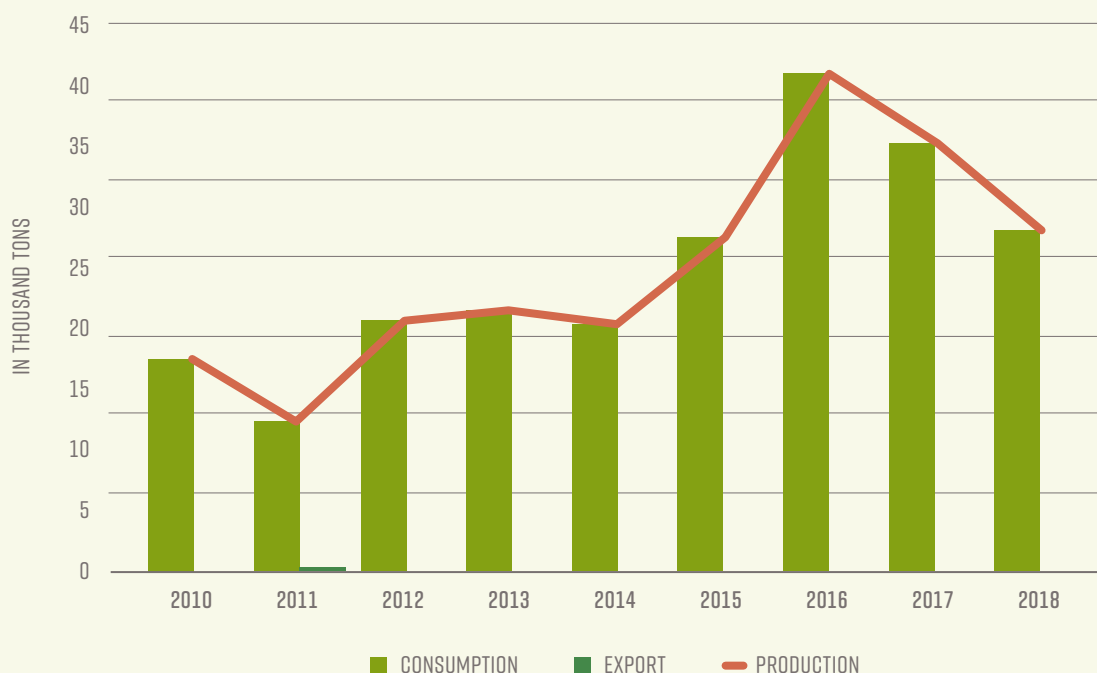
All eggs consumed in Suriname are domestically produced. Farm gate prices were stable during 2012-2018 (Table 4), whereas consumer prices have increased (SRD \$2/piece at the beginning of 2020). LVV and the Ministry of Trade and Industry demanded the poultry association, APPS, normalise prices, arguing that there was no shortage or increase in input prices. Consumer prices normalised, but were followed by overproduction and a sharp decrease to SRD \$1.25/piece. There has also been great fluctuation in the production of eggs, with a large increase in egg production in 2016, followed by a decline in 2017-2018.

TABLE 4: FARMGATE AND CONSUMER PRICES EGGS, 2012-2018

	UNIT	2012	2013	2014	2015	2016	2017	2018
FARMGATE PRICES	SRD/UNIT	0.81	0.69	0.80	0.75	0.78	0.80	0.70
CONSUMER PRICE	SRD/UNIT	0.94	0.80	0.90	0.87	0.90	1.15	1.25

Source: LVV agricultural statistics, 2019.

20. See also: SR Herald, 24/09/2019.

FIGURE 15: EGG PRODUCTION AND CONSUMPTION, 2010-2018, 000 TONS

Source: LVV agricultural statistics. 2019.

1.3. FISHERY

1.3.1. ECONOMIC AND SOCIAL IMPORTANCE OF FISHERY

Fisheries are a promising sector for Suriname; the sector's value has increased from SRD \$500 million in 2013 to SRD \$815 million in 2017 (3.5% of GDP).²¹ Besides the economic importance, the sector is important for the local population's protein supply (in 2013, the estimated per capita consumption was 17.7 kg) and the employment of an estimated 4,900 people in 2017.²² The country has a coastline of 380 km and a continental shelf area of 54,550 km².

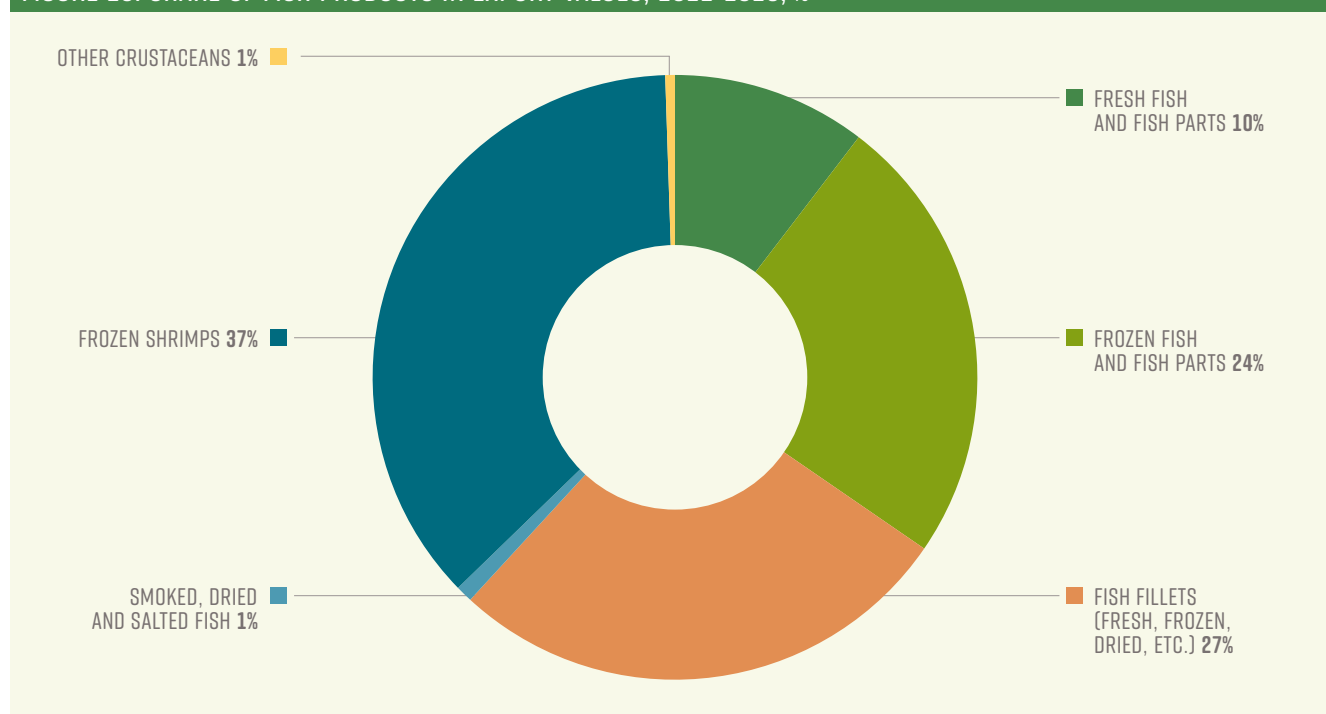
21. Bureau of Statistics, Government of Suriname. 2019.

22. FAO Fisheries and Aquaculture. 2019.

NET EXPORTER OF FISH PRODUCTS

Suriname is a net exporter of fish and fish products. The fishery sector was responsible for 37% of the total export value of agricultural products between 2012 and 2018, with 23% contributed by fish products and 14% by crustaceans. Between 2012 and 2018, the export value of fish products increased almost four-fold, from SRD \$52 million to SRD \$197 million, showing its increasing importance to foreign currency generation.

FIGURE 16: SHARE OF FISH PRODUCTS IN EXPORT VALUES, 2012-2018, %



Source: LVV agricultural statistics. 2019.

Though total fish and shrimp capture fluctuates, higher international market prices have resulted in higher values of production and exports for the sector.²³ The main export items are frozen marine fish and frozen shrimp (Figure 16). The export volume as of 2017 was around 33,383 tons, of which 34% was sold to CARICOM countries, 26% to EU member states, 21% to Asia, and 16% to the United States of America and Canada.²⁴ Imports were worth only SRD \$55 million in 2018, and were mainly prepared fishery products, such as canned sardines, imported at a 0% tariff.

23. Attune and Burkhardt. 2017.

24. Data received from Fish Inspection Institute (VKI).

ARTISANAL AND INDUSTRIAL FISHERY

Fisheries in Suriname are divided into two sub-sectors: artisanal fisheries and industrial ones. There is no definition for either of these sub-sectors in the Fisheries Act, but a distinction is made by the licensing system, which depends on the fisheries zone, determined by the depth of the continental shelf. The inland fisheries are an import source of protein and local income, but of little importance for export, with about 800 tons of catches, of mostly peacock bass, catfish and cachama/redbellied pacu.²⁵

The artisanal fleet caught about three quarters of the volume in 2012, with a decreasing share in total landings, due to a diversification of species by the industrial fleet. In weight terms, the total catch increased from 35,000 tons in 2010, to over 47,000 tons in 2016, due to an increase in catches by the industrial fleet, including blue shark and tuna (mostly yellowfin).²⁶ Although landed in Suriname, tuna and other large pelagic species (blue shark, billfish species etc) are often caught in international waters beyond the zone of Surinamese jurisdiction.

In 2018, the production level was around 47,090 tons, with a species of small shrimp called seabob accounting for about 7,650 tons²⁷. Other fisheries also developed, with tuna catches reported from 2012, which reached 4,700 tons in 2015, before decreasing to 3,400 in 2016 and 2017.²⁸

Besides industrial and artisanal fisheries, subsistence fishery and aquaculture also exist in Suriname. The aquaculture production is small and has been estimated to represent 110 tons in 2017.²⁹

Fishing vessels in Suriname are divided into inland fleets (BV), which only operate in rivers, and coastal boats (SK).³⁰ Open type (OG) SK Guyana boats operate for an average of 10-15 days at sea, with about 5 crew members, while close type (GG) SK Guyana boats operate in marine waters for 15-20 days, with an average of 6-7 crew members. They target mainly demersal finfish.

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25. FAO Fisheries and Aquaculture. 2019.

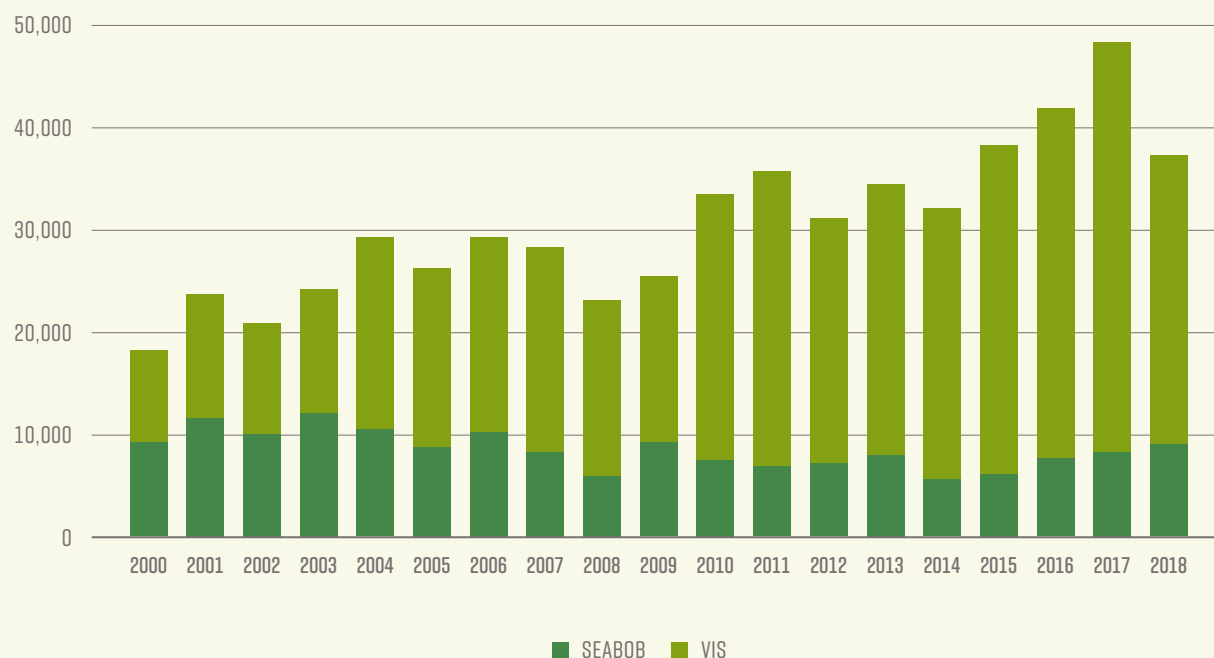
26. WTO. 2019.

27. FAO. 2014.

28. FAO. Fishery and Aquaculture Country Profiles. 2018.

29. FAO Fisheries and Aquaculture Country Profiles. 2019.

30. Ibid.

FIGURE 17: SHRIMP AND FISH LANDINGS, 2000-2018, TONS

Source: LVV, Department of Fisheries. 2019.

1.3.2. SURINAME'S FISHERY POLICIES

RESPONSIBLE INSTITUTIONS

The Department of Fisheries of the Ministry of Agriculture, Animal Husbandry and Fisheries (LVV) is the main institution governing the management and regulation of fisheries. The department has 4 divisions (Staff, Secretariat, General Affairs and Finance) and 4 technical departments:

- **Supervision and inspection.**
- **Statistics and Research** (with responsibility for information systems, including supply of catch data).
- **Artisanal Fisheries.**
- **Deep Sea Fisheries** (licenses, control, etc.)

In addition to the LVV, the following institutions have a role in the fishery sector:

- **The Maritime Authority of Suriname (MAS)**, established in 2002 under the Maritime Authority Act, is responsible for the registration and supervision of fishing vessels.
- **The Fish Inspection Institute (VKI)**, established in 2007 by the LVV, is the authority responsible for: quality inspections of fishery products; hygiene inspections of the food chain from fishing vessels and landing sites, to processing facilities and transport; and the registration of landing sites and commercial aquaculture; a monthly fee for inspection is paid by the processing companies.
- **The Suriname Coast Guard**, under the Ministry of Home Affairs, is responsible for at-sea inspections of fishing vessels in Surinamese waters.

There are two state-owned companies active in the sector:

- **Centrale voor Vissaanvoerhaven in Suriname (CEVIHAS)** is the central fishing port, co-owned by LVV and *Stichting voor Visserij bevordering* (STIVI).
- **Suriname American Industries Limited (SAIL)** captures seabob shrimp and prepares it for export. It also sells ice to other companies. SAIL used to catch other fish and shrimp species, but the number of vessels has been drastically reduced from 96 trawlers in 1988, to 5 trawlers in 2020.

Suriname is a member of the Caribbean Regional Fisheries Mechanism (CRFM), whose mission is “to promote and facilitate the responsible utilization of the region’s fisheries and other aquatic resources for the economic and social benefits of the current and future population of the region.” In Suriname, the CRFM has been important for increasing the participation of fishermen in policy making.

There are a number of active consultation boards:

- Founded in 2018, the **Surinamese National Fisherfolk Organization (SUNFO)** is the umbrella organization of the artisanal fishers’ organizations of Suriname. Its goal is to strengthen the capacity of the artisanal sector to take part in fishery management at the national and regional level. Every cooperative has 2 representatives in SUNFO, except for *Visserij Collectief* (VC), who have 3, because they are the biggest and represent 2 districts.

- **The Sea Fisheries Consultative Board** is a statutory advisory board on the fisheries policy of Suriname (Article 26 of the Sea Fisheries Act). The Council consists of 7 members. The government is represented by the Director of LVV, the Director of MAS and a representative of the Ministry of Justice. Sitting on behalf of the sector, is a representative of the shrimp trawlers, a representative of the fish trawlers, a representative of the coastal fishermen and a representative of the fish processing industry.
- **Seabob Working Group:** the fishermen and the Suriname government worked with conservation organizations to set up a working group to oversee fishing practices in the seabob fishery, which are certified by the Marine Stewardship Council (MSC), a worldwide standard for sustainable fisheries.

POLICY DOCUMENTS

The general policy for fisheries is set out in the Fisheries Management Plan for Suriname 2014-18. The plan was developed with assistance from the ACP Fish II project, financed by the European Development fund and follows the 2003 FAO Code of Conduct for Responsible Fisheries. The objective is to preserve the biological diversity of marine resources by controlling fishing fleet capacity, reducing bycatch, using new fishing methods, improving data and increasing the quality of products. The plan does include specific measures, but states that a specific plan for fisheries control is to be developed. The management plan has however, never been officially adopted as a policy document by the Minister and government, which demotivates the department of fisheries to adopt a new management plan. At the time of writing, a new management plan is being written and consultation with the sector has been finalized.

The fishery law (*Zeevisserijwet* S.B. 1980 no. 144) is outdated and the Fishery Department of LVV struggles with a limited budget, despite the relative importance of the sector.³¹ Data quality can be improved, as most of the marine and all the inland fish catch is unspecified, which makes any attempt at sustainability and resource management challenging.³²

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31. FAO Fisheries and Aquaculture. 2019.

32. FAO Fisheries and Aquaculture. 2019.

OBLIGATORY LICENSES

According to the 'Law on the Territorial Sea and the Continuous Economic Zone 1978', "neither Suriname citizens nor foreigners can fish commercially without a valid fishing license in the "Fishing Zone", which consists of the territorial waters and bordering 200 nautical mile exclusive economic zone (EEZ) of the Republic."³³

The conditions applied to fish licenses are determined annually by ministerial decree, which sets out the fishing zones, permitted fishing gear, and other conditions. There are several types of fishing license: artisanal fishers can have an inland (BV or *Binnenwater Visserij*) license or Suriname Coast (SK or *Surinaamse Kustvisserij*) license. Industrial or commercial fishermen can have an A, B, or C license depending on the ownership of the vessel (Surinamese, semi-foreign or foreign). For all fisheries and vessel permits, catch must be landed and processed in Suriname.

The maximum number of licenses per category, as determined by the ministerial decree of 2019, and the cost of the license, are shown in Table 5.

Suriname's licensing system allows foreign vessels to operate in its EEZ. According to Attune and Burkhardt³⁴, 100% of industrial C licenses and 50% of B licenses are foreign owned. From 1997 to 2000, the number of Venezuelan vessels licensed to fish in Suriname varied between a maximum of 134 in 1999, and a minimum of 82 in 2000.³⁵ About 80% of all offshore licensed fishermen are foreigners. Currently, all industrial longline vessels (targeting tuna species and other large pelagics) operate under the Panamanian flag, and no such boats operate with a Surinamese flag. According to Attune et al., "it is believed that Surinamers have cultural barriers to fishing on sea because they do not like to stay away from home for long periods of time."³⁶

Since 2007, a Vessel Monitoring System (VMS) is obligatory for the industrial fleet. The VMS reports data on geographical position, direction and speed. The artisanal subsector was more hesitant to apply the system and to share their data with the Ministry, as it is generally believed, though not proven, that artisanal vessels do not respect the fishing zones indicated in the licenses. Since 2020, the VMS has also been obligatory for artisanal vessels.

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33. Attune and Burkhardt. 2017. p.12.

34. Attune and Burkhardt. 2017.

35. Charuau et al. 2001.

36. Attune and Burkhardt. 2017. p.37.

TABLE 5: NUMBER AND COST OF FISHING LICENSES, 2019

BOAT TYPE: ARTISANAL		NUMBER OF LICENSES	COST OF LICENSE
OPEN GUYANA TYPE (SK)	543, OF WHICH: – 10 FOR <i>SCHUTBANK</i> – 468 FOR LINE OR DRIFTNET – 10 DRIFTNET IN FRONT OF CORONIE – 55 FOR BANGAMARY		MAXIMUM 50 M³: SRD \$750 (USD 100) FOR <i>SCHUTBANK</i> , LINE, DRIFTNET, BANGAMARY BETWEEN 50 M² AND 65 M²: SRD \$1,500 (USD 200) FOR LINE AND DRIFT NET
CLOSED GUYANA TYPE (SK)			MAXIMUM 85 M²: SRD \$2,000 (USD 336) FOR DRIFTNET
BOAT TYPE: INDUSTRIAL			
RED SNAPPER TRAWLER LONGLINER	224	USD \$3,500 FOR A, B AND C LICENSE	
PELAGIC LONGLINER	60	USD \$3,500 FOR A, B AND C LICENSE	
SEABOB TRAWLERS	26	USD \$5,000 FOR A, B AND C LICENSE	
SHRIMP TRAWLER	39	USD \$7,500 FOR A, B AND C LICENSE	
DEMERSAL BOTTOM TRAWLER	47	–	
A LICENSE			
GROSS WEIGHT UNTIL 130 TON		SRD \$6,000	
GROSS WEIGHT 131-200 TONS		SRD \$7,000	
GROSS WEIGHT 201-300 TONS		SRD \$8,000	
GROSS WEIGHT ABOVE 300 TONS		SRD \$9,000	
B OR C LICENSE			
GROSS WEIGHT UNTIL 130 TON		USD \$7,500	
GROSS WEIGHT 131-200 TONS		USD \$11,000	
GROSS WEIGHT 201-300 TONS		USD \$13,000	
GROSS WEIGHT ABOVE 300 TONS		USD \$15,000	

Source: Department of Fisheries, LVV.

1.3.3. SUPPORT TO THE FISHERY SECTOR

The actual spent program budget on fisheries of LVV has been reduced to 0 since the recession of 2016. The budget was intended mostly for fish disease monitoring, development of small-scale aquaculture to improve livelihoods and reduction of bycatch. Development of the sector mostly relies upon donors and NGO programs. FAO funded the regional REBYC-II LAC project, working on sustainable management and reduction of unwanted bycatch. The United Nations Development Programme (UNDP)/Global Environment Fund (GEF) Caribbean Large Marine Ecosystems (CLME+) project currently runs a number of nation-wide projects in Suriname.

The Department of Fisheries has little capacity to increase its efforts in research and development. Research on fish diseases, quality inspection, and aquaculture opportunities to decrease the

pressure on the fishing stock, is not currently possible. The department has a total of 72 staff (40 lower, 14 center and 18 higher skilled), which represents 5.5% of the total staff of the Ministry of Agriculture, Livestock and Fisheries. There has been no direct budgetary or non-budgetary support to fishers during the period under review. Industrial fishery companies fishing in the EEZ do have two fiscal advantages:

- **Fuel tax concession** (exemption from 10% standard turnover tax and levy of 0.40% in 2015 and 2016; and a flat rate of SRD \$1.30/l in 2017 and SRD \$1.13 in 2018).
- **Duty free import** of equipment and components.

Besides tax income, the fishery sector provides additional income to the state:

- Fishing licenses represent one of the two major non-tax revenues for LVV, worth SRD \$1.8 million in 2015. The second is slaughterhouse inspection and certification.
- The actors pay a fishing inspection fee to VKI, a private judicial entity (independent, non-profit) under LVV. SAIL reports this to be a monthly fee of USD \$1,800-\$2,700, depending on the activities.

Besides the limited public budget, the fishery sector struggles with:

i) Overcapacity of the fishing fleet: the fishing effort has, historically, been too high. An excess number of licenses and increasingly efficient fishing techniques have put too much pressure on the fish stock. There is also a need for improved statistical and biological monitoring of the stock by improving data collection and registration of catches and efforts of fishers; **ii) Illegal, unreported, and unregulated (IUU) fishing:** fishermen operating without valid licenses or not respecting the conditions of the licenses; **iii) Poor Health & Safety measures:** on artisanal boats it is common practice for illegal workers to labor in poor working conditions. There have also been several cases of piracy reported, some of which have had fatal consequences; and **iv) High international competition and fuel price dependency.**

The bottlenecks are explained in more detailed in Annex IV.

1.4. TRADE REGULATIONS

Suriname's trade policy is oriented toward liberalization and aimed at improving efficiency, increasing diversity and identifying Suriname's key strengths as an open economy with vast natural resources³⁷. To a large extent, trade policy formulation and its objectives are laid down in the country's five-year development plans (OPs), the most recent being the 2017-2021 Policy Development Plan³⁸. Suriname's trade policy is strongly influenced by its membership in the Caribbean Community (CARICOM) and the World Trade Organization (WTO).

