Guyana Green Industry and Trade Assessment (GITA)

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Contents

Chapter 1: Introduction

This chapter offers definitions of green industry production and trade set within the context of Guyana work with the Partnership for Action on Green Economy (PAGE). It briefly describes the linkages between the Guyana Green Industry and Trade Assessment (GITA), the Green State Development Strategy: Vision 2040 (GSDS) and the Green Business Framework developed recently by the Ministry of Business, and lists key issues and questions that will be addressed in the GITA. It concludes with a brief overview of the remaining chapters in the GITA.

1.1 Definitions of green industry production and trade

UNIDO describes green industry as industrial production and development that does not come at the expense of the well-being of natural systems or lead to adverse consequences to human health. Green industry is aimed at mainstreaming environmental and social considerations into the operations of enterprises by "*encouraging better environmental performance, directly addressing environmental challenges and producing in an environmentally preferable manner*". (UNIDO, 2011; IISD & UNEP, 2014:93).

For purposes of this assessment, industry is limited to the manufacturing sector encompassing activities which are described in Section C (manufacturing) of the International Standard Industrial Classification of All Economic Activities (ISIC), Revision 4, of the Statistics Division of the United Nations Department of Economic and Social Affairs. Industry as used in this assessment refers exclusively to manufacturing activities; the terms industry and manufacturing are herein used interchangeably.

For purposes of this assessment and in keeping with this strategic approach, green industry encompasses four activities, with the first activity being the exclusive focus of this GITA:

- Greening industry: this refers to any activity by which the processes of the manufacturing industry (1) improve efficiency of energy, water and raw materials, (2) reduce pollutant discharges to move towards compliance with environmental norms and (3) shift to use of renewable energy to the maximum extent possible.
- Environmental goods and services industry: the manufacture of pollution control and monitoring equipment. In addition, environmental services, such as environmental engineering and auditing, are included even though they are not a direct part of industry according to ISIC 4. However, as such services are needed for greening of industry, they are included within the category of green industry.
- Renewable energy industry: the manufacture of renewable energy technologies (e.g. solar panels, wind turbines, mini-hydro turbines). These are clearly part of industry even though there is no one specific ISIC subcategory for these technologies.
- Materials recovery and recycling industry: to the extent that these activities include transformation during production, they are part of the manufacturing subsectors where this transformation occurs (e.g. transforming scrap metals into new metals, remanufacturing car engines, etc.). If they mainly refer to sorting activities, they are classified under waste management activities or wholesale of waste and scrap[1].

For the purposes of this assessment, green industry trade broadly refers to trade that "does not deplete natural resources, harm the environment or deteriorate social conditions, while promoting economic growth." (UNEP, 2013). While there is no universally agreed definition of green industry trade, green trade opportunities for manufactured goods in general are the export of environmental goods and services and renewable energy technologies. In the case of Guyana, green trade opportunities are mainly agro-industry products that comply with quality, health and environmental standards (ISO 9000, HASP and ISO 1400) and forestry products that comply with the standards set by the Forestry Stewardship Council's Policy and Standards Committee.

1.2 Linkages with the Green State Development Strategy: Vision 2040 and the Green Business Framework

The Guyana GITA forms a central part of the empirically-based analysis undertaken through the Partnership for Action on Green Economy (PAGE) in Guyana. It expands on key components of the Green State Development Strategy: Vision 2040 and the Green Business Framework. GITA plays a critical role in identifying a set of both modified and new policies to support the transition to green industrial production and trade. It puts forward specific recommendations for green industry and green trade policy and programmes, which were presented to key stakeholders at a verification workshop in December 2018.

[1] Recycling used to be classified under manufacturing in ISIC 3, but this did not well reflect its production process.

1.3 Key Issues and Questions

This assessment focuses on the following key issues that are most relevant to green industry and trade, which are:

- What is the current status of industry and trade?
- What existing policy regimes have the potential for greening industry and supporting green industry trade?
- What is known about industrial environmental pollution and resource use?
- What modifications in or effective use of existing industrial policies could contribute to greening industry and green industry trade?
- What new initiative(s) might be undertaken to accelerate the greening of industry and trade, or even aspects thereof?
- What new industry activities offer potential for green industry and trade?
- How could the development of these activities be supported?