The third trade policy review of Suriname by the WTO in 2019, welcomes the priorities outlined in the Development Plans, to improve the business climate, advance the investment framework, and diversify the economy. However, it is concerned about the lack of approval and implementation of crucial legislation, on issues such as customs procedures, investment, trade facilitation, etc, which have been left pending, sometimes for more than ten years.³⁹

MEASURES AFFECTING EXPORTS OF AGRICULTURAL PRODUCTS

All exports are subject to a consent fee of 0.1% and a statistical fee of 0.5%. These fees apply to exports to all destinations (including the CARICOM) and are calculated on the basis of FOB value. Rice exports are subject to an implicit export tax in the form of an inspection fee. This tax amounts to SRD \$10 per ton for the entire period under review. The Ministry of Trade and Industry has confirmed that the government does not grant any export subsidies to any sector.

MEASURES AFFECTING IMPORTS OF AGRICULTURAL PRODUCTS

Suriname grants duty-free treatment to all imports from CARICOM. Through agreements concluded by CARICOM, Suriname also grants preferential treatment to imports from Cuba, the Dominican Republic, and the European Union.

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37. Derlagen, C., Tas, J., Boyce, R.A., Shik, O., de Salvo, C. P. 2017.

38. Stichting Planbureau Suriname. 2017.

39. WTO. 2019.

In addition to tariffs, all imports, except those originating in CARICOM countries, are subject to a consent fee of 1.5%, and a statistical fee of 0.5%.⁴⁰ A 20% tariff is applied to nearly all agricultural imports from non-CARICOM countries. In the period under review, the only change was an increase in import tariff for poultry from 22% to 40%, implemented in 2018.

Based on the 1997 Law on Turnover Tax, a turnover tax of 10% is applied to most domestically produced and imported goods. For a number of food products, a rate of 0% applies.⁴¹ This includes all products under review, such as rice, meat products, milk, eggs, and fruits, as well as other agricultural commodities, like wheat and potatoes. The manufacturer levies the tax at the point of sale. For imports, the 10% tax is calculated on the basis of the import value of the goods (CIF), plus all other duties and charges.

1.5. OTHER MEASURES

EXCHANGE RATE POLICY

The local currency of Suriname is the Suriname Dollar (SRD). In 2011, the Central Bank of Suriname (CBvS) decided to carry through a devaluation of the local currency by 20%, from SRD \$2.78 to SRD \$3.35 per USD. In addition, a band of SRD \$3.25-\$3.35 per USD was established within which all transactions have to take place. Between 2012 and 2015, the official exchange rate was SRD \$3.25 per US Dollar. In 2016, the Central Bank switched its nominal anchor from the exchange rate to the monetary base. The authorities indicated that Central Bank interventions in the foreign exchange market remain limited and are effectuated only to mitigate excessive volatility⁴². During an overall recession in 2016, a strong depreciation of the Suriname dollar played an important part in pushing up the annual inflation rate. The official exchange rate increased to SRD \$6.2 per USD dollar in 2016 and \$7.4 in 2017-2018.

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40. Ibid.

41. These include baby food, beans, biscuits, bread, butter, cocoa powder, cheese, cold cuts, cooking gas, cooking oil, diapers, diesel oil, disinfectants, eggs, electricity, fresh fish and meat products, fresh fruit and vegetables, margarine, garlic, matches, medicines and medical equipment, milk and powder milk, mosquito coils, oats, peanut butter, potatoes, rice, salt, salted fish, sanitary towels, sardines in oil or tomato sauce, school uniforms and instruction materials, soap, spices, sugar, tea, toilet paper, tomato puree, toothpaste, wheat, and wheat flour.

42. WTO. 2019.

At the beginning of 2020, the parliament passed a law limiting payments with international currencies to avoid further depreciation of the Surinamese dollar, which depreciated from SRD \$7.4 in December 2019, to over SRD \$14 per US dollar in March 2020.⁴³ The law would fix the exchange rate again to the 2019 level and was received with protest by local banks and the private sector. Rapid depreciation then set in, following the news that US \$100 million had disappeared out of the cash reserve of the Central Bank.⁴⁴

The impact of the depreciation of the Surinamese Dollar on the agricultural sector is difficult to estimate. Strong depreciation against the US Dollar (over 100% between 2015 and 2018) increases the competitiveness of Suriname's most important agricultural export commodities, in particular rice and bananas. But as Suriname is strongly dependent on imported inputs (fertilizers, fuel, animal feed, equipment, etc.), production costs have also increased considerably.

For the rice sector, depreciation means that rice has become more competitive in the international market. However, growing production costs may dampen the effects on farm profitability, as prices of fuel and fertilizer (which are both imported) have also increased.

- **For the banana sector**, depreciation of the SRD increases competitiveness but only to a limited extent; FAI exported all its bananas to Europe and payments are made in Euros.
- **For the poultry sector**, depreciation means that imported chicken from Brazil and the United States has become more expensive, and local poultry producers are better able to compete against imported poultry products. However, given that feed costs represent 70% of total production costs of poultry and that nearly all feed is imported, it is difficult to assess the exact impact of depreciation on the poultry sector.
- **For the fishery sector**, depreciation makes the products more competitive in the international market, but effects are limited. The production costs of industrial fishery are largely determined by (imported) fuel prices and staff salaries are paid in US dollars.

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43. See also: NRC. 25/03/2020.

44. See also: NOS. 31/01/2020.

SUBSIDIZED CREDIT

The Agricultural Credit Fund (AKF) has been inactive since 2015. The AKF was established in 2007 to provide preferential credit to agriculture, and was funded with EUR €2.3 million of capital from the Netherlands' development assistance resources. It operated as a revolving fund and was managed by the *Landbouwbank* (Agricultural Bank)⁴⁵, which was acquired by *Volkscredietbank* in 2015.

The AKF used to lend primarily to the rice sector for low interest rates and without the need to provide coverage for smaller amounts. In July 2013, the portfolio of the AKF consisted of 191 loans for a total amount of SRD \$19.4 million. 400 loans were approved in 2014. Loans to the rice subsector represented 37%, or SRD \$7.2 million of the total portfolio in the same year.⁴⁶

In 2016, a review of the financial status of AFK by the *Centrale Landsaccountantsdienst* (CLAD) revealed a debt of SRD \$7 million and a board in operation whose term had already expired months prior. The fund is now under the management of the *Nationale Ontwikkelingsbank* (NOB, National Development Bank), but has not provided any loans since 2015. Rice farmers have financed their harvest through short-term loans at commercial banks and there is no information on outstanding loans.

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45. The *Landbouwbank* is a financial institution fully owned by the Government of Suriname and is responsible for 5% of all credit in Suriname.

46. Derlagen, C., Tas, J., Boyce, R.A., Shik, O., de Salvo, C.P. 2017.

2. ESTIMATES OF SUPPORT TO AGRICULTURAL SECTOR



2.1. METHODOLOGY

The application of the PSE methodology by the OECD (OECD, 2016) provides a standardized quantitative method of measurement of support to the agricultural sector. The OECD has officially estimated the level of support to agriculture for various countries since 1987. The IDB Agrimonitor initiative has applied the methodology since 2003 to its member countries in Latin America and the Caribbean.

Quantitative policy analysis is based on the comparison of the observed market conditions with a benchmark situation. The aggregate effect of the policy in the supply-demand model is measured by the price ratios in the “with” and “without” program situations. In this instance, output producers’ prices (farm gate prices) are compared with prices expected without policy interventions, e.g. reference prices. If the difference between market and reference output prices is positive, policy causes benefits to producers. If negative, policy leads to implicit taxation of the farmers.

The methodology measures support to producers (PSE and related indicators), consumers (CSE), to the sector as a whole (GSSE), and total policy transfers to the agricultural sector (TSE).

2.2. SELECTION OF COMMODITIES AND DATA

This report updates the IDB study of agricultural policy in Suriname carried out in 2016.⁴⁷ Since the PSE indicators are commodity-specific, a commodity selection was carried out to ensure Suriname’s most important products are covered by the analysis and to maximize its policy relevance. The commodity selection attempted to include both pre-defined, standard MPS commodities, as well as the country’s most potentially competitive commodities.

The methodology of the OECD prescribes that all commodities with a less than 1% share in total value of agricultural production are excluded from support estimates and that the sum of the production values of the selected commodities covers at least 70% of the total value of agricultural production over the previous three years. Despite the recognized growth potential, fresh vegetables have not been included, given that the share of individual vegetable products in total value of agricultural production was relatively low and volatile across the years.

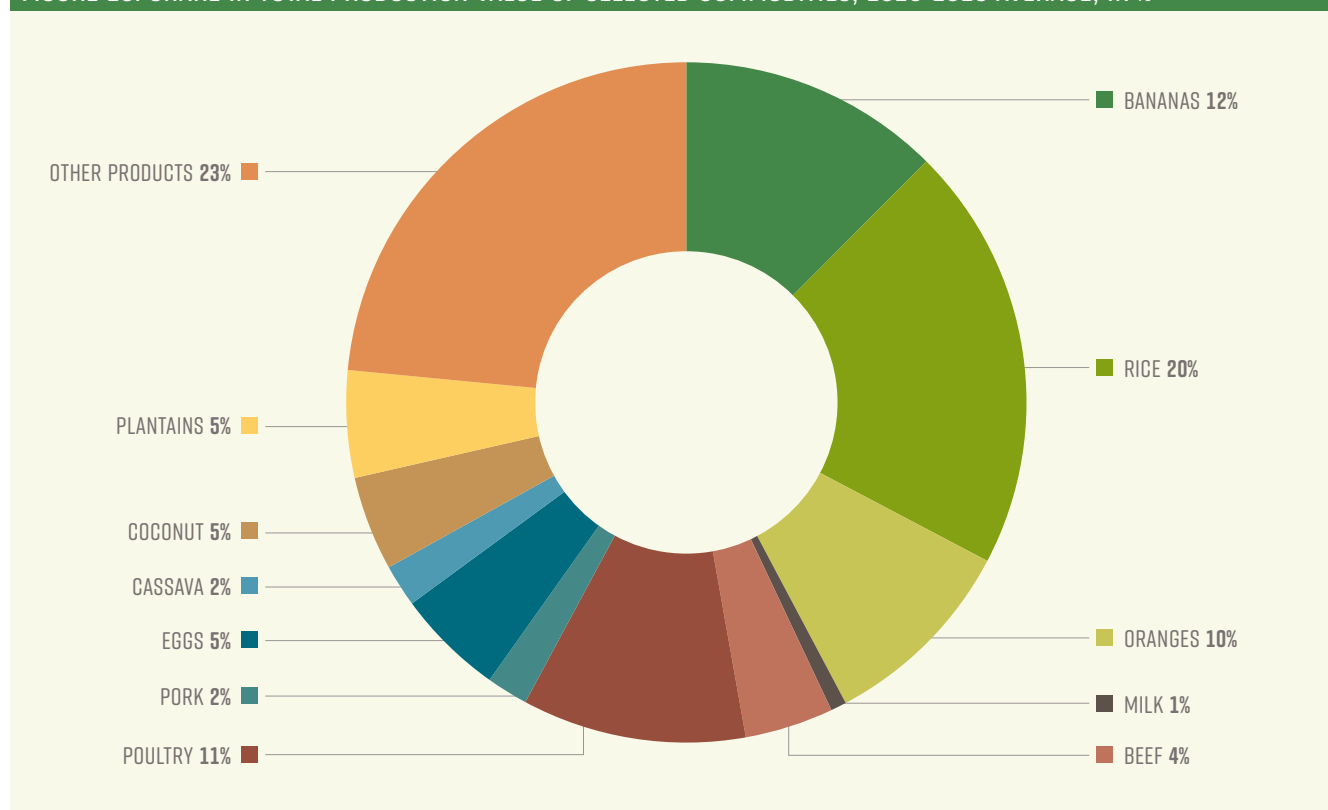
The commodities selected for the PSE calculation in Suriname are the same as those included in the previous study with plantains and coconut added, both representing 5% of total production value between 2015-2018. The selected commodities are listed in Table 6 and Figure 18 shows their share in production value.

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47. Derlagen, C., Tas, J., Boyce, R.A., Shik, O., de Salvo, C. P. 2017.

TABLE 6: SELECTED COMMODITIES FOR SURINAME'S PSE ESTIMATION

EXPORT COMMODITIES	IMPORT COMMODITIES
RICE	POULTRY
BANANAS	BEEF
ORANGES	PORK
CASSAVA	EGGS
PLANTAINS	MILK
COCONUT	—

FIGURE 18: SHARE IN TOTAL PRODUCTION VALUE OF SELECTED COMMODITIES, 2015-2018 AVERAGE, IN %

Source: LVV agricultural statistics. 2019.; author's own calculations.

Domestic prices: Domestic prices for all commodities are farm gate prices as collected and reported in the Agricultural Statistics Compendium of LVV.

Reference prices and margin adjustments: Reference prices are calculated in different ways depending on the trade status of the product. For exported commodities (rice, bananas, cassava, oranges, plantain and coconut), the reference prices are average export unit values, adjusted for processing, transportation and handling costs to make them comparable with domestic farm gate prices.

For imported commodities (poultry, beef, milk, eggs and pork), the reference prices are average import unit values minus processing, transportation and handling costs. For more details on the specific reference price calculations, see Annex V.

Excess feed costs: No cassava is currently used for animal feed. As all cassava produced is used for human consumption, no feed adjustments have been applied. For rice, the quantity used for cattle fodder is included in the feed adjustment in order to exclude double counting of support to rice used as animal feed.

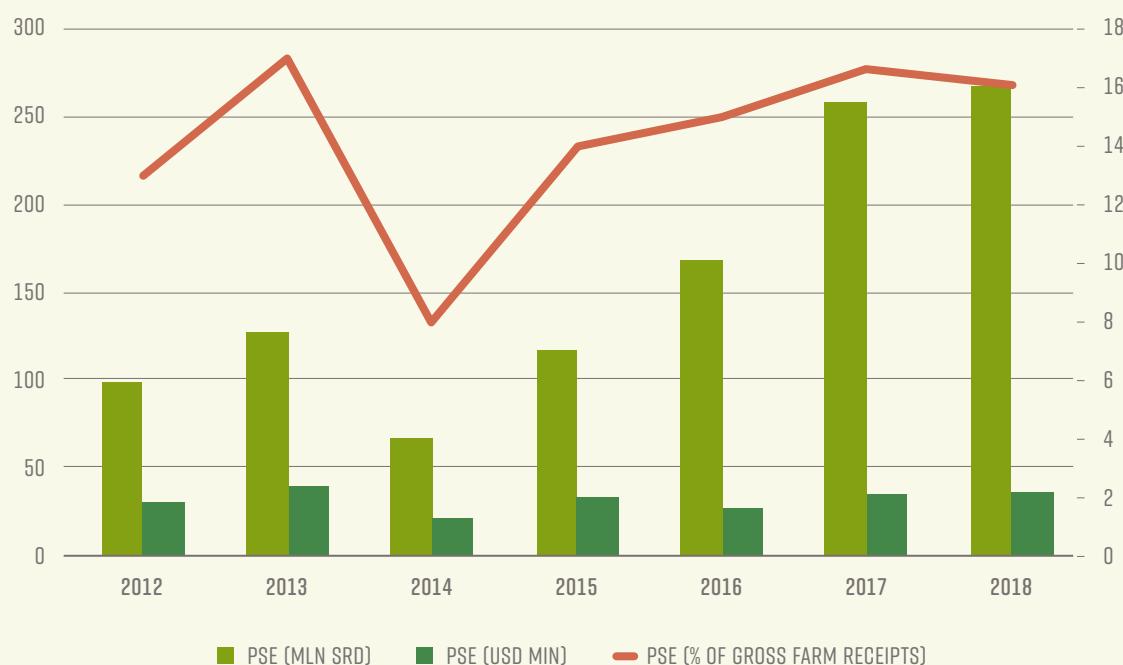
Budget data: government budgets are available until 2018 for all Ministries, containing the actual expenditures. The budgets of the following ministries were included in PSE/GSSE calculations: Ministry of Agriculture, Animal Husbandry and Fisheries; Ministry of Public Works; Ministry of Spatial Planning, Land and Forestry; Ministry of Regional Development; and the Ministry of Trade and Industry.

Only the program budgets of government entities are included in the analysis. The staff and administrative budgets of the ministries are excluded, as they do not generate transfers to producers. The Suriname budget provides descriptions of the programs, however, the programs include various types of transfers in terms of PSE/GSSE classification. If the program is mostly designed to provide on-farm services to producers, it was included in PSE, even though part of the budget costs of the program might include a general services component.

2.3. RESULTS: LEVEL AND STRUCTURE OF SUPPORT

2.3.1. OVERALL SUPPORT TO PRODUCERS

PSE is the major indicator used by the OECD and other international organizations to estimate the effect of policy interventions on the welfare of agricultural producers. It provides an indication of the level of public sector support for food and agriculture in a given country. The annual national PSE in Suriname was SRD \$116 million in 2015, SRD \$169 million in 2016, SRD \$258 million in 2017, and SRD \$267 million 2018. The increasing absolute trend is mostly explained by strong inflation in 2016. The PSE as a percentage of total farm receipts (PSE%) shows a slightly increasing trend from 14% in 2015, to 16% in 2018 (Figure 19).

FIGURE 19: NATIONAL PSE FOR SURINAME, 2015-2018, IN MLN SRD AND USD (LEFT AXIS) AND IN % OF GROSS FARM RECEIPTS (RIGHT AXIS)

Source: author's own calculations.

The main component of PSE in Suriname is market price support (MPS), which is the case in most developing countries. The other component, budget transfers, represent 7% in 2015 and only 1%-2% of total PSE in the years after (Figure 20). This is due to the sharp decrease in government budget for the agricultural sector since the recession in 2016 onwards. MPS measures the effect of agricultural policies on producer prices. Throughout the period under review, producers were supported mainly because they received prices above the international reference (the price they would get in the absence of policies). This has a relatively strong influence on production decisions by farmers and therefore, distorts agricultural markets. A strong driver of MPS is the import tariff put in place to protect domestic producers of poultry meat. This measure allows them to obtain higher prices for the chicken meat they produce.

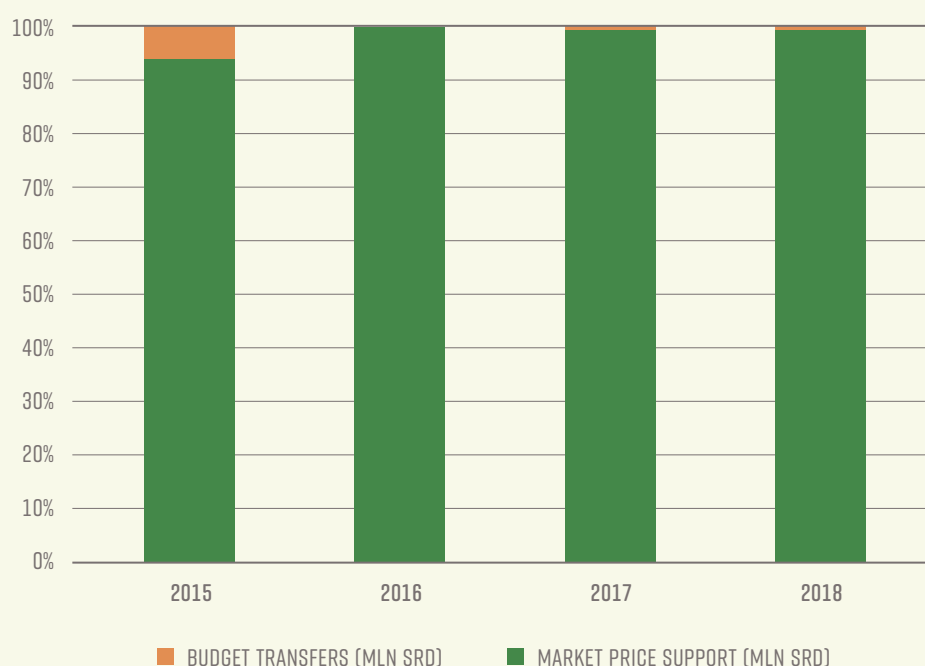
The MPS for the rice sector is negative in all years under review. This means that in the absence of government policies, producers could obtain higher prices than they are currently able to.

Due to its importance in the value of agricultural production and in the agricultural sector in Suriname in general, changes

in the results for rice have a relatively strong effect on national PSE. When the PSE is analysed excluding rice, support for the agricultural sector is much higher across all years, both in terms of value and as a percentage of gross farm receipts (up to SRD \$400 million and 30% of gross farm receipts in 2018). The results of the simulation of PSE indicators excluding the rice sector are demonstrated in Figure 21.

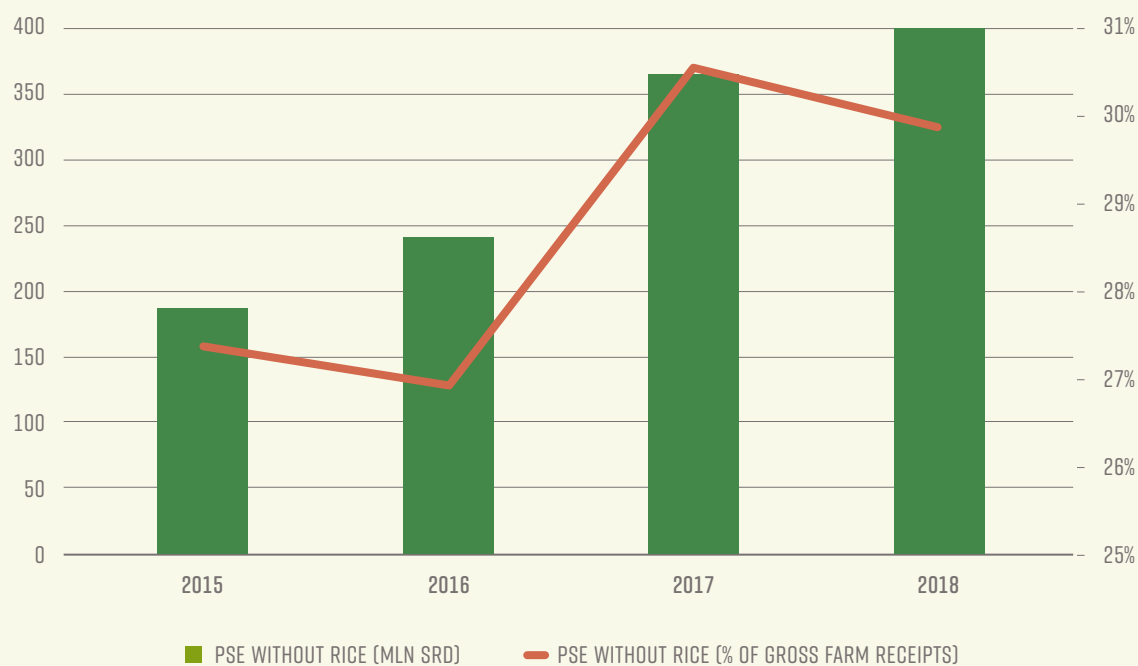
C. Derlagen et al.⁴⁸, discuss different reasons for the negative MPS of rice (which has been negative since at least 2006), including: i) the capacity usage of rice mills is relatively low and as a result, milling is relatively inefficient and costs are high. High costs resulting from this under-utilization of the mills are transferred to producers; ii) transport costs from Nickerie to Paramaribo are significant due to the absence of port facilities in Nickerie; and iii) a widening gap between the international price of rice and the producer price (Figure 22), could point to the relatively weak bargaining position of rice farmers vis-à-vis millers. Explicit taxation of rice exports also contributes to negative MPS.

FIGURE 20: SHARES OF BUDGETARY TRANSFERS AND MPS IN TOTAL PSE, 2015-2018, IN %

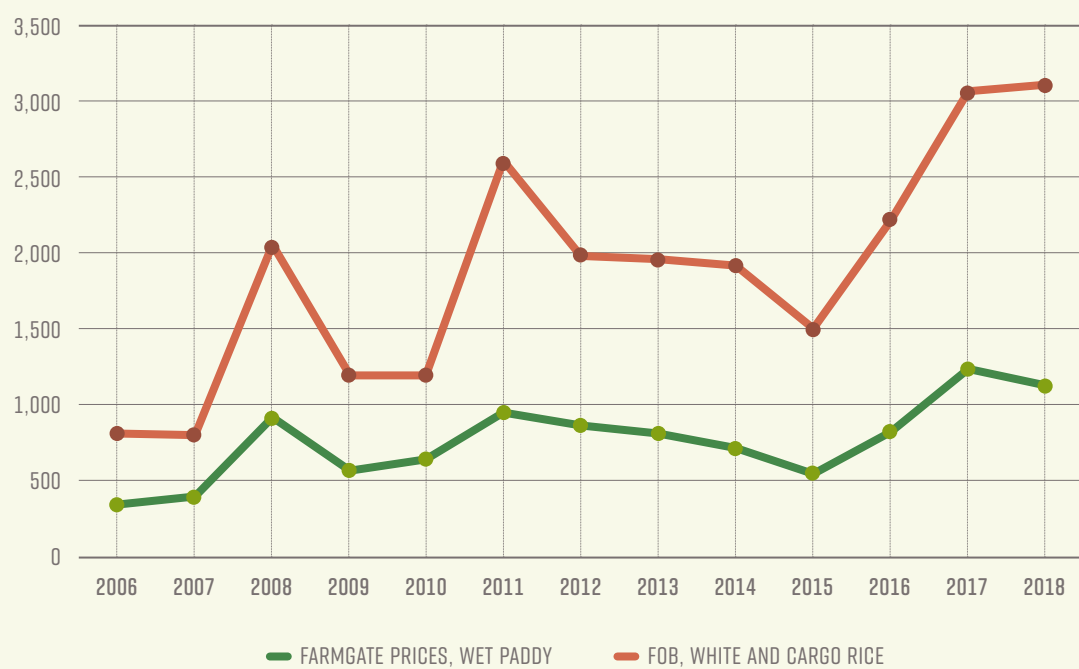


Source: author's own calculations.

48. Derlagen, C., Tas, J., Boyce, R.A., Shik, O., De Salvo, C. P. 2017.

FIGURE 21: NATIONAL PSE FOR SURINAME WITHOUT RICE, 2014-2018, IN MLN SRD AND % OF GROSS FARM RECEIPTS

Source: author's own calculations.

FIGURE 22: FARMGATE PRICES AND FOB PRICES FOR RICE, 2006-2018, SRD/TON

Source: author's own calculations.

The average PSE% of gross farm receipts over the period 2015-2018 is 15.45%. This is higher than what was observed in 2012-2014 (12.3%). Compared to other countries in the region, it is in the high-middle range (Figure 23) and similar to neighboring country, Guyana. Many other countries in the region, such as the United States, Ecuador and Brazil, have much lower PSE levels, while Jamaica, the closest regional reference for Suriname, had significantly higher levels of support. The high PSE indicators for Jamaica are influenced by the country's high tariffs, put in place to shield its poultry subsector from cheap imports, resulting in strong MPS.

FIGURE 23: PSE IN SURINAME AND OTHER COUNTRIES, LAST 3 YEARS AVERAGE IN % OF GROSS FARM RECEIPTS



Source: author's own calculations, IDB database, OECD PSE database.

2.3.2. SUPPORT TO PRODUCERS BY COMMODITY

The level of support for individual commodities is measured through MPS and producer single commodity transfer (SCT), which indicate the support provided through both price support policies and budget transfers benefiting specific commodities. The SCT% indicator provides insight into the total support for each commodity, as a percentage of the product's gross farm receipts (Table 7).

TABLE 7: SINGLE COMMODITY TRANSFERS, 2015-2018, IN % OF PRODUCT'S GROSS FARM RECEIPTS

	2015	2016	2017	2018
BEEF AND VEAL	43.64	1.01	31.65	44.34
BANANAS	0.00	0.00	0.00	0.00
COCONUTS	72.40	44.04	28.15	28.23
CASSAVA	0.00	56.02	45.27	65.78
EGGS	33.01	48.59	33.81	-7.22
MILK	52.53	41.71	21.61	34.65
ORANGES	74.02	75.5	81.68	70.12
PIGMEAT	64.73	43.69	37.06	43.84
PLANTAINS	26.19	34.87	8.26	9.98
POULTRY MEAT	26.61	29.93	41.06	49.93
RICE	-49.21	-33.31	-31.24	-46.11

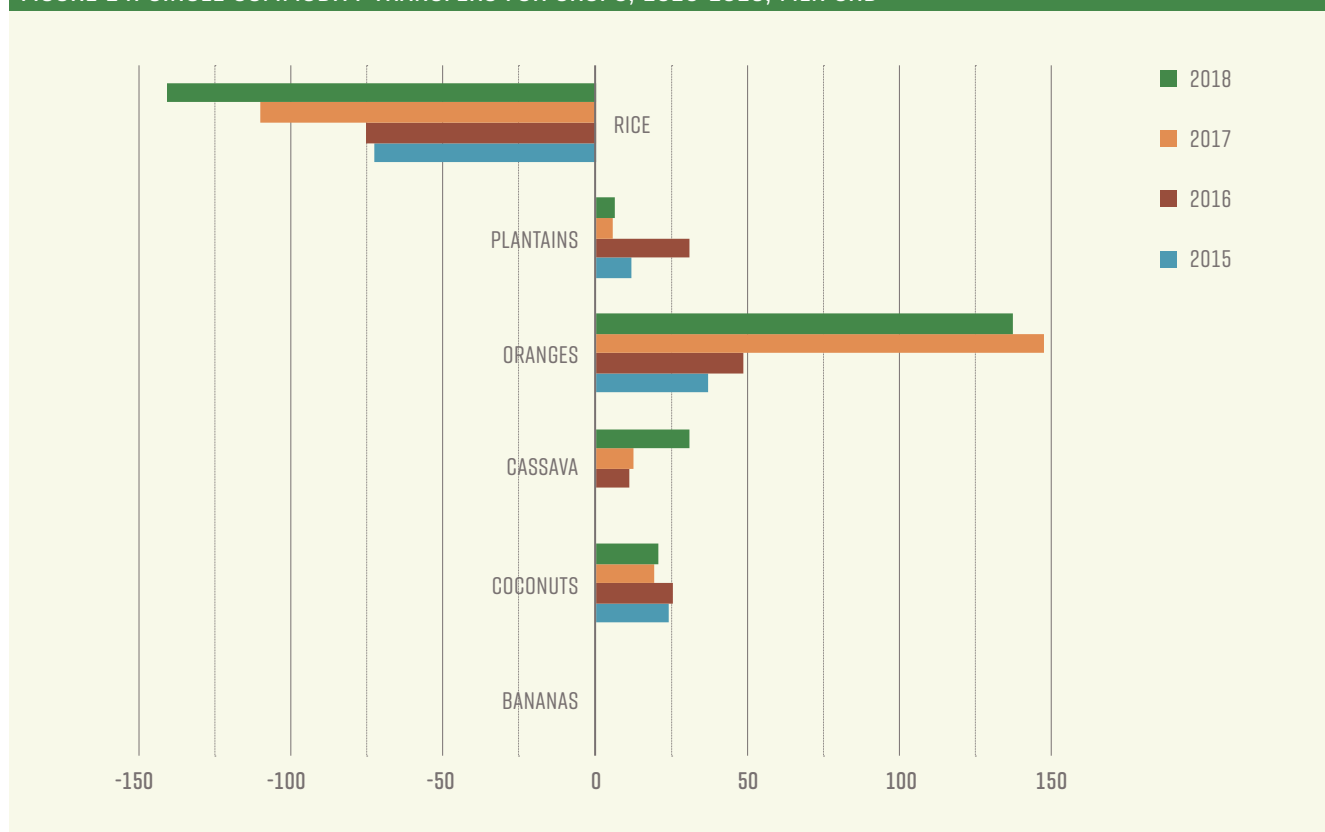
Source: author's calculations.

CROPS

As demonstrated in Figure 24, SCTs to crops have generally been positive, except for rice.

The negative support for rice is quite significant, varying in relative terms between 31% and 49% of its total value of production between 2015 and 2018. This is explained by the export tax (SRD \$10/ton, 1%-2% of the producer price), as well as the value chain inefficiencies, preventing price transmission (i.e. market power of the millers). There are no budget subsidies or taxes on rice producers, so the negative levels of SCT are entirely created by the negative MPS. The reasons for the negative MPS are discussed above in 3.1.

FIGURE 24: SINGLE COMMODITY TRANSFERS FOR CROPS, 2015-2018, MLN SRD



Source: author's own calculations.

However, there may be an undervaluation of the budgetary support for the rice sector. Almost 90% of the General Service Support Estimate is directed to infrastructure development and maintenance, which mainly consists of irrigation and drainage infrastructure, benefitting the rice sector. Research efforts are also largely directed to the rice subsector development.

The banana value chain is integrated and almost entirely controlled by a single company (until recently a private company). During the period under review, there were no policies identified that affected the banana subsector and therefore, its MPS was set to zero. Under the EU's Banana Accompanying Measures, a total of €9.3 million was allocated to Suriname for increased investment in the sector, but these investments were not realized.

The positive support for **cassava, coconut and plantains** seems low in absolute terms, but represent a high share of the crop production value. There are no specific support measures applicable to these sectors, so positive levels can be explained by higher reference prices than farm gate prices and inefficiencies

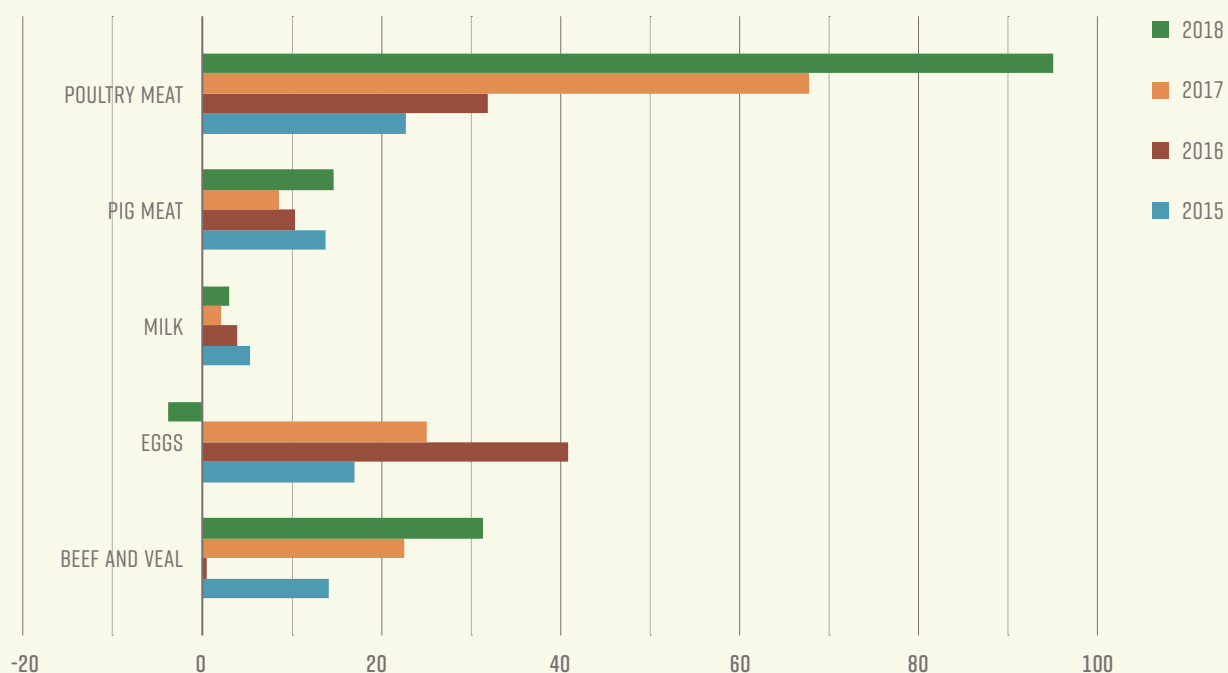
in the value chains. Cassava producers used to receive minimum procurement prices, but this policy was no longer active during the period under review.

The SCT for **oranges** is high and has shown an increasing trend over the years. There is almost no budgetary support provided through public funding for the distribution of planting materials or the establishment of nurseries, so the positive SCT is due to the MPS of oranges. Orange producers benefit from domestic prices that are significantly higher than reference prices. This is mainly due to the high cost structure for the orange market thanks to the low degree of the sector's professionalization.

LIVESTOCK

Producers of all types of livestock commodities benefit from agricultural policy, as shown in Figure 25. These sectors produce import-substituting commodities and therefore, are protected by import duties. They are excluded from the tariff liberalization schedule in CARICOM.

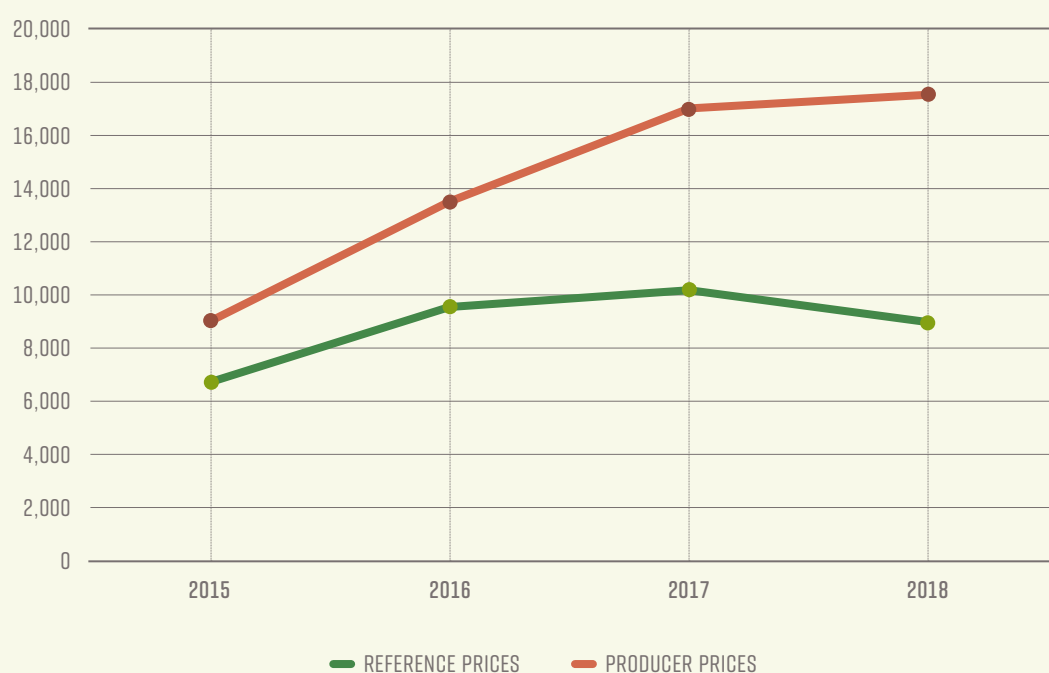
FIGURE 25: SINGLE COMMODITY TRANSFERS FOR LIVESTOCK, 2015-2018, MLN SRD



Source: author's own calculations.

The **poultry** subsector is supported by government policy, with an increasing level of support both in absolute and relative terms between 2015 and 2018. This support can only be partially explained by the import tariff that increased during the period of the study, which is the source of prevailing high domestic prices. Although domestic prices in Suriname generally keep track with international poultry prices, a widening price gap was observed over the years. The government policy currently in place creates higher consumer prices, but enables better pricing conditions for local producers (Figure 26).

FIGURE 26: POULTRY REFERENCE AND PRODUCER PRICES, 2015-2018, SRD/TON

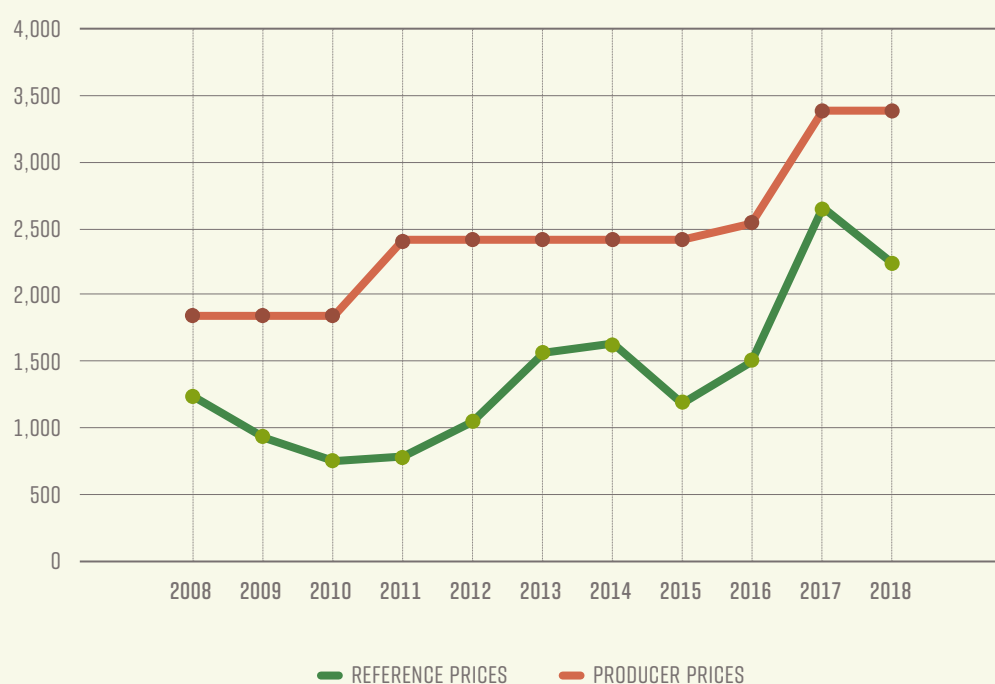


Source: author's own calculations.

The **milk** market is the most regulated market among livestock commodities in Suriname. The state-owned dairy processing plant, *Melkcentrale Paramaribo*, purchases milk from farmers at fixed prices that are higher than the estimated border price. The absolute and relative support to the milk sector decreased sharply compared to the period 2012-2014. This can be explained by: i) a narrowing gap (2015-2017) between the prices received by farmers and the reference price (Figure 27). After a long period of stable producer prices, a higher producer price was implemented

in 2017, to better meet the cost of production and avoid a further decline in local milk production; ii) the absolute volumes of local milk production have decreased significantly between 2012 and 2018 from 4.96 tons to 2.63 tons and have been increasingly substituted by imported powder milk. The SCT of milk reflects that the price consumers pay for milk is above the price they should pay based on the price level observed in the international market.

FIGURE 27: MILK PRODUCTION AND REFERENCE PRICES, 2008-2018, SRD/TON



Source: LVV and author's own calculations.

For both **pork and beef**, farmers were supported by government policies throughout the period under review as they received prices that are above the reference. The MPS for beef was negative in 2016, and has been changed to 0, as this price gap was explained by non-policy reasons. The MPS of beef has increased over the years, mainly due to a sharp increase in reference prices between 2015 and 2016, along with more moderately increasing production prices.

The SCT for **eggs** was positive in 2015-2017, indicating that producers receive higher prices than they would in the absence of any policy. In 2018, the SCT was negative, due to a negative MPS resulting from a sharp increase in the reference price.

In general, the SCT indicates the effect of policy on agricultural producers and consumers. However, it also includes implicit non-policy effects, especially in developing countries. Non-policy factors that have a big impact on the above results, include:

- **Exchange rate instability:** steep exchange rate depreciation in 2016.
- **Insufficient or costly access to finance and unstable regulatory and juridical systems:** with the inactivity of the Agricultural Credit Fund (AKF), access to credit for small-scale producers have become challenging. Suriname ranks very low on the overall competitiveness ranking of the World Economic Forum.
- **Underdevelopment of physical infrastructure:** the poor condition of irrigation and drainage systems, insufficient storage facilities, and poor access to port facilities all drive up costs for producers and traders.
- **Obsolete technology in the processing industry,** resulting in lower outturns and limited value addition.
- **Little organisation and production concentration:** farmers receive lower prices and middlemen receive a higher share of market margins due to asymmetries in market information and power.

2.3.3. ESTIMATES OF SUPPORT TO GENERAL SERVICES

The general services support estimate (GSSE) records transfers from the government budget to services that benefit the agricultural sector collectively.⁴⁹ Figure 28 shows the level of GSSE in real prices.

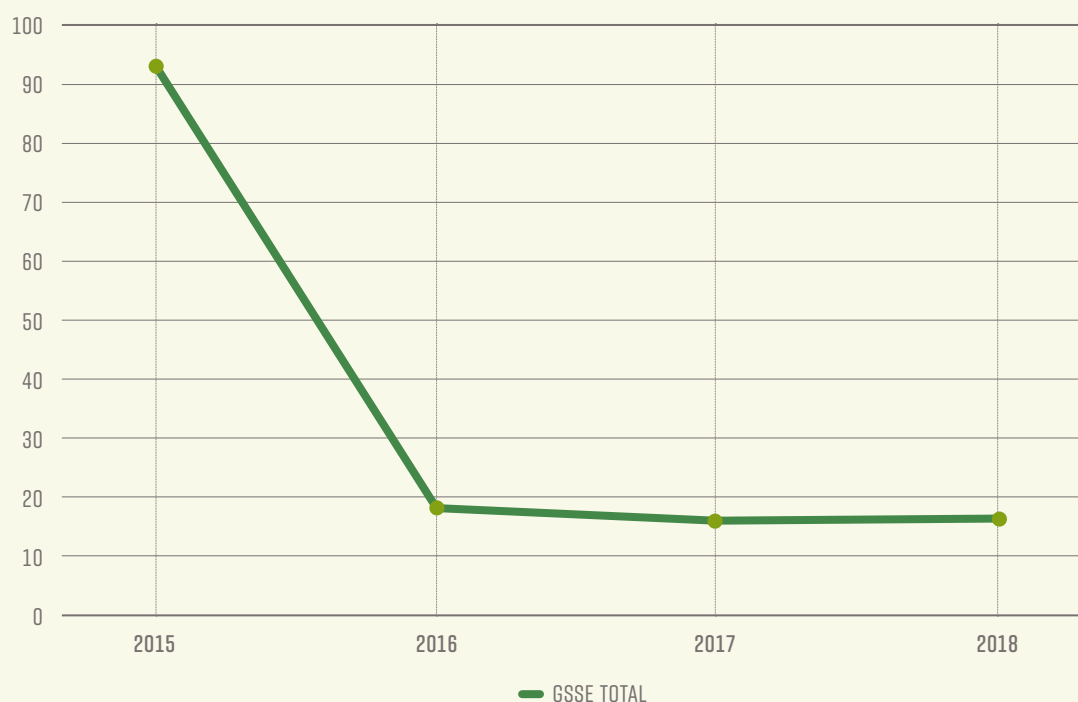
As can be seen from Figure 28, budgetary transfers to the sector as a whole decreased sharply after 2015, due to the recession in the country and reduction of the program budget of LVV. The budgetary transfers total balanced between SRD \$16 million and SRD \$18 million on an annual basis (USD \$2.2–\$2.8 million).

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49. Support to general services, measured by GSSE, includes transfers that create an enabling environment for agriculture, such as support to agricultural innovation systems, inspection and control systems, marketing and promotion and rural infrastructure support.

General services support provided to agriculture accounted for over 45% of total transfers to agriculture (including MPS) in 2015, but dropped to 9.5% and 6% in the following years. This is very low compared to the region's average, but comparable to Jamaica and Nicaragua's levels.

FIGURE 28: LEVEL OF GENERAL SERVICES SUPPORT ESTIMATE, 2015-2018, MLN SRD



Source: author's own calculations.

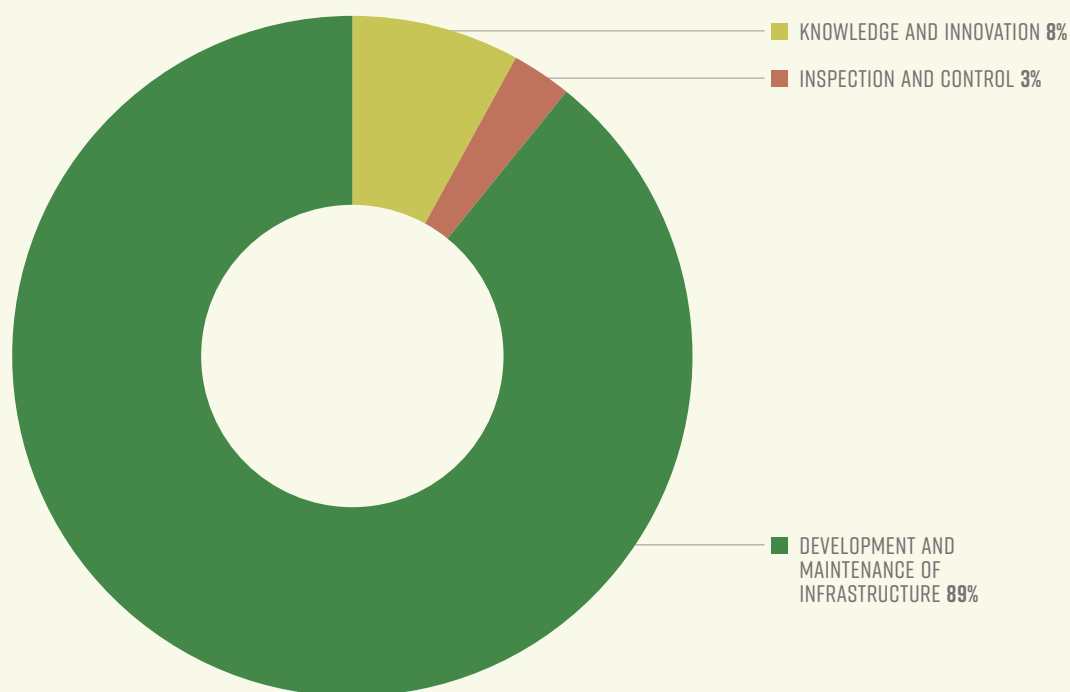
The composition of support to general services is shown in Figure 29. On average, 89% of GSSE consists of support for the development and maintenance of infrastructure. Given that Suriname's most important export crop is rice, irrigation and drainage infrastructure investments are essential in order to maintain agricultural productivity under changing climate conditions. While investment in general services and especially infrastructure is key for the long-term economic sustainability of the agricultural sector and to increase competitiveness, there is a clear underfinancing of research and development (on average 8% of GSSE), and inspection and control (animal and plant health) services.