1.4 Remaining chapters

The chapters listed below are based on a review of policies and programmes, national and international data sources and interviews with key informants, and will attempt to respond to the questions listed in 1.3 above:

- **Chapter 2: Guyana's policy framework supportive of green industry production and trade.** This chapter reviews the major policies that have or could influence the greening of industry and the export of manufactured goods. It identifies both policy and implementation gaps.
- **Chapter 3: Guyana's manufacturing sector and trade in manufactured goods.** This chapter describes Guyana's industrial and export structure. The data on manufacturing, both production and employment, will be drawn primarily from data from the National Statistics Bureau and export data from UN COMTRADE.
- **Chapter 4: Industrial environmental pollution and resource use.** This chapter utilises the limited international and national data to characterise the current situation.
- **Chapter 5: Interventions for greening industry.** This chapter outline interventions, which include measures to improve the implementation of current policies and programmes and new measures that have the potential to contribute to the transition to green industry. It can be seen as identifying policy implementation gaps that need to be addressed in green industries in Guyana in addition to the notable efforts by the Government to introduce conventional industrial, environmental and energy management programmes.
- **Chapter 6: Measures and priorities for green goods production and trade.** This chapter describes the potential for expanding green goods production or supporting production of new green goods. It identifies the need for identifying the environmental and social implications of supply chain expansion.

- **Chapter 7: Findings and recommendations.** This chapter summarises the findings in the above chapters and recommends practical measures that have the potential to support green industry development and trade in Guyana.

Chapter 2: Guyana's policy framework and institutions for green industry production and trade

This chapter reviews the major policies that have or could have influence the greening of industry and the trade in manufactured goods. It also lists the institutions that are most central for promoting green industrialisation.

2.1 National Development Policy Framework: Low Carbon Development Strategy and Green State Development Strategy: Vision 2040

The Low Carbon Development Strategy (Government of Guyana, 2010) and the Green State Development Strategy (Government of Guyana, 2018) are the most instrumental developments in the policy framework that is guiding Guyana's transition to a green, low carbon economy. Guyana's Low Carbon Development Strategy (LCDS), launched in 2009, is an overarching framework to move the country towards low carbon, climate resilient and low deforestation economic growth.

The two main goals of the Low Carbon Development Strategy (LCDS) are as follows:

1. *To transform the economy to deliver greater economic and social development by following a low carbon development path.*

2. *To provide a model for the world of how climate change can be addressed through low carbon development in developing countries, if the international community takes the necessary collective actions, especially relating to Reducing Emissions from Deforestation and Forest Degradation Plus (REDD+).* [2]

Policy discourse and action around the LCDS, including the implementation architecture, prioritised the first goal as environmental security, conservation and capitalisation of forest assets. The second goal described low carbon transformation in terms of *modernisation of traditional economic industries* (sugar, rice, gold mining and forestry) and *expansion to grow comparatively advantageous sectors* such as aquaculture, manufacturing, non-traditional agriculture, business process outsourcing, information technology and tourism.

[2] LCDS (2010).

The Green State Development Strategy: Vision 2040 is Guyana's twenty-year, national development policy that reflects the guiding vision and principles of the 'green state' i.e. ensuring a good quality of life for all Guyana's citizens based on sound education and social protection, low carbon and resilient development, providing new economic opportunities, justice and political empowerment. The Strategy describes that Guyana's future development will be derived from the country's natural wealth–its diversity of people and abundant natural resources (land, water, forests, mineral and aggregates, biodiversity). "Vision 2040" builds upon Guyana's previous national development strategies e.g. the Low Carbon Development Strategy (2009) and the National Development Strategy (2001) that established the policy priorities for low carbon growth and diversified economic development, respectively.

It lays out Guyana's aims to realise green economic growth through the following: increase of value-added production to reduce reliance on primary commodities particularly in mining and agriculture; the reduction and reversal of natural resource degradation; access to new markets thereby enhancing export trade and creation of jobs, all with a focus on expanding the economic base. These policy objectives are related to achieving *Sustainable and Inclusive Structural Transformation* for Guyana outlined in the Green State Development Strategy: Vision 2040. There are four priorities guiding policy and investment action in this regard:

1. Resource extraction for sustainable development
2. Sustainable, productive, climate-resilient and diversified agriculture
3. Green, inclusive, high value-added industrial development
4. Enabling business environment.

In the context of green, inclusive and value-adding industrial development, the core policy recommendation involves improving industrial resource efficiency and developing circular production systems both at the shared infrastructure level and within and between the manufacturing enterprises on Guyana's industrial estates. It involves the adoption of green technologies to reduce carbon emissions, improve circular production, reduce environmental pollutants and waste, and strengthen the production efficiency and competitiveness of locally manufactured green goods and services. Other policy interventions include infrastructure investments that prioritise air, road and industrial clusters, technology development and transference programmes, informational, financial and technical support initiatives and the strengthening of trade and market facilitation services.

2.2 Industrial Policy

The Strategic Plan 2016-2020 of the Ministry of Business notes that, *"Through the development of industrial estates the Ministry of Business has the responsibility to promote, encourage and facilitate investments that diversify foreign earnings and develop value added sectors through improving the environment in which businesses operate and providing an opportunity for increased competitiveness."* It also highlights the absence of an industrial development policy as a major policy gap. However, the Government plans to undertake a review of current and planned industrial estates as a pre-preparatory

action towards establishing an industrial development policy after the Green State Development Strategy: Vision 2040 is adopted by the National Assembly. Currently, the Industrial Development Department within the Ministry of Business provides policy and coordination oversight for Guyana's industrial estates.