The importance of infrastructure related expenditures in the GSSE decreased in the period under review. The relative share

of knowledge and innovation programs increased in the severely reduced budget of LVV after 2016.

An important note is that budget expenditures are not reported in detail, but only at the program level. It has not been possible to analyze the data at a disaggregated level. Therefore, the GSSE results for Suriname may overestimate support to agriculture. This is particularly true for expenditures related to irrigation and drainage infrastructure maintenance and rehabilitation, as it is difficult to assess which drainage and irrigation expenditures specifically benefit the agriculture sector.

FIGURE 29: COMPOSITION OF GSSE, 2015-2018 AVERAGE



Source: author's own calculations.

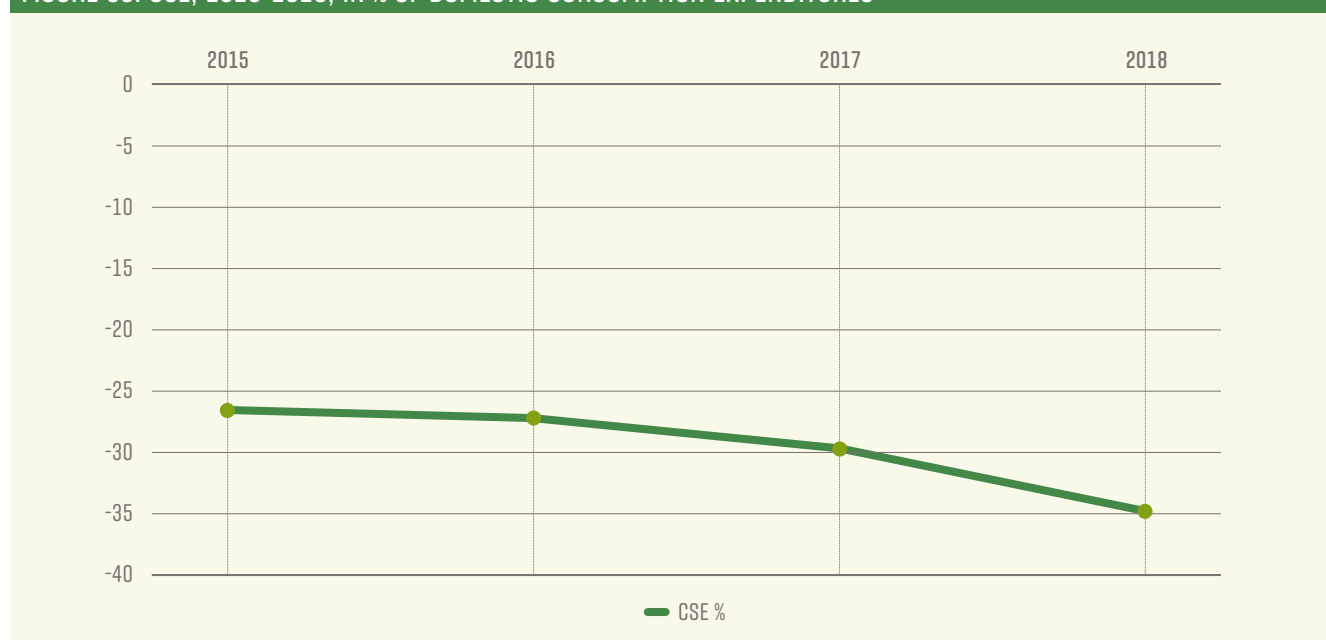
2.3.4. ESTIMATES OF SUPPORT TO CONSUMERS

The CSE is the common indicator of support that quantifies how agricultural support policies affect the consumers of agricultural commodities. Negative national CSE means that there are transfers from consumers to producers of agricultural commodities.

In Suriname, CSEs as a percentage of domestic consumption expenditure is negative throughout the entire period under review. As shown in Figure 30, the percentage CSE (CSE%) varied between -26% and -35% of domestic consumption expenditure. This means that consumers in Suriname paid significantly higher prices for their food than in the absence of government policy. In Suriname, 8.5% of the population was food insecure between 2016 and 2018.⁵⁰

Transfers from consumers to producers were observed for all live-stock commodities. The negative CSCT indicators for all these products mean that support to farmers in these sectors originated primarily from transfers from consumers who pay higher prices for their products. The producers of these commodities are supported mainly at the expense of domestic consumers, who pay higher prices for milk, poultry meat, beef, pork, and eggs.

FIGURE 30: CSE, 2015-2018, IN % OF DOMESTIC CONSUMPTION EXPENDITURES

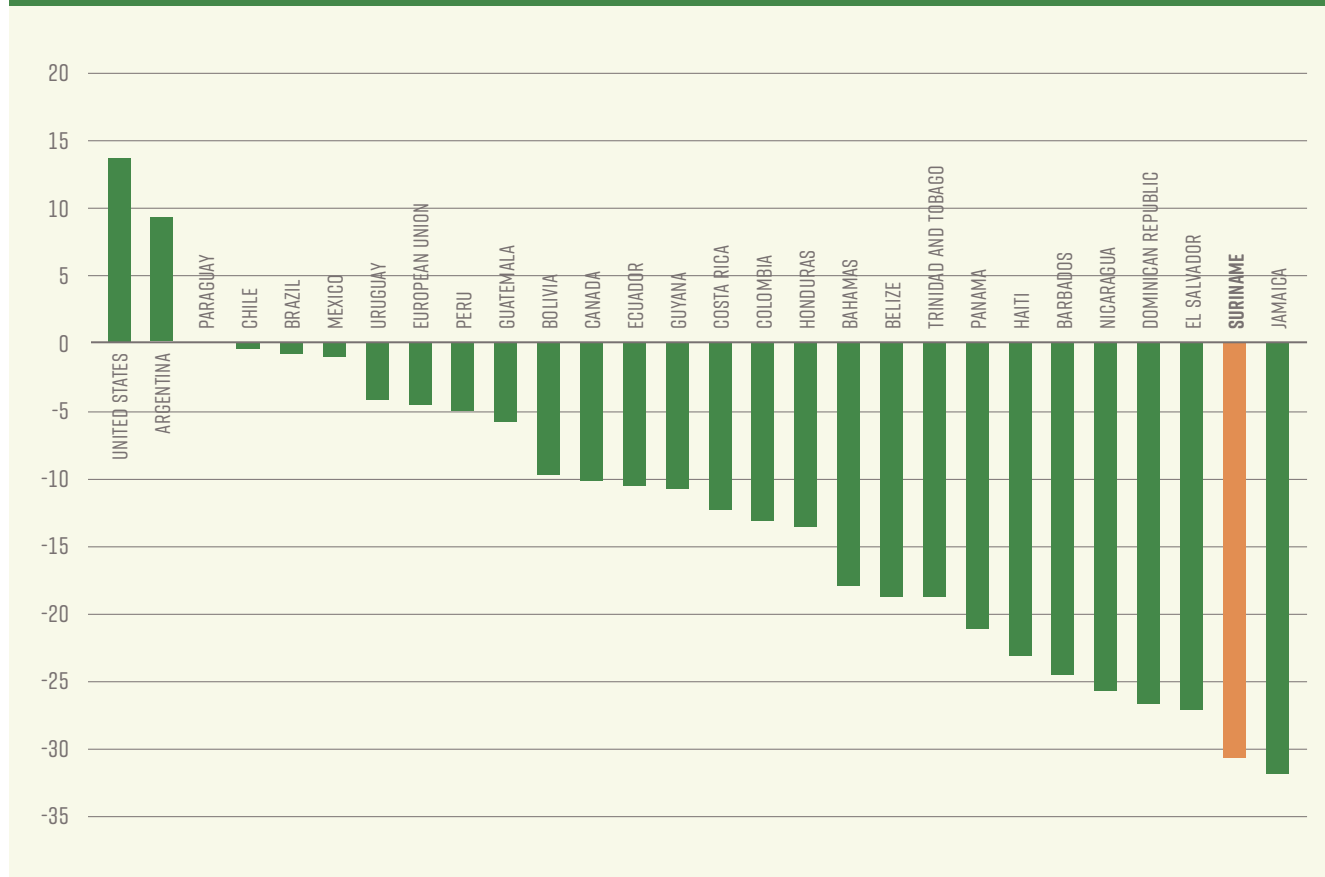


Source: author's own calculations.

50. FAO. 2019. State of World Food Insecurity.

A negative CSE% is the case in most Latin American and Caribbean countries, but Suriname Consumer Support estimates Suriname's CSE% to be at an average of -29.6%. This puts Suriname's CSE% among the most negative in the region, together with Jamaica and El Salvador (Figure 31). In low-income countries, governments have, historically, often taxed their agricultural sectors by lowering food prices, as concerns for the welfare and food security of (urban) consumers are considered more important than farming profitability. When incomes grow in the country, however, governments tend to provide more support to agricultural producers at the expense of consumers. In Suriname, there are no direct programs to create transfers to consumers, such as school meal programs.

FIGURE 31: CSE IN SURINAME AND OTHER COUNTRIES, LAST 3 YEARS AVAILABLE, IN %



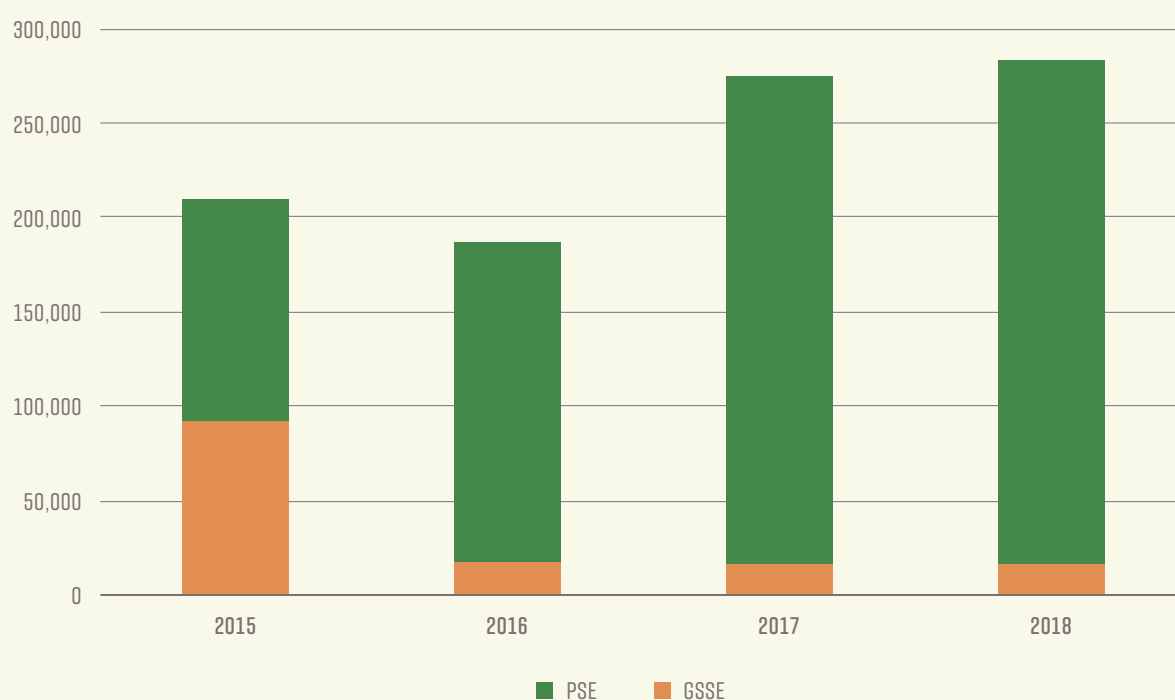
Source: author's own calculations, IDB database, OECD PSE database.

2.3.5. ESTIMATES OF TOTAL SUPPORT TO THE AGRICULTURAL SECTOR

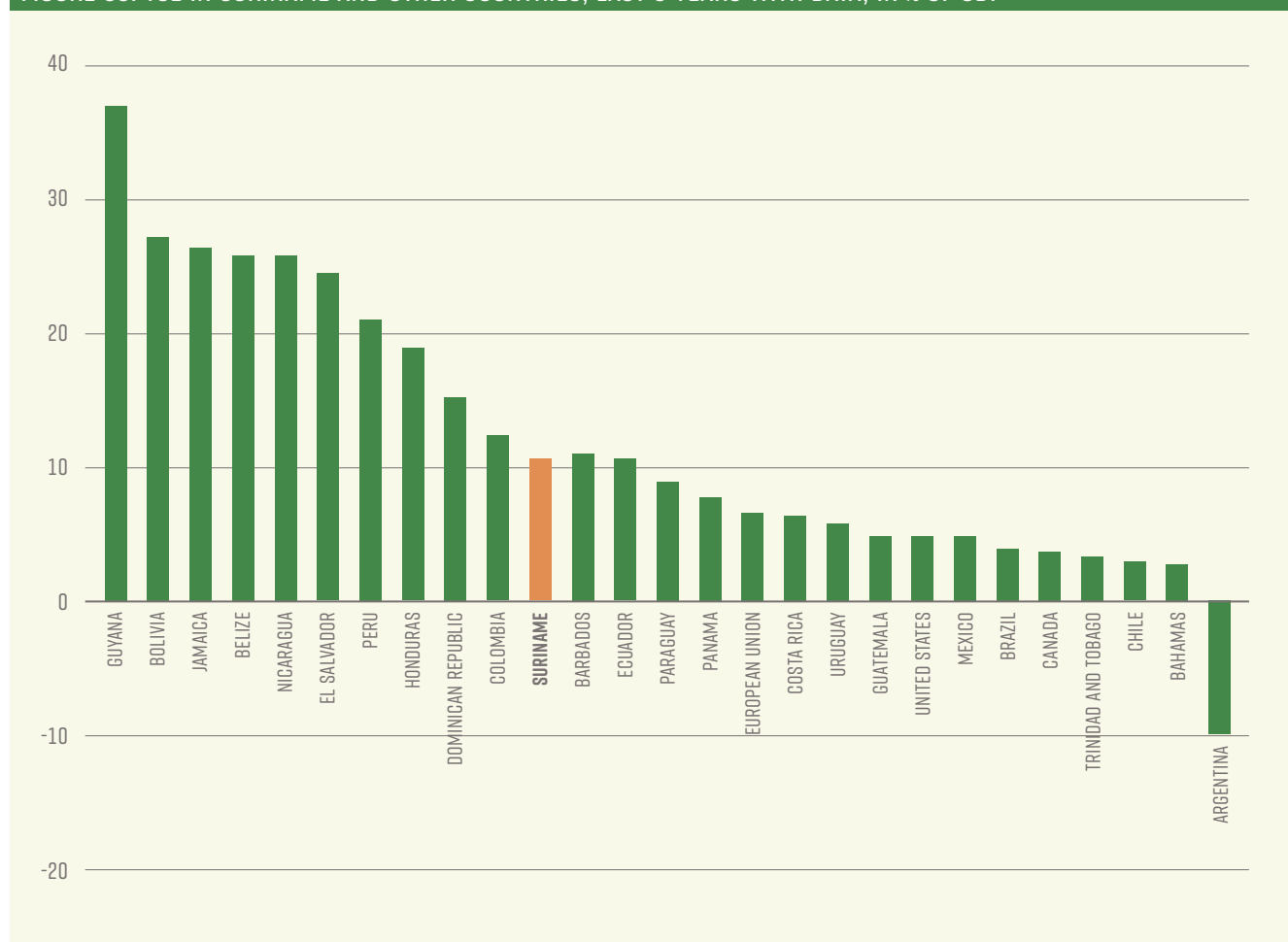
PSE, GSSE and transfers to consumers from taxpayers are jointly called the **Total Support Estimate (TSE)**, which indicates the aggregate of transfers in the economy as a result of agricultural policy. The TSE is usually estimated in percentage form as a share in GDP to demonstrate the burden of agriculture-related transfers on the economy.

Figure 32 shows that between 2015 and 2018, the Total Support Estimate to the sector in Suriname increased from SRD \$209 million in 2015, to SRD \$283 million in 2018. The increase is largely explained by the depreciation of the local currency reflected in the higher MPS, which compensates for the decrease in GSSE. There were no transfers to consumers from taxpayers. Between 2015 and 2018, the total support to the agricultural sector was the equivalent of 1.12 % of GDP. From an international perspective (Figure 33), this result is in line with the average of sector support in the region and comparable to the support level of Colombia, Ecuador and Barbados.

FIGURE 32: TSE PER COMPONENT, 2015-2018, IN MLN SRD



Source: author's own calculations.

FIGURE 33: TSE IN SURINAME AND OTHER COUNTRIES, LAST 3 YEARS WITH DATA, IN % OF GDP

Source: author's own calculations, IDB database, OECD PSE database.

The following Table 8 gives an overview of all the support estimates and budget data.

TABLE 8: OVERVIEW OF SECTOR SUPPORT IN SURINAME, 2015-2018

	UNIT	2015	2016	2017	2018
I. TOTAL VALUE OF PRODUCTION (AT FARM GATE)	SRD MN	824.3	1,123.0	1,547.2	1,655.9
I.I TOTAL VALUE OF PRODUCTION OF WHICH, SHARE OF MPS COMMODITIES	%	70.94	78.15	79.68	75.24
II. TOTAL VALUE OF CONSUMPTION (AT FARM GATE)	SRD MN	894.51	1,209.08	1,561.69	1,608.36
II.I VALUE OF CONSUMPTION (FARM GATE): MPS COMMODITIES	SRD MN	634.60	944.86	1,244.29	1,210.10
III.1 PRODUCER SUPPORT ESTIMATE (PSE)	SRD MN	116.29	168.75	258.29	267.17
A. SUPPORT BASED ON COMMODITY OUTPUTS	SRD MN	109.19	167.79	256.02	264.90
A1. MARKET PRICE SUPPORT	SRD MN	109.19	167.79	256.02	264.90
BEEF AND VEAL	SRD MN	14.15	0.43	22.59	31.35
BANANAS	SRD MN	0.00	0.00	0.00	0.00
COCONUTS	SRD MN	24.16	25.46	19.09	20.40
CASSAVA	SRD MN	0.00	10.98	12.15	30.68
EGGS	SRD MN	19.35	40.85	24.74	-3.71
MILK	SRD MN	5.30	3.84	2.21	3.05
ORANGES	SRD MN	36.84	48.87	147.49	137.09
PIGMEAT	SRD MN	13.71	10.33	8.67	14.64
PLANTAINS	SRD MN	11.52	30.87	5.40	6.38
POULTRY MEAT	SRD MN	22.82	31.94	67.92	95.07
RICE	SRD MN	-70.39	-72.44	-106.28	-135.64
NON MPS COMMODITIES	SRD MN	31.73	36.67	52.03	65.59
A2. PAYMENTS BASED ON OUTPUT	SRD MN	0.00	0.00	0.00	0.00
B. PAYMENTS BASED ON INPUT USE	SRD MN	7.10	0.96	2.27	2.27
B1. VARIABLE INPUT USE	SRD MN	0.06	0.02	0.00	0.00
B2. FIXED CAPITAL FORMATION	SRD MN	6.32	0.67	1.96	1.96
B3. ON-FARM SERVICES	SRD MN	0.72	0.27	0.31	0.31
C. PAYMENTS BASED ON CURRENT A/AN/R/I, PRODUCTION REQUIRED	SRD MN	0.00	0.00	0.00	0.00
D. PAYMENTS BASED ON NON-CURRENT A/AN/R/I, PRODUCTION REQUIRED	SRD MN	0.12	0.13	0.20	0.20
E. PAYMENTS BASED ON NON-CURRENT A/AN/R/I, PRODUCTION NOT REQUIRED	SRD MN	0.00	0.00	0.00	0.00
F. PAYMENTS BASED ON NON-COMMODITY CRITERIA	SRD MN	0.00	0.00	0.00	0.00
F1. LONG-TERM RESOURCE RETIREMENT	SRD MN	0.60	0.14	0.11	0.11
F2. A SPECIFIC NON-COMMODITY OUTPUT	SRD MN	0.00	0.00	0.00	0.00
F3. OTHER NON-COMMODITY CRITERIA	SRD MN	0.00	0.00	0.00	0.00
G. MISCELLANEOUS PAYMENTS	SRD MN	0.00	0.00	0.00	0.00
III.2 PERCENTAGE PSE	%	13.99	15.01	16.67	16.11
IV. GENERAL SERVICES SUPPORT ESTIMATE (GSSE)	SRD MN	92.96	17.88	15.99	16.27

Source: author's own calculations.

TABLE 8: OVERVIEW OF SECTOR SUPPORT IN SURINAME, 2015-2018

	UNIT	2015	2016	2017	2018
H. AGRICULTURAL KNOWLEDGE AND INNOVATION SYSTEM	SRD MN	4.05	3.16	2.47	1.74
H1. AGRICULTURAL KNOWLEDGE GENERATION	SRD MN	4.05	2.58	1.95	1.24
H2. AGRICULTURAL KNOWLEDGE TRANSFER	SRD MN	0.00	0.59	0.52	0.50
H2A. EDUCATION	SRD MN	0.00	0.59	0.52	0.50
H2B. EXTENSION SERVICES	SRD MN	0.00	0.00	0.00	0.00
I. INSPECTION AND CONTROL	SRD MN	1.51	0.27	1.51	0.79
I1. AGRICULTURAL PRODUCT SAFETY AND INSPECTION	SRD MN	0.00	0.00	0.00	0.00
I2. PEST AND DISEASE INSPECTION AND CONTROL	SRD MN	1.51	0.27	1.51	0.79
I3. INPUT CONTROL	SRD MN	0.00	0.00	0.00	0.00
J. DEVELOPMENT AND MAINTENANCE OF INFRASTRUCTURE	SRD MN	87.40	14.45	12.01	13.74
J1. HYDROLOGICAL INFRASTRUCTURE	SRD MN	70.76	14.35	12.01	13.74
J2. STORAGE, MARKETING AND OTHER PHYSICAL INFRASTRUCTURE	SRD MN	16.59	0.10	0.00	0.00
J3. INSTITUTIONAL INFRASTRUCTURE	SRD MN	0.05	0.00	0.00	0.00
J4. FARM RESTRUCTURING	SRD MN	0.00	0.00	0.00	0.00
K. MARKETING AND PROMOTION	SRD MN	0.00	0.00	0.00	0.00
K1. COLLECTIVE SCHEMES FOR PROCESSING AND MARKETING	SRD MN	0.00	0.00	0.00	0.00
K2. PROMOTION OF AGRICULTURAL PRODUCTS	SRD MN	0.00	0.00	0.00	0.00
L. COST OF PUBLIC STOCKHOLDING	SRD MN	0.00	0.00	0.00	0.00
M. MISCELLANEOUS	SRD MN	0.00	0.00	0.00	0.00
V.1 CONSUMER SUPPORT ESTIMATE (CSE)	SRD MN	-238.22	-329.09	-464.23	-560.69
N. TRANSFERS TO PRODUCERS FROM CONSUMERS (-)	SRD MN	-155.62	-208.85	-303.49	-355.77
TRANSFERS TO PRODUCERS FROM CONSUMERS OF WHICH, MPS COMMODITIES	SRD MN	-110.40	-163.21	-241.81	-267.68
O. OTHER TRANSFERS FROM CONSUMERS (-)	SRD MN	-80.01	-117.56	-156.83	-199.93
OTHER TRANSFERS FROM CONSUMERS OF WHICH, MPS COMMODITIES	SRD MN	-56.76	-91.87	-124.95	-150.42
P. TRANSFERS TO CONSUMERS FROM TAXPAYERS	SRD MN	0.00	0.00	0.00	0.00
Q. EXCESS FEED COST	SRD MN	-2.59	-2.67	-3.91	-4.99
V.2 PERCENTAGE CSE	%	-26.63	-27.22	-29.73	-34.86
V.3 CONSUMER NAC	RATIO	1.36	1.37	1.42	1.54
VI. TOTAL SUPPORT ESTIMATE (TSE)	SRD MN	209.25	186.63	274.28	283.44
R. TRANSFERS FROM CONSUMERS	SRD MN	235.63	326.42	460.32	555.70
S. TRANSFERS FROM TAXPAYERS	SRD MN	53.64	-22.22	-29.22	-72.33
T. BUDGET REVENUES (-)	SRD MN	-80.01	-117.56	-156.83	-199.93
VI.1 PERCENTAGE TSE	%	1.28	0.96	1.14	1.10
VI.2 PERCENTAGE GSSE	%	44.43	9.58	5.83	5.74

Source: author's own calculations.

3. ESTIMATES OF SUPPORT TO FISHERY SECTOR



3.1. METHODOLOGY

Budget transfers to fisheries were estimated following the OECD Fishery Support Estimate (FSE) methodology.⁵¹ “Support” is understood as transfers from domestic governments to domestic fishers, arising from governments’ policies and may be budgetary or non-budgetary in nature. A policy measure is included in FSE if it generates transfers to fishers, either individually or collectively, regardless of the nature, objectives or impacts of the policy measure. The Fishery Support Estimate (FSE) consists of budgetary support to individual fishers (TIF-Budgetary), budgetary support to the fishers collectively (GSSE), and non-budgetary support to individual fishers (market price support (MPS) and fuel tax concessions (FTC)).

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51. OECD 2015.

Non-budgetary support to fishers is provided in Suriname in the form of Fuel Tax Concessions (FTC). To calculate the FTC, the unit rate of support is calculated as the difference between the price paid by the average household user for automotive diesel fuel and the price paid by fishers. This unit rate of support is multiplied by the total amount purchased to arrive at the total value of the transfer.

Many of the policies reported in the FSE are subject to some form of cost sharing or cost recovery from fishers that benefit from them, which are deducted from the total fishery support estimate. Market Price Support (MPS) for fisheries is not calculated by the OECD and have not been calculated in this study, because of the lack of good data on quantities and prices for different fish and shrimp products.

3.2. DATA AND RESULTS

The Fishery Support Estimate (FSE) is analyzed with and without Fuel Tax Concessions (FTC). In Suriname, there were no budgetary transfers to individual fishers (TIF) during the years 2015-2018. Support to general services was limited (Table 9) and the main item was enforcement expenditures by the Coast Guard. The budgetary Fishery Support Estimate (FSE) was negative in 2016 and 2017, as the Cost Recovery (CR) charges for obtaining fishing licenses are higher than General Service Support Estimate (GSSE).

One of the main income sources for the Ministry of Agriculture, Livestock and Fishery is the license fees paid by domestic fishers, both industrial and artisanal. The annual fees paid depend on the boat and its brut weight. Artisanal fishers pay between USD \$100 and USD \$335 annually, industrial companies between USD \$3,500 and \$15,000.⁵² The license fees are added as a cost recovery item. Industrial processors pay around USD \$1,800-\$2,700⁵³ monthly for quality inspections of the VKI, a private judicial entity (independent, non-profit), under the Ministry of Agriculture, Animal Husbandry and Fisheries. As this is a paid-for service, the sum of the support and the cost recovery charge is assumed to be zero. The same logic applies for government owned landing sites, which often charge artisanal fisher boats a landing fee.

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52. Data received from Fish Inspection Institute (VKI); amounts of artisanal fishers reported in SRD converted to USD with 01.01.2020 conversion rate (1 USD: 13 SRD).

53. Data received from SAIL.

TABLE 9: FISHERIES SUPPORT ESTIMATE DATA, 2015-2018

INDICATOR	UNIT	2015	2016	2017	2018
FISHERIES SUPPORT ESTIMATE - TOTAL	SRD \$ 000	13,295.80	10,777.80	17,471.40	21,014.40
FISHERIES SUPPORT ESTIMATE - NON BUDGETARY	SRD \$ 000	11,972.80	11,972.80	20,952.40	20,952.40
O. TRANSFERS TO INDIVIDUAL FISHERS - NON BUDGETARY	SRD \$ 000	11,972.80	11,972.80	20,952.40	20,952.40
O.A. MARKET PRICE SUPPORT (MPS)	SRD \$ 000	-	-	-	-
O.B. FUEL TAX CONCESSIONS (FTC)	SRD \$ 000	11,972.80	11,972.80	20,952.40	20,952.40
FISHERIES SUPPORT ESTIMATE - BUDGETARY	SRD \$ 000	1,323.00	-1,195.00	-3,481.00	62.00
I. TRANSFERS TO INDIVIDUAL FISHERS - BUDGETARY (TIF - BUDGETARY)	SRD \$ 000	-	-	-	-
II. GENERAL SERVICE SUPPORT ESTIMATE (GSSE)	SRD \$ 000	3,172.00	1,123.00	780.00	1,835.00
II.A. ACCESS TO OTHER COUNTRIES' WATERS	SRD \$ 000	-	-	-	-
II.B. PROVISION OF INFRASTRUCTURE	SRD \$ 000	20.50	-	-	-
II.C. MARKETING AND PROMOTION	SRD \$ 000	-	-	-	-
II.D. SUPPORT TO FISHING COMMUNITIES	SRD \$ 000	-	-	-	-
II.E. EDUCATION AND TRAINING	SRD \$ 000	-	-	-	-
II.F. RESEARCH AND DEVELOPMENT	SRD \$ 000	20.50	-	-	-
II.G. MANAGEMENT OF RESOURCES (ENFORCEMENT EXPENDITURES)	SRD \$ 000	3,131.00	1,123.00	780.00	1,835.00
II.H. MISCELLANEOUS TRANSFERS TO GENERAL SERVICES	SRD \$ 000	-	-	-	-
III. COST RECOVERY CHARGES (CR, FOR RESOURCE ACCESS RIGHTS)	SRD \$ 000	-1,849.00	-2,318.00	-4,261.00	-1,773.00

Source: LVV, budget data; author's own calculations.

If the FSE is analyzed without Fuel Tax Concessions, GSSE makes 100% of the FSE, if the cost recovery charges are not taken into account. In OECD countries, where cost recovery charges are scarce, the average share of GSSE of FSE was 80% in 2012. In 2016 and 2017, the fees collected from the fishery sector (cost recovery charges) were higher than the support (general service support estimate), making the sector a net contributor to the national income even before tax payment. The share of GSSE on the value of total landing is low, on average 1.3% over 2015-2018, compared to an average of 2% in 2012 for the OECD, showing a limited government budget awarded to research, protection of marine resourcing, and enforcement of sustainable fisheries practices.

An interesting additional exercise would be to analyze how the GSSE and CR affect both artisanal and industrial fishers, i.e. what is the share of each type of support in the landing value by group? Reliable data to conduct this analysis is currently unavailable.

TABLE 10: FSE INDICATORS (WITH AND WITHOUT FTC), 2015-2018

INDICATORS WITHOUT FCT	UNIT	2015	2016	2017	2018
TIF SHARE OF FSE WITHOUT FCT	%	0.0	0.0	0.0	0.0
GSSE SHARE OF FSE WITHOUT FCT	%	100.0	100.0	100.0	100.0
GSSE/VALUE OF TOTAL LANDING	%	2.6	0.7	0.3	0.6
FSE/ VALUE OF TOTAL LANDING	%	1.1	-0.7	-1.2	0.0
INDICATORS WITH FTC					
FTC SHARE OF FSE (WITHOUT CR)	%	79.1	91.4	96.4	91.9
FSE SHARE OF TOTAL LANDING	%	10.7	6.4	5.9	6.7

Source: author's own calculations.

Fuel tax concessions make up the biggest part of the FSE (above 79% since 2015). Support to fuel use has been of particular interest, owing to its connection to climate change and non-renewable resource use, and in view of the Group of Twenty (G-20) Pittsburgh agreement in 2009, to “phase out and rationalize over the medium-term inefficient fossil fuel subsidies.”

The industrial fleet has access to tax free fuel in Suriname, a form of non-budgetary transfers to individual fishermen. The fuel price differential is based on a levy on the price of diesel of SRD \$0.40/liter in 2015 and 2016, and SRD \$0.70/liter in 2017 and 2018.⁵⁴ The total amount of fuel purchased by the industrial fleet is estimated based on the number of licenses, assumed days at sea and fuel use per day of trawlers (fuel intensive) and longliners (less fuel intensive).⁵⁵ The total value of government transfers for fuel taxes for fishing fleets amounts to SRD \$12 million in 2015 and 2016 and increased to SRD \$22 million in 2017 and 2018. The Fuel Tax Concessions are only accessible for industrial fishers. It is also important to note that a high share of the industrial fleet is foreign-owned.

With the budgetary Transfers to Individual Fishers (TIF) at 0, the artisanal fishery sector (representing around $\frac{3}{4}$ of the total landing volume) does not get any direct support besides the general service support, but has to pay cost-recovery charges. The FSE share of total landings, including FTC, was on average 7.4% between 2015 and 2018.

54. Fuel is on the list of 50 commodities with application of 0% turnover tax.

55. Data provided by SAIL and LVV, department of fisheries. 2013.

4. GREENHOUSE GAS EMISSIONS AND AGRICULTURAL POLICY



This chapter addresses the link between commodity policies that provide support for particular commodities and the environmental impact of those commodities. The aim is to see what the impact of the policy transfers is on the GHG emissions.

4.1. INTRODUCTION

Suriname is home to many unique ecosystems. The forests cover about 94% or 15 million hectares of the total land area. Greenhouse Gas (GHG) emissions in Suriname for the inventory year 2008 equal -1,883 Gg CO₂eq.⁵⁶ This negative figure indicates that more GHG are sequestered than emitted to the atmosphere,

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56. Government of the republic of Suriname. 2016.

which means that Suriname is a net sink for GHG. The net sequestration is due to the contribution of the forestry and other land-use sectors, which sequestered 8,243 Gg CO₂eq in 2008. Taking into account the low historical deforestation rate, Suriname is identified as a HFLD (High Forest Cover, Low Deforestation) country. However, there are a number of threats undermining this position, such as gold mining, infrastructure development, and agricultural development. Hydropower meets the majority of the country's energy needs, and the remainder is met by burning fossil fuels using diesel generators, specifically, in the Interior.⁵⁷ Suriname is extremely vulnerable to natural disasters and rising sea levels, as a large portion of the population lives in the coastal plain, where economic activity exists at or below sea level.

The main source of CO₂ production in Suriname is the combustion of fossil fuel (49%), followed by Land-Use Change and Forestry (31%), and Agriculture (19%). The GHG emissions sharply decreased in 1999 due to the closure of the Aluminum Smelter, but show a relative increase from 2008 through 2012. Despite the recorded increase, Suriname remains carbon negative.⁵⁸

Suriname is a signatory to the Paris Climate Change Agreement of December 2015 (COP 21 of the United Nations Framework Convention on Climate Change – UNFCCC) and as a signatory, has submitted “Nationally Determined Contributions” (NDC) to the UNFCCC. The first such communication took place in 2006, with a Second Communication in 2016. As part of the Second Communication of Suriname to the United Nations Framework Convention on Climate Change, a national Green House Gases Inventory with a baseline year of 2005 was created. This inventory was compiled for the following sectors: Energy, Industry, Agriculture Forestry and Other Land Use (AFOLU), and Waste. Suriname published its last NDC in 2020, in which the country committed to both adaptation and mitigation contributions in the agricultural sector. The current report is largely based on data drawn from the Second Communication, in which the 2006 IPCC guidelines were used to compile Suriname's emission estimates for carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). Due to a lack of country specific parameters, default IPCC values were used for most of the inventory. For calculating CO₂ equivalents, the Global Warming Potential (GWP) guidelines of the fourth Assessment Report of IPCC have been used.

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57. Ibid.

58. Ibid.

Utilization and Protection of the Environment is one of the 4 pillars indicated in the Policy Development Plan 2017-2021. Coastal protection and optimization of water use were identified as the main areas for the government's attention. The responsibility of climate change policy and reporting in Suriname sits with the Climate Taskforce within the Office of the President, which acts as a coordinating entity between ministries, and facilitates the development of a coherent and focused approach. At LVV, one person works as the Climate Change focal point.

4.2. METHODOLOGY

The methodology used in this section is the IDB-Josling methodology, first applied in Jamaica in 2017⁵⁹. The goal is to address the link between, on the one hand, commodity policies that provide support for particular sectors, and on the other, the environmental impact of those sectors as measured by their contribution to GHG emissions. Comparison with policy transfers is straightforward, using the Producer Commodity Specific Transfers (PCST) indicator. This indicator measures the transfers that are specific to a particular commodity and thus provide direct incentives to produce that crop or animal product.

The association of GHG emission data with the policy support provided to specific commodities is not precise, as emissions are dependent on farming practices, soil types, climate variables and other conditions, which can vary. Nevertheless, the result of the comparison presented in this study provides a starting point for more detailed research into the linkage between agricultural policy and climate change. The following commodities are selected based on their share in production value: banana, beef, cassava, coconut, eggs, milk, oranges, plantain, pork, poultry, and rice. The selected commodities represent 77% of the total production value over the period 2015-2018 (Figure 18), 89% of the total crop production in tons, and 99% of total hectares used for crops in 2017.

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59. Josling, T., Alleng, G., De Salvo, C. P., Boyce, R., Mills, A., Valero, S. 2017.

4.3. ASSUMPTIONS

EXTRAPOLATION OF GHG EMISSIONS DATA FROM THE SECOND NATIONAL COMMUNICATION TO UNFCCC

This study is based on the emissions data collected in the Second National Communication to the UNFCCC. The categories of emissions used are shown in Table 11.

TABLE 11: LIST OF EMISSIONS CATEGORIES ESTIMATED IN NDC STUDY

LIVESTOCK	EMISSIONS
ENTERIC FERMENTATION	CH ₄ , CO ₂ equivalent (Gg)
MANURE MANAGEMENT	CH ₄ , CO ₂ equivalent (Gg)
LAND	
CONVERSION TO CROPLAND	CH ₄ , CO ₂ equivalent (Gg)
CONVERSION TO GRASSLAND	CO ₂ (Gg)
SOILS	
BIOMASS BURNING IN CROPLANDS	CH ₄ +NO ₂ , CO ₂ equivalent (Gg)
BIOMASS BURNING IN GRASSLANDS	CH ₄ , CO ₂ equivalent (Gg)
LIMING	CO ₂ (Gg)
UREA APPLICATION	CO ₂ (Gg)
DIRECT N ₂ O EMISSIONS FROM MANAGED SOILS	NO ₂ , CO ₂ equivalent (Gg)
INDIRECT N ₂ O EMISSIONS FROM MANAGED SOILS	NO ₂ , CO ₂ equivalent (Gg)
RICE CULTIVATION	CH ₄ , CO ₂ equivalent (Gg)

Source: Government of the Republic of Suriname. 2016.

The GHG inventory of the National Communication presented data until 2008, with a baseline year of 2005. The inventory used the 2006 IPCC guidelines to compile Suriname's emission estimates for carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O).

The 2008 data is assumed to change at the same rate as the yearly production levels, in order to obtain yearly data from 2015 to 2018. Depending on the type of GHG, emissions are assumed to grow at the same growth rate of the crop or livestock category that generates them. GHG emissions of conversion to cropland and grassland are included in the dataset as in Latin America and the Caribbean, one-third of the emissions from beef production is estimated to come from pasture expansion into forested areas.⁶⁰

60. Gerber, P.J., H. Steinfeld, B. Henderson, A. Mottet, C. Opio, J. Dijkman, A. Falcucci, and G. Tempio. 2013.

This data is assumed to be stable over the years, because of a lack of data on recent trends.

The total GHG emissions from agriculture were estimated at 77,335 Gg CO₂ equivalent for 2008 (last year provided by the study) and 1,041 Gg CO₂ equivalent as the average during 2015-2018 (Table 12). Data per year is not used in this study, as the data given is only estimated.

TABLE 12: AGRICULTURAL GHG EMISSIONS PER YEAR

GHG EMISSIONS FROM CROPS AND LIVESTOCK	EMISSIONS	AVERAGE 2015-2018
LIVESTOCK		
ENTERIC FERMENTATION	CH ₄ , CO ₂ equivalent (Gg)	52.68
MANURE MANAGEMENT	CH ₄ , CO ₂ equivalent (Gg)	12.77
LAND		
CONVERSION TO CROPLAND	CH ₄ , CO ₂ equivalent (Gg)	5.79
CONVERSION TO GRASSLAND	CO ₂ (Gg)	81.05
AGGREGATE SOURCES		
BIOMASS BURNING IN CROPLANDS	CH ₄ +NO ₂ , CO ₂ equivalent (Gg)	124.38
BIOMASS BURNING IN GRASSLANDS	CH ₄ , CO ₂ equivalent (Gg)	0.80
LIMING	CO ₂ (Gg)	1.93
UREA APPLICATION	CO ₂ (Gg)	11.48
DIRECT N ₂ O EMISSIONS FROM MANAGED SOILS	NO ₂ , CO ₂ equivalent (Gg)	24.94
INDIRECT N ₂ O EMISSIONS FROM MANAGED SOILS (FROM MANURE AND SOILS)	NO ₂ , CO ₂ equivalent (Gg)	0.68
RICE CULTIVATIONS	CH ₄ , CO ₂ equivalent (Gg)	725.17
TOTAL	gg CO₂ equivalents	1,041.67

Source: Government of the Republic of Suriname. 2016.; author's own calculations.

Methane (CH₄) from rice cultivation accounts for 69% of total emissions from agriculture. Other major contributions came from methane, nitrogen emissions from biomass burning in croplands, and methane from enteric fermentation. The amount of GHG emissions from enteric fermentation and manure management decreases as the amount of cattle decreases over the years.

There is no data on the application of synthetic fertilizers, which is largely used in agriculture in Suriname.

ALLOCATION OF GHG EMISSIONS TO SPECIFIC CROP OR LIVESTOCK

The contribution of individual crops to the total GHG emissions is not calculated in the Second National Communication study, but is estimated based on other information and studies. The study does allocate enteric fermentation and manure management to different livestock types. Manure management is allocated at 8% for pigs, 8% for poultry, with the most of the remaining amount going to beef, and a small percentage to other livestock.⁶¹

In 2013, the FAO stated⁶² that in low productivity regions, enteric fermentation was the main emission source for livestock products, which is almost entirely (99%) allocated to beef in this study. In industrialized regions, feed production and processing, and manure (combined) are as important as enteric fermentation.

The estimates reported in this paper could be improved by the collection of data on the use of fertilizer and soil management activities connected to specific commodities.

GHG EMISSIONS FROM FUEL AND ELECTRICITY CONSUMPTION

In this study, the GHG emissions from fuel and electricity use of agriculture are included to give a more complete estimation of GHG emissions per crop.

Many crops require some first stage processing and transportation to get them to market. Each of these activities uses fuel and electricity. In this study, fuel and electricity use is calculated in field operations, harvesting, processing and transportation.

To achieve an estimation of yearly fuel and electricity use in agriculture, Suriname's total electricity and fuel use was multiplied by agriculture's share of GDP. The data was then allocated to the crops based on the share of hectares. For beef and dairy cows, there is no exact data on hectares, as such, estimates are based on the intensity of cows per hectare.

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61. There is an inconsistency in the National Communication study. In annex the allocation of the GHG types allocates manure management for 99% to beef and 1% to swine, while poultry is left out. The main study however allocates 8% of manure management emissions to poultry. As manure management is an important GHG emission in poultry, we allocated 8% to poultry. We have unfortunately not been able to discuss with the authors of the study.

62. Gerber, P.J., H. Steinfeld, B. Henderson, A. Mottet, C. Opio, J. Dijkman, A. Falcucci, and G. Tempio. 2013.

SEQUESTRATION OF GHG EMISSIONS BY AGRICULTURAL PRODUCTS

The positive contribution of crops—in particular tree crops—to GHG absorption needs to be included in the accounting, in order to take into consideration this key aspect of land use. In the absence of data on sequestration by agricultural crops, sequestration amounts for crops were estimated using limited studies on individual tree crops. Sequestration amounts are included in the calculations in the section on the cost of agricultural carbon emissions (ACE) by crop, as ignoring these benefits would skew the estimates against tree crops. Annual crops also sequester carbon, but this is largely released after harvest and therefore, not relevant for GHG accounting on an annual basis.

CARBON PRICING

The goal of this report is to analyze GHG emission estimates alongside the incentives provided by agricultural policy. In order to do this, we use a common unit: money. This requires that we estimate a carbon price so the cost of GHG emissions can be compared to the cost of financial transfers to the producers of particular commodities. There is no commonly used carbon price, in the sense of an observable market price applicable globally. However, at least 47 countries, representing 15% of global GHG emissions, now have carbon-pricing initiatives.

Observed carbon prices range from less than USD \$1 up to USD \$140/tCO₂e. About three quarters of emissions covered by carbon pricing are priced at less than USD \$10/tCO₂e. This is substantially lower than the price levels that are consistent with achieving the temperature goal of the Paris Agreement, in the range of USD \$40–80/tCO₂e in 2020.⁶³ In South America, carbon pricing initiatives remain low; USD \$6/tCO₂e in Argentina, USD \$5 per ton in Chile and Colombia, and USD \$4 in Mexico. Given the lower prices in the region, the carbon price used in this study is USD \$10/tCO₂e, similar to what was used in the 2016 IDB–Josling study⁶⁴ for Jamaica.

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63. World Bank Group. 2019.

64. Alleng, G, Boyce, R., Josling, T., Mills, A., De Salvo, C. P. and Valero, S. 2017.

LIMITATIONS

The GHG emission data is estimated by adjusting 2008 data for changes in the production and hectares levels. As such, a comparison between years cannot be made. The analysis is therefore, made using averages between the years 2015 and 2018, and does not show yearly data. The goal of the analysis is to compare the climate impact of the different agricultural sectors, not to discuss evolutions in time.

Another important limitation is the undervaluation of emissions from livestock. The main share of the feed for poultry and pigs is imported (maize, soya, concentrations) and has a substantial impact on the GHG emissions, but has not been included in this study. This creates an important underrepresentation of the total emissions of poultry and swine, as FAO estimates feed production contributes 78% of emissions for poultry and 60% in the pig supply chain.⁶⁵

Moreover, emission intensities can be influenced by a combination of factors, depending on the farming techniques and region in question. Although the data on field emissions is specific to Suriname, the emissions in operations are general assumptions.

4.4. RESULTS

4.4.1. COMPARISON BETWEEN SECTORS

The contributions of selected commodities to GHG emissions are detailed in Table 13. In value of production (column 1) three products are dominant: rice, bananas and poultry (the rest of the production value is generated by products not included in this study, mostly vegetables). The share of total transfers by sector (column 2) reflects policy priorities. Positive Market Price Support, meaning prices received by producers are higher than in the absence of policy measures, are the main composition item of single commodity transfers in Suriname. It is clear that there is no relationship between the value of support (SCT) and the value of production (VOP), with oranges receiving a high level of SCT and low VOP, and the negative SCT of the rice sector compared to a high VOP.

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65. MacLeod, M., Gerber, P., Mottet, A., Tempio, G., Falcucci, A., Opio, C., Vellinga, T., Henderson, B. & Steinfeld, H. 2013.

Column 3 shows the contribution of the commodities to the GHG field emissions (excluding operational emissions) as an average for 2015-2018. The rice sector is over-dominant in its contribution to GHG emissions, mostly due to the methane emissions emitted from flooded rice fields and nitrous oxide, produced by soil microbes in rice fields. The sector with the highest value of production is thus, also the highest emitting sector. Some products that have a low profile in terms of production value, still contribute significantly to GHG emissions, such as milk and beef. The poultry and egg sector have a very low contribution to GHG field emissions, mostly because of the exclusion of emissions from imported feed.

TABLE 13: SHARE OF COMMODITIES IN SUPPORT AND EMISSIONS, 2015-2018 AVERAGE, %

	VALUE OF PRODUCTION (VOP)	SINGLE COMMODITY TRANSFERS (SCT)	GREENHOUSE GAS FIELD EMISSIONS	AGRICULTURAL CARBON EMISSIONS (ACE)	NET SOCIAL VALUE (VOP-SCT-ACE)
BANANAS	12.5	0.0	0.9	0.8	15.79
RICE	20.2	-49.1	83.0	90.5	29.14
ORANGES	9.5	45.7	0.4	-2.8	3.17
MILK	0.7	1.8	2.4	2.3	0.43
BEEF	4.2	8.5	4.2	4.0	3.38
POULTRY	10.6	26.9	0.1	0.1	8.15
PORK	2.0	5.8	0.1	0.2	1.33
EGGS	5.1	9.8	0.0	0.0	4.55
CASSAVA	2.0	6.6	0.3	0.3	1.21
COCONUT	4.5	11.0	0.1	-2.4	3.68
PLANTAIN	5.1	6.7	0.2	-0.7	5.19
OTHER PRODUCTS	23.5	26.4	8.3	7.9	24.0
TOTAL	100.0	100.0	100.0	100.0	100.0

Source: Government of the Republic of Suriname, 2016.; author's own calculations.