2.3 Trade Promotion Policy

In 2015, the Government of Guyana and the World Trade Organization (WTO) published a Trade Policy Review of Guyana. The report recalls that Guyana's Nation Trade Strategy (2003) remains the principle domestic approach to trade promotion. The Government further reported deepening the alignment and coherence at the regional level.

Development Objective #3 of the Green State Development Strategy: Vision 2040 – "Green and Inclusive Economic Diversification", states,

"This strategic area will identify and assess the major opportunities for expanding Guyana's economic base to higher-value adding activities, especially in manufacturing… Core areas of focus will be manufacturing that expands on existing lower-value agricultural, forestry and mineral processing sectors; eco-tourism; and sustainable fisheries, aquaculture and fish processing – all of which leverage the country's clear natural resource advantages".[3]

2.4 Environment and Energy Policies

2.4.1 The Environmental Protection Act (1996)

The Environmental Protection Act *"provides for the management, conservation, protection and improvement of the environment, the prevention or control of pollution, the assessment of the impact of economic development on the environment and the sustainable use of natural resources"* (EPA, 1996). It is best described as the umbrella legislation that mandates the undertaking of a number of measures to safeguard the environment and its resources, including water resources. In particular, Section IV deals with the execution of environmental impact assessment and Section V deals with prevention and control of pollution, both of which are necessary tools to mitigate watershed degradation. For example, Part IV (19) 1 states, *"A person shall not discharge or cause or permit the entry into the environment, of any contaminant in any amount, concentration or level in excess of that prescribed by the regulations or stipulated by any environmental authorisation".*

Environmental protection regulations were promulgated in 2000. They govern water pollution abatement and hazardous waste management and should be sufficient for protecting human health and the environment. However, it appears that water regulations have only been partially implemented. In spite of its authorities, the Environmental Protection Agency does not have an inventory of permits issued to significant manufacturing firms or monitoring data on manufacturing wastewater treatment or discharge,

[3] GSDS (2018) Pg. 6

nor are there records showing which firms are not in compliance with wastewater discharge standards. Similarly the Agency has no data about industrial hazardous waste generation and disposal.

2.4.2 The Water and Sewerage Act

The Water and Sewerage Act (2002) is an important piece of recent legislation that facilitates the development of a National Water Policy for Guyana. When fully implemented, the Act will enable the establishment of a new legal, institutional and regulatory framework within which the salient issues regarding water resource management can be adequately addressed. The Act further allows for the introduction of national water standards and a National Water Council to spearhead the water resource management policy. Specific issues covered are water supply and connection, water regulations, wastewater and sewerage matters, drought orders and hydro-meteorological matters.

2.4.3 The National Solid Waste Management Strategy

This policy guides the Government's agenda on waste collection, transportation and disposal, by improving waste management infrastructure, enforcing existing legislation and promoting waste to energy initiatives. The policy has six major goals that reflect the Government's interest in managing the economy's solid waste in order to prevent ruination of the natural setting.

The ban of Styrofoam and other non-compostable food and beverage container imports is a direct result of this policy. Also, the policy has led to a reduction in the use of non-degradable packaging materials while simultaneously creating retail markets for biodegradable alternatives. Littering has also seen a marginal decrease in urban areas.

2.4.4 National Forest Plan

The National Forest Plan calls for "the conservation, protection and utilisation of the State's forest to ensure sustainable social, economic and environmental benefits for current and future generations of Guyanese, whilst fulfilling Guyana's commitments under international agreements and conventions." To achieve this, the National Forest Plan outlines four strategic objectives with sub-objectives consistent with the GSDS. Of most relevance for the manufacturing sector, the Plan calls for an increase in value-added products and in jobs created through value-added production.

2.4.5 Guyana Climate Change Action Plan

The Guyana Climate Change Action Plan outlines strategic measures to be taken to respond to the threat of climate change to water resources. These water conservation measures are: water metering; the use of time-runs where the water supply may be staggered according to regions or sectors in the domestic/industrial sector; cautious development of new artesian wells in the interior regions; the

introduction of efficient control and management practice for the water reservoirs network, especially those for agriculture use; and the introduction of scientific monitoring and management of irrigation and drainage systems.