Expressing GHG emissions in a monetary unit allows for an interesting comparison between GHG costs and the value of farm output. The commodities' share of the total Agricultural Carbon Emissions Costs (ACE) is indicated in Table 13 (column 4). This column shows the value for each commodity when the carbon emission costs are reduced from the production value. This is the situation where negative externalities of GHG emissions are accounted for. The ranking of the commodities does not differ much from the ranking of value of production, showing the value of ACE

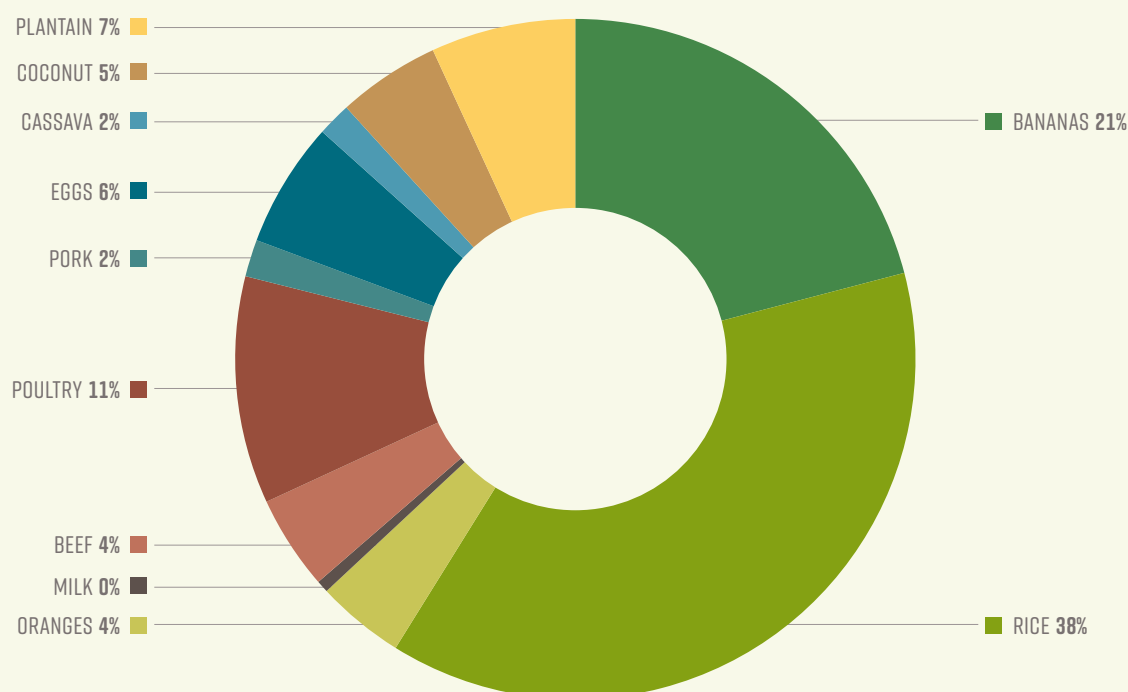
is relatively small. Rice, bananas and poultry still have the highest value of production, accounting for carbon emission costs.

To link GHG emissions with agricultural policy, we must subtract the combined GHG emission impact (ACE) and transfers from commodity-specific policy (SCT) from the total production value. The result is the total Net Social Value (Figure 34).

This shows the importance of various crops and livestock products when adjustments for climate impact and support measures are correctly made. Crops with relatively little support (or in several cases negative support) and a low ACE value turn out to make a more significant contribution to the net benefits of the agricultural sector. Those with significant support and high levels of GHG emissions make up a smaller share of the sector's net benefit.

Rice is the commodity with the highest Net Social Value and is thus, of the highest value to the economy, even though it is the highest emitter. The relative shares of the Net Social Value are very similar to the shares in production value.

FIGURE 34: SHARE IN NET SOCIAL VALUE, AVERAGE 2015-2018



Source: author's own calculations.

4.4.2. INTERPRETATION OF RESULTS

The main objective of combining GHG emission data with data on policy transfers is to measure to what extent the transfers encourage or reduce GHG emissions. If the transfers encourage sectors with high GHG emissions, then it would seem climate change and agricultural policies are at cross-purposes. Rice, the most emitting sector, is negatively supported by policy. The highest supported sectors, oranges and poultry have little climate impact. There are thus, no policy transfers stimulating highly emitting sectors in Suriname.

GHG emissions per hectare are detailed in Table 14, column 1. The table shows that rice has, unsurprisingly, the highest per-hectare GHG emissions, followed by cassava, milk, and beef. This remains true for rice and cassava, when the sequestration benefits are accounted for and the carbon price included (of the other crops, rice does not have any sequestration), see column 4. Policy transfers that encourage production of a commodity with a lower per hectare GHG emission (in the case of Suriname, coconut, plantain and oranges) would actually reduce GHG emissions.

Another way to measure the connection between agricultural policy and GHG emissions is to calculate the percentage of total production value that is offset by the ACE (Table 14 column 5).

TABLE 14: GHG AND ACE PER UNIT BY COMMODITY, 2015-2018 AVERAGE

	GHG EMISSIONS		AGRICULTURAL CARBON EMISSIONS		ACE AS PERCENT OF VOP	VOP-SCT/ACE
	MET. TONS CO ₂ E/HECTARE	MET. TONS CO ₂ E/METRIC TON	SRD MN	SRD MN/HECTARE	%	RATIO
BANANAS	7.41	0.24	0.68	353.38	0.42	237.58
RICE	17.58	3.82	70.35	1,160.19	26.99	5.12
ORANGES	4.73	0.37	-2.01	-1,730.12	-1.64	-14.96
MILK	7.70	7.89	1.64	505.33	17.01	3.68
BEEF	7.24	23.52	2.88	507.06	5.31	12.88
POULTRY	NA	0.12	0.07	NA	0.05	1,131.06
PORK	NA	0.75	0.12	NA	0.47	112.69
EGGS	NA	0.04	0.01	NA	0.02	4,225.74
CASSAVA	10.33	0.39	0.18	664.56	0.71	67.89
COCONUT	1.05	0.08	-1.73	-1,569.95	-2.99	-20.59
PLANTAIN	4.19	0.13	-0.51	-1,033.08	-0.78	-101.45

Source: author's own calculations.

Rice has an environmental cost of 26% of VOP. The ACE costs of beef and milk are also a significant proportion of their production value. Coconut, oranges and plantain have negative ACE because of the high value of sequestration compared to the GHG emissions, and therefore, the ratio of ACE to VOP is negative.

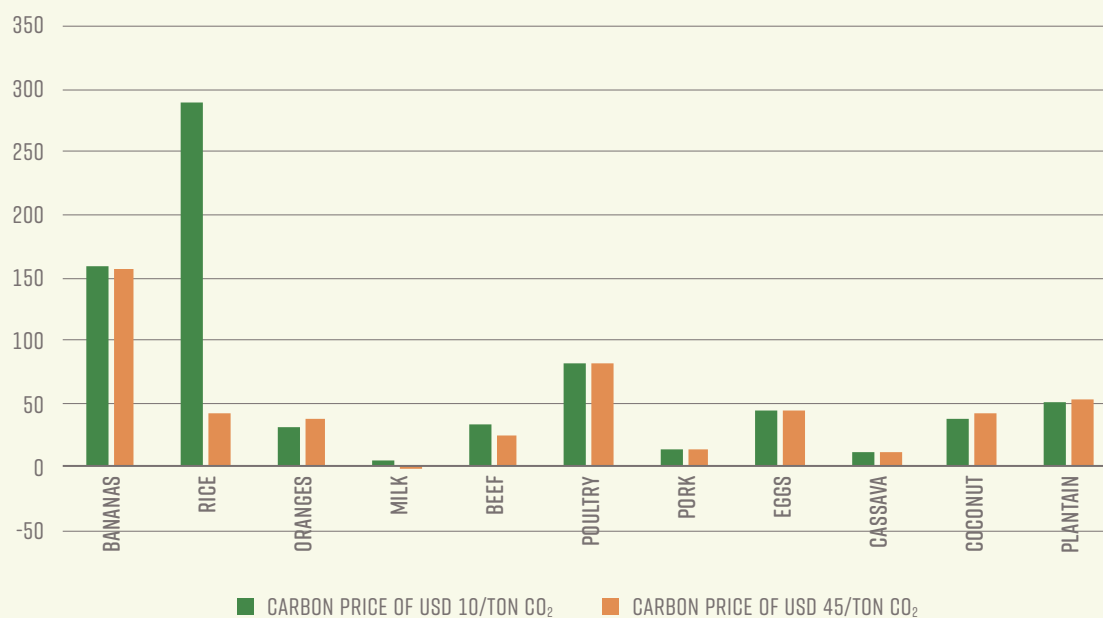
This measurement suggests that a policy to reduce GHG emissions should support commodities with a low share of ACE on VOP: coconut, plantain and oranges. Such a policy should also restrict transfers to rice, milk and beef. However, these are also important nutritious commodities for the local population.

Column 6 of Table 14 shows the value (net of transfers) per unit of environmental costs. Eggs, poultry and bananas have highly favorable ratios, indicating the greatest value (net of transfers) per unit of environmental cost. Plantain, coconut and milk have very low ratios of net value to the cost of GHG emissions, and there appears to be no net benefit once emission costs and transfers are accounted for. Minimizing ACE is not automatically a sound policy choice: if GHG emissions are already being limited, then one should get the best value possible, subject to this constraint.

4.4.3. INCREASING THE CARBON PRICE

An important remark is that the carbon price used in this study (USD \$10/metric ton CO₂ equivalent) is low, compared to the recommendations of the Paris Agreement and the High-Level Commission on Carbon Prices. If, instead, we take a higher carbon price of USD \$45/metric ton CO₂ equivalent, which is more in line with the international recommendations, the results change drastically.

In this scenario, bananas are the commodity with the highest Net Social Value (NSV), followed by poultry and rice. Bananas therefore, have the most positive contribution to the economy, after considering the policy transfers and emission costs. With the higher carbon price/ton CO₂, rice lowered in ranking. Rice is the commodity with the highest value of production share, but after considering the value of the subsector's emissions (ACE), its social value lowers drastically. Coconut, plantains and oranges contribute a higher share in the NSV compared to their contribution to the production value. This is explained by the fact that these crops have only limited price support policies, emit little GHG and sequester carbon. Poultry and eggs have a high Net Social Value, but the value would be considerably lower if the GHG emissions of the manufacturing of feed were included.

FIGURE 35: NET SOCIAL VALUE WITH DIFFERENT CARBON PRICES, MLN SRD, AVERAGE 2015-2018

Source: author's own calculations.

When we construct a table similar to Table 14, but with the carbon price increased to USD \$45/ton CO₂, rice has an environmental cost of 116 % of its production value (Table 15).

TABLE 15: GHG AND ACE PER COMMODITY, CARBON PRICE OF USD 45/TON CO₂, 2015-2018 AVERAGE

	GHG EMISSIONS		AGRICULTURAL CARBON EMISSIONS		ACE AS PERCENT OF VOP
	MET. TONS CO ₂ E/HECTARE	MET. TONS CO ₂ E/METRIC TON	SRD MN	SRD MN/HECTARE	%
BANANAS	7.41	0.24	3.04	1,590.20	1.89
RICE	17.58	3.82	316.59	5,220.84	121.43
ORANGES	4.73	0.37	-9.04	-7,785.55	-7.37
MILK	7.70	7.89	7.37	2,274.00	76.55
BEEF	7.24	23.52	12.98	2,281.78	23.92
POULTRY	NA	0.12	0.33	NA	0.24
PORK	NA	0.75	0.54	NA	2.13
EGGS	NA	0.04	0.05	NA	0.07
CASSAVA	10.33	0.39	0.82	2,990.52	3.18
COCONUT	1.05	0.08	-7.76	-7,064.78	-13.43
PLANTAIN	4.19	0.13	-2.30	-4,648.88	-3.52

Source: author's own calculations.

The ACE costs of beef and milk are also a significant proportion of their production value. This measurement suggests stimulating investment in climate-smart technologies in rice production, and reducing policy transfers to beef and milk, which contradict the government's environmental goals.

In the final column in Table 15, bananas, rice and poultry show the highest value (net of transfers) per unit of environmental cost. The net benefit of rice production, once emission costs and transfers are reduced, is considerably lower, given the negative SCT.

4.4.4. POLICY IMPLICATIONS

The analysis of the differences in GHG emissions by subsector suggests that policy-makers should reduce the transfers to the highest GHG-emitting sectors —such as beef, milk and rice. But in Suriname, there are no transfers stimulating production to either beef or rice. Investment in irrigation and research, which dominate the forms of support given to the rice subsector, make production more efficient and may even reduce GHG.

Even though direct transfers are scarce, Suriname is (like most countries), indirectly subsidizing high-emitting crops and livestock, by not charging them for the GHG emissions they produce. In the absence of a carbon price, a policy strategy could be to support low emitting crops or livestock that directly compete with high-emitting crops. For beef, one could support other sources of protein, from poultry to legumes, but also nuts, mushrooms, or insects. For rice, one could support other cereals or different rice production practices.

As direct transfers to individual agricultural sectors are very low in Suriname, the question of how to reduce transfers to GHG emitting sectors might be of low priority. The question of how to increase adaptation to changing circumstances for agricultural areas, almost all located on the coastline and thus very vulnerable to rising sea levels, is a bigger priority. In the NDC to the UNFCCC, Suriname intends to promote climate-smart agricultural technologies.

As the rest of the world moves to decarbonize, there is also the following question to consider: can Suriname position its agricultural sector as a supplier of high value food products with a low GHG emission impact and high market potential in richer countries?

5. CONCLUSIONS



The relative importance of agriculture in Suriname's economy has declined over the last two decades, from around 18% of GDP in the mid-1990s, to 9% in 2018. Fishery is a promising sector for Suriname, having increased its contribution to GDP by 63% between 2013 and 2017. Besides their economic importance, both sectors are important employers and local food suppliers.

Overall, the agricultural sector suffers from the depreciation of the local currency, making imported inputs more expensive and creating an uncertain investment environment, but generating a positive impact on the competitiveness of export commodities.

Suriname uses a varied set of policy measures to support its agricultural sector, from trade barriers to direct budgetary support. The Total Support Estimate to the agricultural sector in Suriname was positive throughout the period under review, with an increasing trend. The TSE averaged 1.11 % of GDP over 2015-2018. This result is in line with the average of sector support in the region, comparable to the level of support seen in Colombia, Ecuador, and Barbados.

The PSE as a percentage of gross farm receipts in Suriname is similar to the average for the Latin American and Caribbean region, but has increased since the last review. The share of support provided to agriculture in the form of budget support in the 2015-2018 period amounted to 7% of total PSE in 2015, but only 1% in the years after the recession.

Agricultural policy in Suriname mainly supports producers through Market Price Support, with producers receiving higher prices than in the absence of any policy. This support is, however, provided at the expense of domestic consumers, who pay higher prices for milk, poultry, beef, pork, and eggs, compared to the non-policy situation.

There are **significant differences** between supports to the different sectors:

- **Rice producers in Suriname received negative price support in all years under review.** Overall support to rice remains negative, even when budget transfers are taken into account. However, it should be made clear that much of the support that is classified as support to general services primarily benefits the rice sector.
- **In general, livestock products receive higher levels of support than crops do,** even though most crops receive positive market price support.
- **In the fishery sector, support is mainly directed to the industrial fleet in the form of Fuel Tax Concessions,** amounting to SRD \$21 million in 2018. Total support (excluding the FTC) is negative, as cost recovery charges for license payments outgo general support.

The budgetary support to general services (which involves transfers to the agricultural sector in general and not to individual farmers) has decreased significantly since 2016 (from 44% to 6% of total support), due to the recession, resulting in a reduction of research and innovation, and limited development in the diversification of the economy. Support to general services was provided mostly in the form of infrastructure development (rural roads and irrigation and drainage, 89% of GSSE), while the financing of inspection services, research and development, education, and training remains low.

Agriculture accounts for 19% of total GHG emissions in Suriname. Rice and beef are the most GHG emitting agricultural sectors. There is no relationship between sectors that receive significant support and those with high GHG emissions. Agricultural policy, therefore, does not specifically contribute to increasing GHG emissions.

6. POLICY RECOMMENDATIONS

Since 2016, the government of Suriname has faced two major macroeconomic problems: **GDP decline and depreciation of the local currency**. Public investment in stimulating the competitiveness of the agricultural sector reduced significantly and the public agricultural budget remained primarily focused on the rice subsector.

Based on the analysis carried out, the following agricultural policy recommendations are given:

- **Reduce direct involvement in the sector and provide incentives to private investments instead.** State ownership of farms and processing facilities are not generating efficient results in Suriname.
- **Create a more attractive environment for private investors** by reducing excessive regulations, improving the efficiency of bureaucratic procedures, and clarifying policies.
- **Provide incentives for sector-wide diversification** in order to reduce the sector's over-dependence on rice and bananas for agricultural exports. Crops with potential include coconut, vegetables, cassava and plantains. Local feed production for the poultry sector would also help to reduce dependency on the increasingly expensive imported inputs.
- **Focus public support on measures enhancing the profitability and productivity of the agricultural sector**, such as pest disease and quality management systems, GHG emission reduction, and risk management support programs. This will help create a more resilient agricultural sector.
- **Research options to stimulate value-adding activities in supply chains**, to increase employment and export earnings.
- **Develop a medium-term plan for the rice sector**, which focuses on better collaboration between stakeholders, supporting practices that minimize GHG emissions, access to credit for small- and medium-sized rice farmers and increased research capacity to improve the quality of seeding.

- **Invest in lowering banana production costs** by supporting general services for the subsector (for example, by investing in the Port of Nickerie, and in research to reduce crop disease and improve productivity).
- **Develop a strategy for the milk sector**, to stimulate local milk production. Milk price regulation should be avoided. Rather, a focus on reducing government-dependency and increasing the subsector's innovation capacity is advised. This could include investment in improving the cold chain and breeding for better quality products.
- **Improve regulations for ensuring the long-term sustainability of the fishery sector**. Stock calculations need to be conducted and linked to the maximum allowed licenses and the capacity of the fleet. Effective control of applied regulations is advised to decrease overfishing. Investment in health and safety of the artisanal fishery sector and improvement of data registration is advised.
- **Improve public-private, regional and international collaboration**, and invest in capacity building of local administration staff.
- **Develop and deploy measures to increase the agricultural sector's resilience to climate change**. This is considered particularly important given Suriname's agricultural sector is located almost entirely by the coast, and is thus subject to rising sea levels and extreme weather events. On the mitigation level, decreasing GHG emissions would have the highest effect in the rice and beef sector. Researching and developing techniques and practices with lower climate impacts is recommended.

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ANNEXES

ANNEX I: OVERVIEW OF THE BANANA VALUE CHAIN⁶⁶

Bananas are Suriname's most important agricultural export product in volume and second in value after rice. However, the sub-sector is facing several major problems that hamper the long-term sustainability of banana production in Suriname.

INPUTS

The banana sector uses fertilizer and pesticides intensively. As both are imported, the cost of production rises along with depreciation of the local currency. Moreover, the sector worldwide has reported an increase in costs of compliance with quality, sanitary and environmental standards for bananas entering the European market, which are incurred mainly by producers.⁶⁷

PRODUCTION

Major production sites are located in Jarikaba and Nickerie. The total planted area has been stable at around 2,000 hectares between 2012 and 2017, with a sharp decline to 1,730 hectares in 2018. Production has declined even more rapidly from 63,000 tons in 2015 to 45,000 tons in 2018, reflecting a decrease in productivity from 35 tons/hectares in 2015 to 28.5 tons/hectares in 2018.

In 2014, Univeg⁶⁸ took over 90% of the shares of the state-owned company, *Stichting Behoud Bananen Sector (SBBS)*. Univeg operated under the name Food and Agriculture Industries (FAI) as a fully owned subsidiary of Univeg, and was the single largest banana producer in the country and the largest employer. In 2020, after reporting losses and growing debt, FAI closed down its operations in Suriname. The subsector returned to state ownership, and it remains unclear whether import contracts continue.

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66. Information in this annex was obtained from LVV and online publications, as the management of FAI, until recently the major producer, was unavailable for discussions.

67. FAO. 2018.

68. Part of the Belgian Greenyard group, a logistic fruit & vegetable supplier to EU retail markets.

The decision follows a decline of 50% in production between 2014 (73,000 tons) and 2018 (49,000 tons) and a general decline in productivity of 27% in the same period. After FAI took over SBBS operations in 2014, it reported a loss of approximately USD \$10 million in 2014 and USD \$25 million in 2019. According to FAI, there are both internal and external reasons for these huge losses. External reasons include: (i) the USD has gained strength against the EUR in the last 2 years. With the cost of production in USD and the revenues in EUR (since the entire production is sold in Europe), a stronger USD against the EUR is unfavorable for FAI; and (ii) continued price pressure in the competitive European market.

Internal reasons for the losses are: (i) one of the two plantations (in Jarikaba) is struggling with the Moko Disease, which, according to FAI, was not revealed in the due diligence process and subsequent negotiations. As a result of the virus, this plantation has lost 20% of its production capacity; (ii) management and labor issues, with absenteeism as high as 50% of the workforce. New management took over in June 2014 and reduced the workforce from 2600 (in 2013) to less than 2,000; and (iii) the labor productivity in Suriname is low and it is difficult to motivate staff.⁶⁹

Small-scale banana farming does exist, but with a total of only 175 hectares in 2018, it is insignificant compared to the FAI plantation of almost 1,555 ha. The small-scale production has however, more than doubled between 2012 and 2013 and remained stable thereafter.

EXPORT ALMOST EXCLUSIVELY TO EUROPE

The banana export trade is dependent on a sophisticated supply chain, including industrial production methods, refrigerated shipping, ripening centres and distribution facilities in the importing country. Internationally the market used to be dominated by the US-based agri-businesses (Chiquita, Del Monte, Dole and Fyffes) that owned and operated plantations in Latin American countries (controlling at least 70% of world trade in 1980 and 42% in 2013).

Suriname exports almost all its banana production to Europe, predominantly to Belgium and France. The shipping containers arrive in the Port of Antwerp to be transported further on in Europe.

Conditions of supply outstripped demand in 2018, particularly during the summer months when competition from temperate fruits was strong in both the United States and the European Union, which suppressed prices significantly in both destinations

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69. Derlagen, C., Tas, J., Boyce, R.A., Shik, O., De Salvo, C. P. 2017.

in 2018. This was of substantial concern to African, Caribbean and Pacific (ACP) exporters and European producers, who are faced with considerably higher production costs and are thus, typically unable to compete on prices.⁷⁰

PRICES

In Suriname, farm gate prices have risen by 144% between 2012 (SRD \$1.25) and 2018 (SRD \$5.15), which is not a lot when compared to the currency depreciation of 128%.

Despite a lowering production quantity, the sector still reached a higher export value than previous years in 2016-17, due to depreciation of the Surinamese dollar. Total export value amounted to SRD \$129 million in 2018, with an export per ton value of SRD \$2,942.

International banana import prices increased slightly to USD \$817/ton in 2016 to drop to USD \$796/ton in 2017.⁷¹ Consumer prices increased slightly in recent years, standing at USD \$1.85/kg in France.

BOTTLENECKS

The main bottlenecks for the banana sector are:

- **Insecure future for more than 90% of plantations:** with the departure of FAI, which held more than 90% of the banana plantations of Suriname, the future of the sector is insecure. It is likely that the sector will return to state-management, as it was prior to 2014.
- **Exchange rates:** since the entire production is sold in Europe and the cost of production is in USD, a stronger USD is reducing the margins. The strong depreciation of the local currency increases the export value, whereas input prices also increase.
- **Diseases and dropping productivity:** productivity has decreased from 45.4 ton/hectares in 2012 to 28.5 ton/hectares in 2018. The primary reasons are likely the Moko Disease on the plantations and low labour productivity.

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⁷⁰. Ibid.

⁷¹. Ibid.

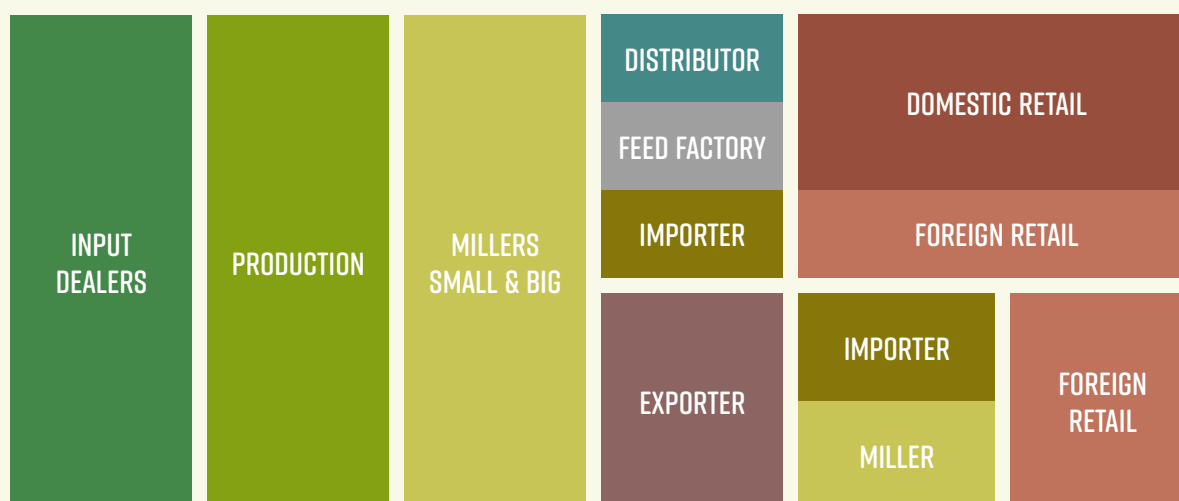
ANNEXES

ANNEX II: OVERVIEW OF THE RICE VALUE CHAIN

Rice is the most important agricultural crop in Suriname. It has the highest annual export value and occupies most of the area under cultivation. Rice production reached a quantity of 273,916 tons and a value of SRD \$309.5 million in 2018. Rice constitutes the basic component in the diets of the Surinamese people, resulting in a high share of local consumption of the crop (40-50%). The commodity is also an important export crop and foreign exchange earner accounting for 37% of the export value in 2018. The export quantity fluctuates more than the production quantity, because of illegal trade to neighbouring countries, which is not included in official statistics.

The rice value chain is made up of a variety of actors and companies (Figure 36). The chain is long, not integrated and lacks a strong market orientation, resulting in inefficiencies and low competitiveness.

FIGURE 36: ACTORS IN THE RICE VALUE CHAIN



INPUTS

The rice sector is dependent on the following key inputs: seeds, fertilizer, diesel, and machine services. As the inputs are almost all imported, currency depreciation is increasing the cost of production for farmers. Seeds are often illegally imported from Guyana and Brazil. These varieties are cheaper and less prone to diseases than those currently available on the Surinamese market. The rice institute, ADRON, is responsible for seed research and innovation, but has endured a severe budget cut since 2016, leaving little space for innovation and research. Reducing input costs is key to improving the subsector's competitiveness.

PRODUCTION

Approximately, 1,400 farmers are employed in the rice sector and 8,000 families are directly dependent on it. Rice production is strongly concentrated in the western coastal districts of Nickerie, Coronie, and Saramacca. Nickerie had 57,500 hectares in 2018, while the districts of Saramacca and Coronie had 1,800 hectares. Rice production is currently trending upward, with paddy production consistently above 200,000 tons since 2009, with 274,000 tons produced in 2018 (Table 16).

The changes in production quantity over the years are mainly caused by changing prices that influence the area farmers plant and harvest, weather, and the efficiency of the water infrastructure. Rice production is performed by medium (1-12 hectares) and large-scale farmers (>12 hectares), representing 45% and 55% of total production area, respectively. The share of large-scale farmers has grown in recent years, as high input prices have enabled them to out-compete many small-scale farmers.

Large-scale farms use advanced mechanization, including the use of planes for seeding. Most rice fields in Suriname are irrigated (approximately 89% of all arable land); however, despite this advantage, productivity is comparatively low. Productivity is between 4.3 and 4.9 ton/hectares and is slightly higher in medium-scale farming, and in Nickerie compared to other districts, while average potential yields with available technologies is 6 t/hectare.⁷²

The producers are fairly organized in the Suriname Rice Farmers Association (SPBA), which includes 1,200 rice farmers. Farm gate prices have decreased over the period 2012-2015, followed by a sharp increase in 2016 and 2017, but are still lower than reference prices (Table 17).

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72. ADRON. 2008.

TABLE 16: KEY INDICATORS PADDY PRODUCTION, 2012-2018

	UNIT	2012	2013	2014	2015	2016	2017	2018
PADDY PLANTED AREA	000 HECTARES	51.4	58.3	62.2	62.3	62.7	59.3	59.2
SHARE IN TOTAL AGRICULTURAL AREA	%	90	88	88	89	89	88	88
QUANTITY HARVESTED	000 TONS	224.1	262.0	275.9	276.5	278.1	289.4	274.0
AVERAGE YIELD/HECTARES	TON/HECTARE	4.36	4.50	4.73	4.43	4.46	4.88	4.62

Source: LVV agricultural statistics. 2019.

TABLE 17: RICE PRICES AND EXPORT VALUE, 2012-2018

	UNIT	2012	2013	2014	2015	2016	2017	2018
FARMGATE PRICE (WET PADDY)	SRD/KG	0.86	0.81	0.71	0.54	0.82	1.23	1.13
CONSUMER PRICE (WHITE RICE)	SRD/KG	3.13	3.00	3.00	2.89	3.16	4.72	4.76
EXPORT PRICE	SRD/KG	1.98	1.95	1.91	1.50	2.21	3.06	3.10
VALUE OF EXPORT	SRD \$ 000	103,155	132,114	179,814	147,097	237,198	229,219	267,071

Source: LVV agricultural statistics. 2019.

PROCESSING

An estimated 23 factories are involved in the processing of paddy rice. However, millers in the sector have not been operating at their full capacity, largely because there are too many processing companies and many small-scale millers. This underutilization of capacity results in high processing costs.

Rice is loaded into 79kg bags of wet paddy, which corresponds to 70kg of dry paddy, resulting in 51kg of milled rice. In addition to these 51kg of milled rice, the paddy rice generates 19kg of other types of rice, which are sold on the domestic market.

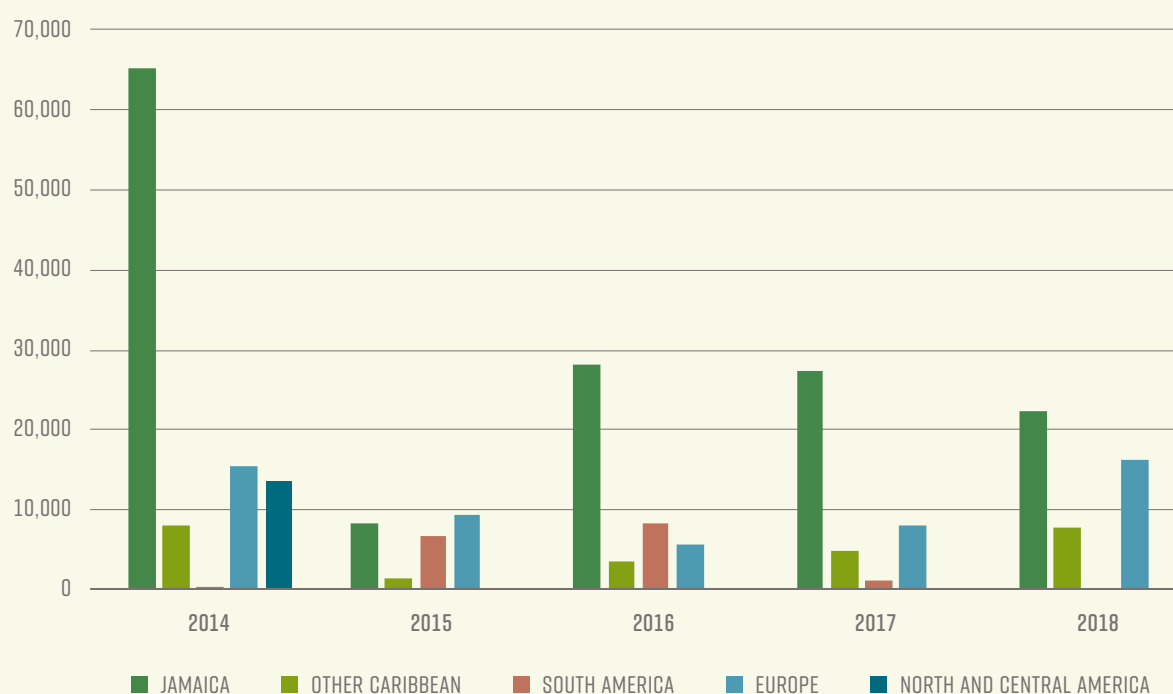
EXPORT AND LOCAL CONSUMPTION

The export of rice products (white, broken, parboiled and cargo rice) has grown in volume and value from 56,000 tons in 2012, to 122,000 tons in 2016. In 2017, export quantity dropped to 78,000 tons, without high impact on the value of export, thanks to increased prices. This drop in official export quantity is due to illegal trade over the borders of French Guyana. In 2018, however, the quantity of exported rice increased again.

The most important and reliable export destination for rice from Suriname is Jamaica, representing 48% of exports in 2018. Exports to the EU have declined sharply since 2010, but have been increasing since 2015 (Figure 37). Through the Economic Partnership Agreement (EPA), Suriname was allowed to export to the EU duty free and quota free. However, exports to the EU remain challenging because of the fierce competition from high-quality Asian rice.

Local consumption uses almost half of the yearly production quantity. Consumer prices in Suriname have increased, which can be mostly explained by inflation. International rice prices have decreased sharply since a peak in 2008, but there has been an increasing trend in prices since 2016.

FIGURE 37: EXPORT DESTINATIONS SURINAMESE RICE, 2014-2018, TONS



Source: UNCOMTRADE database.

KEY BOTTLENECKS

Like in other agricultural sectors in Suriname, the rice sector is suffering from insufficient funds for innovation, maintenance of infrastructure, and increasing efficiency. Besides the lack of funds, communication in the sector could be improved between the many actors involved.

- **Lack of research and innovation:** the budget of ADRON has been severely cut, resulting in little possibility to develop high quality seed varieties or to expand their research field;
- **Poor access to credit for rice farmers:** the *Agricultural Krediet Fonds (AKF)* financed harvest loans, mainly to rice farmers, at an interest of 6.75%. In 2016, an audit revealed excessive debt and management violations. The AKF's activities have been halted. Rice farmers rely on commercial loans to finance the harvest, at interest rates of around 13%;
- **Poor condition of water infrastructure:** maintenance of rice production infrastructure, like channels, pumps, and drainage is key for productivity. There is a need for a more efficient irrigation, to decrease water waste;
- **Challenging management and communication:** the budget for maintenance, investments and management of rice infrastructure is budgeted under three different ministries⁷³. This shared responsibility for rice infrastructure causes delays and inefficiencies in investments and management. However, the set-up of a Water Management Consultation in 2013 improved coordination and planning. 14 water boards have been created for specific zones to manage secondary infrastructure maintenance. They do however, still suffer from a lack of budget and capacity. Plans to set up a Rice Board that would bring together different actors in the sector, following the Guyanese example, have never been implemented.

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73. The Ministry of Agriculture, Animal Husbandry, and Fisheries (LVV), the Ministry of Regional Development (RO) and the Ministry of Public Works.

ANNEXES

ANNEX III: OVERVIEW OF THE POULTRY VALUE CHAIN

The poultry sector provides jobs to approximately 6,400 people, both directly and indirectly, accounting for 26% of total employment in the agricultural sector in Suriname. Chicken meat is the most consumed meat in Suriname and thus, the main source of protein. However, local farmers contribute only one third of the poultry meat consumed, as high amounts are imported.

INPUT SUPPLIERS

The poultry sector remains reliant on imported inputs, like maize for feed, medicines and breeding eggs. The sector is therefore, sensitive to fluctuations in foreign exchanges. The LVV estimates that feeding costs represent 75% of the production costs.

A small part of the chicken feed is produced in Suriname by VESU. Maize is the most important ingredient in terms of volume, representing almost 50% of the feed mix and fully imported, as it is not grown in Suriname. Other imported ingredients are soybean and premix concentrates. The quantity of imported feed fluctuates but has remained more or less stable during 2012-2018.

The National Master Plan for Agricultural Development (2016), mentions local feed production as a crucial point for increasing profitability and competition, but no action has been taken. There is a strong need for research on diseases and local feed production, but no laboratories are currently operating.

Since 2010, the import of breeding eggs has fallen sharply because of increased prices. This fall is only partially compensated by an increase of local breeding eggs (Table 18).

PRODUCTION

The poultry sector dominates the livestock sector (Table 19). With the production of meat and eggs, the poultry sector supplies more than half of the animal protein and 70% of the meat supply (2017).

TABLE 18: INPUT QUANTITIES AND PRICES FOR POULTRY, 2012-2018

	UNIT	2012	2013	2014	2015	2016	2017	2018
EGGS								
IMPORT BREEDING EGGS	'000 PCS	2,707	308	161	85	33	51	86
LOCAL BREEDING EGGS	'000 PCS	6,366	6,611	7,001	7,397	6,095	7,556	8,060
IMPORT VALUE BREEDING EGGS	SRD \$ 000	3,384	706	328	201	165	254	471
IMPORT VALUE PER PIECE	SRD \$ 000	1.25	2.29	2.04	2.36	5.00	4.98	5.48
FEED								
BROILER CHICKEN FEED	TON	22,978	29,543	24,529	30,020	32,066	33,675	34,832
MAIZE (IMPORT)	TON	10,241	12,183	25,286	14,895	10,519	11,102	13,476
SOYBEAN (IMPORT)	TON	8,066	7,180	5,359	5,776	7,088	7,488	7,045
PREMIX CONCENTRATES (IMPORT)	TON	9,987	8,691	8,213	8,573	8,780	8,774	7,628

Source: LVV agricultural statistics. 2019.

TABLE 19: LIVESTOCK TYPES AND NUMBERS

	SLAUGHTERED WEIGHT (TON)	HEADS	VALUE (SRD \$ 000)
CATTLE	1,903	35,995	71,363
PIGS	2,344	34,754	23,440
SHEEPS AND GOATS	20.0	9,463	800
CHICKEN AND OTHER POULTRY	9,729	5,567	165,393

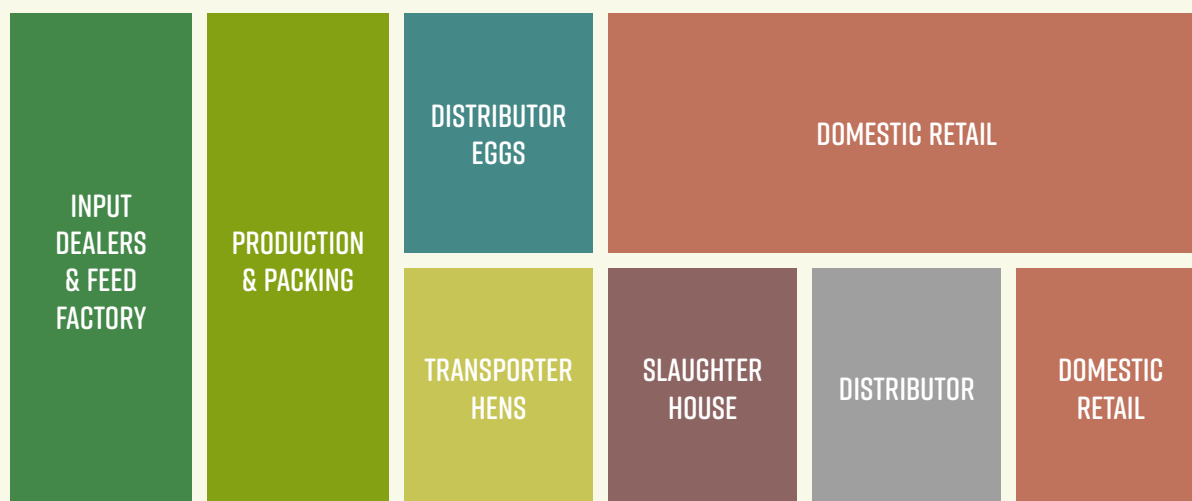
Source: LVV agricultural statistics. 2017.

PROCESSING

The poultry value chain in Suriname is partially vertically integrated, with slaughterhouse and processing companies distributing the meat to wholesale, retail, distributors and directly to consumers (Figure 38).

The sector is represented by the Poultry Association of Suriname (APSS), bringing together all the actors in the value chain: slaughterhouses, egg producers, and meat producers.

FIGURE 38: ACTORS IN THE POULTRY VALUE CHAIN



Source: Derlagen, C., Tas, J., Boyce, R.A., Shik, O., De Salvo, C. P. 2017.

HIGH COMPETITION OF IMPORTED MEAT

Local production has increased after a drop in 2013, reaching 11,000 tons in 2018, while imports account for almost twice the local production. Imported poultry, mainly from Brazil and the United States, is relatively cheap.⁷⁴ Both countries offer chicken parts at less than half the domestic farm gate price (despite the import tax of 40%). There are a number of reasons for this:

- Chicken farmers in Suriname have higher production costs, mainly because they rely on maize and concentrate that are imported with the 12% CARICOM import duties.
- The US market has a preference for breast meat and wings, while leg quarters are exported at discounted prices.
- In the US and Europe, there is a time limit after which frozen meat can no longer be sold for human consumption. The price for this kind of frozen meat gets progressively lower with time.

74. Main importers: Subisco, Rambros & Combé.

TABLE 20: LOCAL AND IMPORTED POULTRY QUANTITIES AND VALUES, 2012-2018

	UNIT	2012	2013	2014	2015	2016	2017	2018
LOCAL PRODUCTION QUANTITY	TON	11,387	8,433	8,901	9,476	7,914	9,729	10,877
LOCAL PRODUCTION VALUE	SRD \$ 000	112,162	95,558	100,225	85,758	106,760	165,393	190,348
FARMGATE PRICE OF LOCAL CHICKEN	SRD/KG	9.85	11.45	11.26	9.05	13.49	17.00	17.50
IMPORT QUANTITY	TON	12,408	19,558	17,960	23,880	22,718	18,047	18,037
IMPORTED VALUE	SRD \$ 000	50,898	74,260	79,629	105,433	107,128	120,485	121,553

Source: LVV agricultural statistics. 2019.

In 2018, the import tax for poultry meat increased from 20 to 40%. This has slightly reduced the import from Brazil, but had little effect on imports coming from the United States. The APPS forecasts a 10% decrease in imports and slight increase in local production.

As a result of the increased tariffs and decreasing exchange rate, local poultry farmers may be better able to compete with imported meat, which is becoming more expensive in the Surinamese market. However, depreciation also means increased prices of imported feed, while the local population has lower purchasing power. Moreover, depreciation at the end of 2019, and continuing in 2020, led to a limited availability of foreign currency, causing difficulties to feed importers.

Despite a considerable price premium (Table 21), local consumers have a preference for domestically produced chicken, as it is considered a healthier product. Imported chicken is mostly used in restaurants.

In other CARICOM countries, import taxes are generally higher than in Suriname. The CARICOM Poultry Association works towards a single market. The poultry plants from six CARICOM Member States—Barbados, Belize, Guyana, Jamaica, Suriname, and Trinidad and Tobago—were cleared to sell poultry products intra-regionally, creating the potential for new markets for Suriname's exporters.

TABLE 21: CONSUMER AND IMPORT POULTRY PRICES, 2012-2018

	UNIT	2012	2013	2014	2015	2016	2017	2018
CONSUMER PRICE CHICKEN MEAT (CENTRAL MARKET)	SRD/KG	15.80	14.63	14.46	12.89	17.63	23.48	28.50
AVERAGE PRICE IMPORTED CHICKEN	SRD/KG	4.10	3.80	4.43	4.42	4.72	6.68	6.74

Source: LVV agricultural statistics. 2019.

BOTTLENECKS

The poultry sector copes with a number of bottlenecks:

- **Dependence on imported maize:** the sector is dependent on imported maize as a key input for chicken feed. This dependence involves risks when the price of maize rises and/or when the SRD devalues against the USD, making imports more expensive.
- **Disease control:** better disease control should lead to higher production and lower production costs. These are the first steps to be taken if the sector wants to develop an export market.
- **Price competition:** Suriname faces strong price competition from the United States, Brazil, and Caricom nations. Although local chicken is generally preferred by consumers, the low price of imported meat makes sustainable growth of the local sector challenging.
- **Lack of infrastructure and services for small-scale farmers:** Small poultry farmers do not have access to slaughterhouses, storage and marketing facilities and have to rely on large companies for those services.

ANNEXES

ANNEX IV: FISHERY VALUE CHAIN ANALYSIS

The analysis of the fishery value chains was conducted for the following three categories:

- **ATLANTIC SEABOB SHRIMPS:** representing 24% of the total production of the fishery sector.
- **MARINE INDUSTRIAL FISHERIES (excl. seabob):** an estimated 50% of the fish catches.
- **ARTISANAL FISHERIES (excl. seabob):** an estimated 50% of the fish catches.

The value chain analysis covers almost the whole of the fishery sector in Suriname, excluding crustaceans other than seabob (which are very low in quantity and value), aquaculture, and subsistence fishing. The analysis focuses on the artisanal sector and industrial sector as a whole, due to a lack of data on export levels of specific species. Seabob shrimps are considered separately given their importance in export quantity and value and the MSC certification of the sector. Other shrimps are included in the marine industrial fisheries.

Data availability for the fishery sector is low. On production, there is no information on producer prices as seabob and marine fisheries have an integrated value chain. From the artisanal catches, different species are registered together when landed. As such, prices of different species are unavailable. Exported quantities are reported by processing type —frozen, smoked, etc.— and not under fish species.

A. ATLANTIC SEABOB

The main shrimp species captured in Suriname is the Atlantic seabob, a small shrimp species found in the shallow coastal waters throughout the Caribbean and along the coasts of North and South America.⁷⁵ The value chain is integrated, with two main industrial companies catching and processing the landings before export.

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75. LVV. 2019. Department of Fisheries.

INPUTS

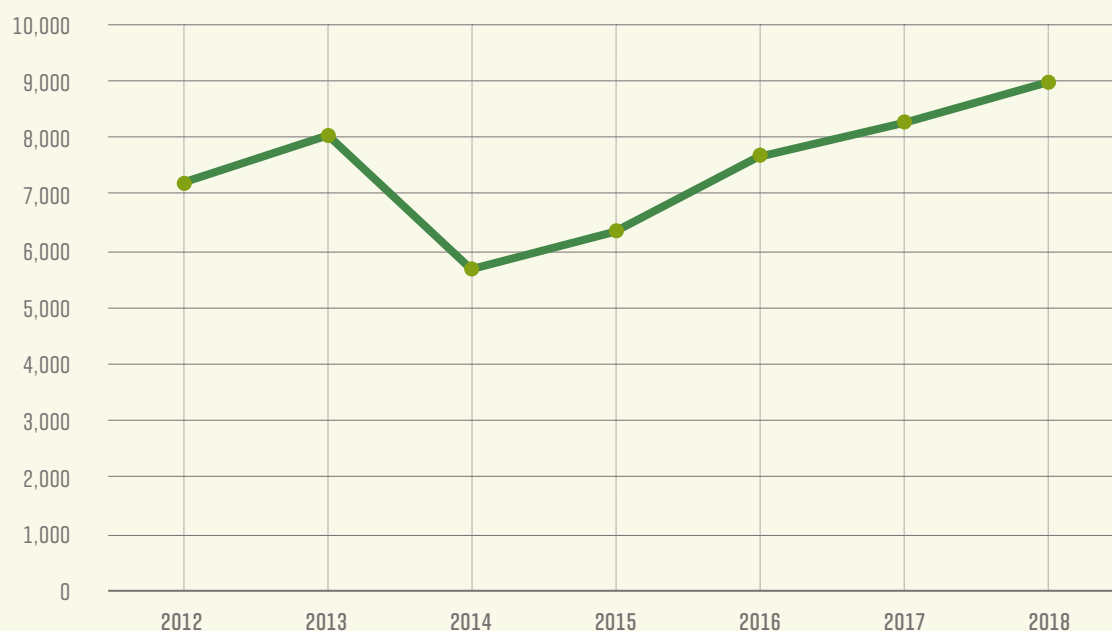
In Suriname, seabob shrimp have been captured using industrial vessels since 1996. The production costs of the industrial fleet are heavily dependent on fuel price —contributing up to 50% of total production costs. Labor is paid in dollars, as most of the staff are of foreign nationalities. Other variable costs are ice, food for the crew, oil, water and electricity.

PRODUCTION

Seabob accounted for 24% of the production volume of the fishery sector in 2018. Captures decreased between 2013 and 2014, but showed an increasing trend between 2014 and 2018, reaching 9,000 tons in 2018.

There are both industrial and artisanal companies active in seabob captures, with artisanal fishery only representing a small part. Artisanal companies land 500 tons a year and capture in the mouths of rivers using seine nets. Their catch is sold fresh or dried in the local market. Industrial companies fish for seabob with "twin-rig" shrimp trawlers and land between 8,000 and 10,000 ton a year.

FIGURE 39: SEABOB LANDINGS, 2012-2018, TONS



Two industrial processing companies operate the trawlers, the government owned SAIL N.V., and *Heiploeg Suriname N.V.* These two companies also perform the processing, where shrimps are peeled, sorted and frozen for export to Europe and America. Besides the peeling, there is no value addition done in the value chain in Suriname. SAIL sells most of its production to Heiploeg for export.

In 2011, Suriname demonstrated that it was meeting international best practice for sustainable fishing, and received the Marine Stewardship Council (MSC) certification. To achieve the MSC conditions, a specific management plan for seabob was set-up and implemented (last version was approved for 2019-2022).

The fishermen and the Suriname government worked with conservation organizations to set up a working group to oversee fishing practices (Seabob Working Group SWG). Fixed members are representatives of the companies (*Heiploeg Suriname N.V.*, Surinam American Industries Ltd. (SAIL), NAMOONA N.V.), the artisanal seabob sector, and the Department of Fisheries of LVV. WWF Guianas acts as an observer. They meet monthly to discuss fishing practices and catch restrictions, as defined by the Harvest Control Rule.

The Harvest Control Rule takes into account social, economic and ecological factors to avoid over-fishing. Measures to reduce by-catch, such as the Turtle Exclusion Device (TED) and a device to allow young and small fish to escape the net, are applied. The seabob fishery license now makes two escape panels compulsory.⁷⁶

EXPORTS OF SEABOB

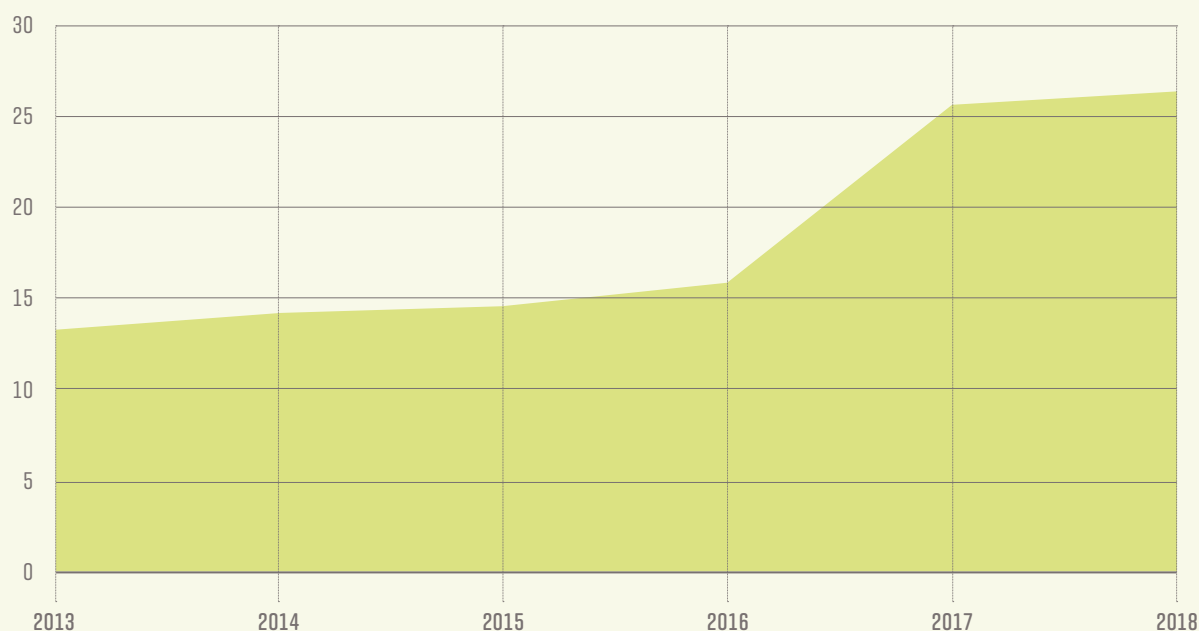
Shrimp species are important for export earnings, accounting for 37% of total fishery export value in 2018. The total export value of shrimp species increased from SRD \$53,500 in 2012 to SRD \$115,500 in 2018. Export quantities and values are combined with other shrimp species in the data collected by LVV; the latter only represent 4%-5% of total quantity, but have a higher value per kilo than seabob shrimps. World shrimp prices rose during the second half of 2015, after disease caused issues in Asia and Latin America, mostly in aquaculture (Figure 40).⁷⁷

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76. FAO. 2019. Aquaculture and Fisheries.

77. FAO. 2014.

FIGURE 40: VALUE OF FROZEN SHRIMPS, 2013-2018, IN SRD/KG



Source: LVV agricultural statistics, 2019.

BOTTLENECKS

The main bottlenecks in the seabob value chain are the overcapacity of the fishing fleet and fierce international competition by other shrimp species:

- **Overcapacity and high bycatch rates:** the seabob sector is an important contributor to decreasing fish stock, because of the trawling techniques used. Moreover, the sector suffers from overfishing.
- **High international competition:** as the fishery sector is export-oriented towards the EU and USA, the products compete internationally with many other shrimp species, including Asian aquaculture shrimps, which have lower production costs. Developing value-added products could increase the profitability of Suriname seabob.
- **Fuel dependency:** the production costs of the industrial fleet are heavily dependent on fuel price, determining around 50% of total production costs. With an increase of 74% of the diesel price in Suriname between 2015 and 2018, the sector has seen its production costs rising substantially.

B. MARINE INDUSTRIAL FISHERIES

Industrial fishers can fish from a depth of 15 fathoms (27.4m) to the limit of Suriname waters. The industrial fishery comprises shrimp trawling fleets, finfish trawling fleets, red snapper and mackerel hand-liners and large-pelagic long-liners. Industrial fishermen use two types of fishing techniques: trawling (shrimp and fish trawling) and line fishing (longlines and handlines).

INPUTS

Trawlers have a high level of fuel consumption, which accounts for around 50% of production costs, making the sector's profitability highly dependent on fuel prices. Due to increasing fuel prices and depreciation, production costs increase heavily. This demands higher catches and income per trip, which in turn contributes to overfishing.

PRODUCTION

Species captured by marine industrial fishery are mostly deep-sea shrimp species and fish such as red snapper, mackerel and other larger pelagic types (sharks, tuna and related fish). According to the data of LVV, 225 vessels are in operation, representing 15% of the fleet's total number. All of the industrial fleet's catches are registered at the time of landing.

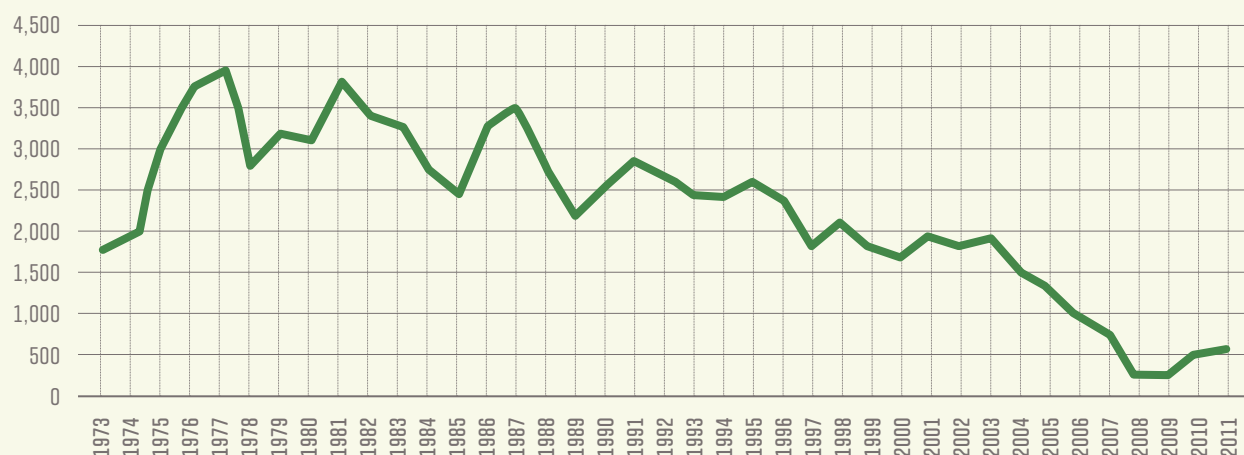
Since the nineties, captures per trawler in the marine shrimp trawl industry have reduced drastically, likely due to illegal fishing, over-fishing, and the high number of licenses and thus, boats operating. As the captured volumes decreased, production cost per catch rose and competitiveness lowered. In recent years, industrial companies have begun landing different species, due to the discovery of new markets, including black snapper (*Orthopristis ruber*), which was previously regarded as bycatch.

DECREASE IN MARINE SHRIMP SUPPLY

Large sea shrimps were the first industrial marine fishery developed in Suriname. This subsector focuses on the Brown shrimp (*Penaeus subtilis*), Hopper (*Penaeus brasiliensis*), Pink shrimp (*Penaeus notialis*) and White shrimp (*Penaeus schmitti*). Since 1996, there has been a sharp decline in total production and yields (in tons per year per boat) (Figure 41).

This decline is due to overcapacity, with the increasing number of vessels, from around 50 before 1970, to almost 200 in 1977. Overfishing has risen to a level at which a sustainable catch cannot be achieved. The fleet has also decreased considerably again over the years.

FIGURE 41: SUPPLY OF LARGE SEA SHRIMPS, 1973-2011, TONS



Source: LVV, Department of Fisheries. 2013.

PROCESSORS

Commercial fishing vessels are predominantly owned by fish processing companies that land and process their harvest at the central fish landing harbor, called Centrale Visaanvoer Haven Suriname (CEVIHAS), or at their private landing stage.⁷⁸ The processing industry consisted of 13 registered companies in 2019.⁷⁹

EXPORT

Figure 42 shows fish export quantities including artisanal landings. Fluctuation in export quantities is mostly due to fluctuations in catches and international prices.

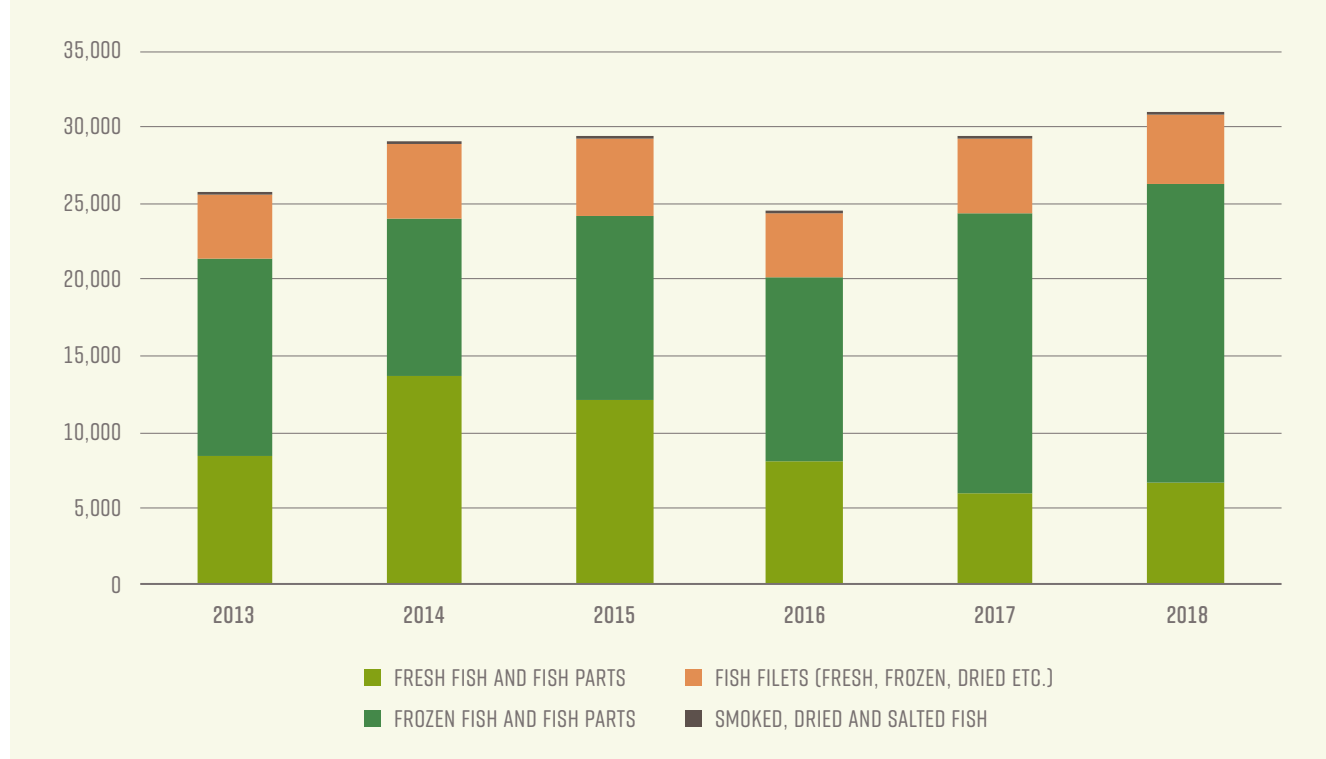
Export is mainly sent to the EU, the United States and Jamaica. The vast majority of total exports are whole, cleaned fish that are frozen or exported on ice. Tuna is exported fresh (whole or in fillet form) or frozen (without head and/ or tail).

78. FAO. 2019. Fisheries and Aquaculture.

79. VKI. 2019. List of Registered Companies.

For fish exported to the EU, a system of catch certificates has been introduced guaranteeing traceability up to the vessel.

FIGURE 42: FISH EXPORT VOLUMES, 2013-2018, TONS



Source: LVV agricultural statistics. 2019.

BOTTLENECKS

The main bottlenecks of the marine industrial subsector are similar to those of the seabob sector:

- **Fuel dependency:** the production costs of the industrial fleet are very dependent on fuel price, determining around 50% of total production costs. The sector experiences increasing production costs, due to rising diesel prices in Suriname;
- **Overcapacity and overfishing:** only for seabob has the number and conditions of licenses given out been based on a stock assessment. For the fishery and other shrimp captures, there has been no stock assessment done per species since 1988⁸⁰. The fishing effort has, historically, been too high because of the too high number of licenses, illegal catches and landings, and fishing techniques, which are becoming more efficient.

80. Planbureau Suriname. 2008.

C. ARTISANAL FISHERIES

Most of the artisanal catches are seawater catches. Artisanal fishers operate in the Shallow Zone (0-10 fathoms) and typically hold an Inland Water (BV) or Suriname Coast (SK) license. In this zone, fishers target Sciaenidae and Ariidea species in conjunction with the shallow water Seabob shrimp. Trawling is not allowed in the shallow sea zone, nor is industrial seabob shrimp fishing, making the area only operational for artisanal fishers.⁸¹

INPUT

Artisanal fishery is traditionally characterized by little mechanization and primitive capture techniques. In recent years, more and more boats have been equipped with mechanical winches to retrieve the nets. Many fishermen are from Guyanese origin.⁸² 85% of the total fleet in Suriname is artisanal, and the vessel types used are Guyana boats (open or closed) and SK Bangamary.⁸³

PRODUCTION

Artisanal marine catches accounted for around 70% of total marine captures in production volumes in 2010-2012,⁸⁴ a figure currently decreasing to 50%, because industrial production found new markets for fish which were previously seen as bycatch, like bang bang and kandratiki.

FAO reported 307,153 tons of official landings considered to be from the artisanal fishery between 1950-2010. The unreported artisanal catches were estimated to be approximately 520,000 tons.

There is no data available on production value or export value of artisanal catches, as the statistics combine the processing performed by the industrial companies, with the catches of the industrial fleet.

The Surinamese National Fisherfolk Organization (SUNFO) is the umbrella organization of the artisanal fishers' organizations of Suriname, founded in 2018. SUNFO's goal is to strengthen the capacity of the artisanal sector to take part in fishery management at the national and regional level.

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81. FAO Fisheries and Aquaculture. 2019.

82. Planbureau Suriname. 2008.

83. LVV. 2013. Department of Fisheries.

84. Ibid.

MIDDLEMEN AND PROCESSORS

Artisanal fishers land in specific government landing sites, which provide facilities such as ice and gasoline resupply. Important landing sites can be found on the Suriname River (Paramaribo, and Commewijne), the Nickerie River (Nickerie), the Coppename River (Boskamp) and the Marowijne River (Galibi). Some landing sites charge a service fee.

There is no auction system for trading landed fish. The fishermen sell the catch to buyers (brokers) or directly to processing companies. In contrast with the industrial fishers, the value chain of artisanal marine fisheries is less integrated. There was no data found on the prices received by fishers when selling to the industrial processors.

EXPORT

High quality fish are exported to the US or EU market, and lower quality fish to the Caribbean market (smoked fish). Middlemen sell the remaining fish to local markets. The bladder of bang bang, kandratiki and copila fish are important products in terms of value for artisanal fishers. Catches represented an estimated 5,474 tons in 2017,⁸⁵ with value per kilo estimated to go up to USD \$180/kg.⁸⁶ There is a value chain for the fish bladder, which is mostly exported to China via Hong Kong.

BOTTLENECKS

The artisanal sector struggles with the following problems:

- **Illegal, unreported, and unregulated (IUU) fishing:** a structural problem facing the fishery sector in Suriname is the continued rise of IUU fishing, both by local and external vessels. Two kind of illegal practices can be distinguished:
  - Fishers with a legal license, but not respecting the conditions set on the license.⁸⁷
  - Fishers without a license fishing in Surinamese waters (by boat foreign and local fleet).

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85. Douane Numbers. 2017. Dried, frozen and fresh combined.

86. Unpublished data WWF.

87. Using nets with mesh size smaller than permitted by law, prohibited tools (traps for example), longer floating nets, fishing in forbidden zones, borrowing licenses and landing in Guyana (because of higher sales prices). Licenses are also often sub rented to Guyanese fishers.

More stringent control on the right use of the license by the Coast Guard and stricter regulations are needed to tackle the problem. To address the illegal fishing of foreign vessels, regional cooperation is necessary. Both types of illegal fishing aggravate the overcapacity problem.⁸⁸

- **Overcapacity of the fishing fleet and capture volumes:** the sector struggles with overfishing due to IUU, the high number of licenses and fishing techniques becoming more efficient.

Especially in the artisanal sector, data collection and quality is poor, making any sustainable resource management challenging. For artisanal catches, not all landings are recorded, but a sample-based system is used by the Fisheries Department. Most of the marine and all of the inland fish landings are registered as unspecified. Training is needed for LVV staff to improve data collection.

- **Poor Health & Safety measures:** artisanal fishers mostly rent boats from boat owners. Illegal workers (often of Guyanese origin) and poor working conditions (open boats of 12 workers for 6 days at sea) are common practices. Investment in new equipment is very rare.
- **Piracy in Surinamese waters:** piracy violence has been reported often in recent years, with a major accident in 2018 resulting in the deaths of a dozen Guyanese nationals.⁸⁹ Mainly artisanal fishers are affected. The Under Directorate of Fisheries of LVV suspects the piracy is carried out by fishermen, who attack and rob each other. In these attacks, captures (mostly fish bladder) and the outboard motor are usually taken. The Suriname Government is considering sea-monitoring programs to reduce this problem.

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88. LVV. 2013. Department of Fisheries.

89. See also: Telesur. 03/05/2018.

ANNEXES

ANNEX V: DETAILS OF REFERENCE PRICE CALCULATIONS

To be correctly compared with the farm gate price, the border price must be adjusted for marketing margins, which include the costs of processing, transportation and handling of a product incurred between the farm gate and the border.

For export products:

FOB price

- handling and transportation costs between border and domestic wholesale market
- handling and transport cost between farm gate and wholesale market
- cost of processing of farm product into export product

For import products:

CIF price

- + handling and transportation costs between border and domestic wholesale market
- handling and transport cost between farm gate and wholesale market
- cost of processing of farm product into export product

Table 22 and 23 explain in more detail how the reference prices and margins are obtained.

TABLE 22: OVERVIEW OF DATA USED, EXPORT COMMODITIES CHECK

COMMODITY	REFERENCE PRICE	MARGIN ADJUSTMENT	OTHER ADJUSTMENTS
Rice	Average export unit value (FOB) price for cargo rice. Cargo rice was chosen for better comparability with farm-gate commodity. <i>Source: Agricultural Statistics, LVV.</i>	As reported by the Association of Rice Exporters (VRE), the Association of Surinamese Paddy Farmers (SPBA), N.V. Sun Rice and logistics company CMA CGM Suriname N.V. All costs have been modified to refer to paddy rice using the quantity adjustment factor when relevant.	Quantity adjustments are made to take into account production of paddy rice and exports of milled rice. Sale of byproducts for feed in the country is discounted from reference price.
Bananas	Average export unit value (FOB) price of bananas. <i>Source: Agricultural Statistics, LVV.</i>	No processing is applicable, the margin adjustment is based on USD \$15/ton for storage, handling and transport and 2% on FOB price for port and trading costs.	— — —
Cassava	Reference price is export unit value (FOB) for fresh cassava from Suriname. <i>Source: Agricultural Statistics, LVV.</i>	Margin adjustment for cassava includes 20% storage, handling, and transportation costs and 2% port expenses.	It was confirmed that no cassava is currently used for animal feed. As all cassava produced is used for human consumption, no feed adjustments have been applied.
Oranges	Reference price is average export unit value (FOB) price of oranges. <i>Source: Agricultural Statistics, LVV.</i>	Adjusted for 30% storage, handling, and transportation costs (data from the PSE report for Jamaica) and 2% port expenses.	— — —
Plantains	Reference price is average export unit value (FOB) price of Colombia. <i>Source: UNCOMTRADE.</i>	No processing is applicable, the margin adjustment is based on USD \$15/ton for storage, handling and transport and 2% on FOB price for port and trading costs.	— — —
Coconut	Reference price is average export unit value (FOB) price of Guyana. <i>Source: UNCOMTRADE.</i>	Handling, port and trading margin from Guyana is applied (PSE Guyana), 30% of FOB price.	— — —

TABLE 23: OVERVIEW OF DATA USED, IMPORT COMMODITIES

COMMODITY	REFERENCE PRICE	MARGIN ADJUSTMENT	OTHER ADJUSTMENTS
Poultry	Unit value of imports from Brazil for HS 02.07.12 "Meat of fowls of species gallus domesticus, not cut in pieces, frozen." <i>Source: UNCOMTRADE.</i>	Based on the marketing costs as reported by the Association of Surinamese Poultry Farmers and container company CMA CGM Suriname N.V.	Quality differences and consumer preferences for domestic chicken taken into account based on retail price ratios between domestic poultry and imported poultry from Brazil.
Pork	Average import unit value (CIF) price. <i>Source: Agricultural Statistics, LVV.</i>	Adjusted for processing calculated as % of border price.	— — —
Beef	The reference price is based on the Australian saleyard cow price, Queensland, minus by-product value, plus processing cost, plus transport cost. This reference was also used by the OECD for Mexico and by the IDB for some of the LAC countries. <i>Source: Mexico PSE.</i>	No adjustment needed as the reference price is at farm-gate level.	Remark: due to low volumes of trade and lack of reliable trade statistics, the reference price for beef and eggs were taken from the largest world producers and adapted to take into account processing, transport, and margins, in accordance with OECD and IDB practice in other countries in the region
Milk	Fresh milk is not a tradable commodity. Therefore, the border price of milk is an implicit value, calculated from the prices of butter and skimmed milk powder, using the components: milk fat non-fat-solids contained in raw milk, butter, and skimmed milk powder respectively <i>Sources: fat content of milk (LVV), non-fat solids content (estimations from other LAC countries), import values of butter and milk powder (Ministry of Trade and Industry).</i>	The reference price of milk at farm gate is the implicit milk border price adjusted for processing costs (average of processing costs in four main milk producing countries (Australia, EU, New Zealand, US).	— — —
Eggs	Eggs are considered non-tradable. Domestic production covers 99% of consumption. US farm-gate price was taken as a reference. Because of the non-tradable status, the price US farmers receive for their output was used as reference. <i>Source: PSE USA OECD.</i>	Insurance and freight cost between US and Suriname	Remark: due to low volumes of trade and lack of reliable trade statistics, the reference price for beef and eggs were taken from the largest world producers and adapted to take into account processing, transport, and margins, in accordance with OECD and IDB practice in other countries in the region