2.4.6 Guyana Energy Agency Strategic Plan

The Guyana Energy Agency (GEA) Strategic Plan (2016-2020) calls for, among other things, an increase in the number of energy assessments/audits with the objective of determining strategies to increase the use of domestic renewable energy sources and increasing energy efficiency at the household, commercial and public levels. To date, several assessments have been undertaken prioritising energy efficiency and the achievement of 100 per cent renewable energy in the public sector. These assessments are in line with the Government's efforts to achieve 100 per cent renewable power in the public sector as well as its policy to reduce national dependence on fossil fuels in domestic and commercial settings. With regard to the manufacturing sector, the plan notes that this sector accounts for the lowest share of petroleum imports and only three per cent of total energy consumed.

The Plan states that the GEA will actively encourage the adoption and implementation of the ISO Energy Management Standard (ISO 50001). The Standard provides a framework of requirements for organizations to develop a policy for more efficient use of energy, fix targets and objectives to meet the policy, use data to better understand and make decisions about energy use, measure the results, review how well the policy works, and continually improve energy management. To date, no enterprises in the industrial estates have undertaken energy audits or set up energy management plans.

2.5 Institutions supportive of green industrialisation

There are several organizations which currently provide policy and planning support for green manufacturing in Guyana. All of these organizations were established prior to the launch of the 2009 LCDS. As such, while these organizations are adjusting their programmes and budgets to integrate greening actions, new mechanisms and organizations are likely to be designed, especially in pursuit of Guyana achieving sustained increases in value-added green goods and services.

2.5.1 Ministry of Business - Industrial Development

The Ministry of Business was established in 2015. It consolidated the integration of the commerce, trade and business development responsibilities of the prior Ministry of Tourism, Industry and Commerce. The focus of the Ministry is to develop and implement policies and programmes that promote Guyana as a strategic investment and tourist destination in the Caribbean and South America. The departments and units within the Ministry of Business include Commerce, Industrial Development, Tourism, the Business Policy and Strategy Unit and the National Exhibition Centre. The Ministry also coordinates its work through several agencies which include the Guyana Office for Investment, the Small Business Bureau, the

Guyana National Bureau of Standards, the Guyana Tourism Authority and the Competition and Consumer Affairs Commission. The Industrial Development Department supports the oversight of the policy implementation and coordination of Guyana's industrial estates and more broadly, industrial development in Guyana.

2.5.2 Ministry of Business- Guyana Office of Investment

The Guyana Office for Investment (G)-Invest) was established under the Public Corporations Act in 1994 as a semi-autonomous body. Its CEO answers to a Board of Directors which is composed of representatives of both the private and public sectors. GO-Invest is divisions, one responsible for Investment Facilitation and Promotion and the other for Export Promotion. With these two divisions, Go-Invest offers a full complement of services to local and foreign investors and exporters.

2.5.3 Ministry of Finance—Bureau of Statistics

The Bureau of Statistics is a sub-autonomous agency of the Ministry of Finance. The agency is responsible for the collection, analysis and publication of national statistics including Guyana's system of national accounts, labour force surveys, household income and expenditure surveys and the Guyana census. The Bureau of Statistics also facilitates periodic establishment surveys; the next such survey being implemented in 2019. This survey will reference selected green manufacturing indicators.

2.5.4 Ministry of Infrastructure—Guyana Energy Agency

The transition to renewable energy and greater energy efficiency for Guyana will occasion significant structural change for the energy sector. Currently, the Agency's mandate is the promotion and regulation of efficient and limited use of petroleum-based energy sources and the development, introduction and promotion of ecologically sustainable and environmentally renewable sources of energy for domestic and commercial applications.

2.5.5 Ministry of the President—Environmental Protection Agency

The EPA is an agency of Guyana's recently established Department of the Environment. Institutionally this department is a sub-autonomous organization of the Ministry of the Presidency. The EPA is authorised to issue six types of environmental authorisations--construction, operations, environment, biodiversity research and noise permits. It issues letters of authorisation to projects or businesses that may not have a significant positive environmental impact. It also responds to incidences of breached regulations or domestic or commercial violations of established regulations. In addition, the EPA is Guyana's National Focal Point for the Convention of Biological Diversity, the Basel Convention and the Cartagena Convention.

Chapter 3: Guyana's manufacturing sector and trade in manufactured goods

This chapter presents an overview of the performance of the four principle sectors of Guyana's economy over the past 10 years and their contribution to GDP. Following this, the performance of the manufacturing sector in terms of production output and employment is summarised. Subsequently, it describes the manufacturing activity at the two largest industrial estates in the country. It concludes by documenting the current and potential cross border trade of Guyana's commodities and manufactured exports.

3.1 Overview

Guyana's GDP grew from 1.8B (constant USD 2010) in 2000 to 2.9B in 2016. The annual percentage growth rate varied from minus 1.4 percent to plus 7.0 percent over this period. The percentage growth rate was 3 percent in 2016. Its Manufacturing Value Added (MVA) was 234M (constant USD 2010) in 2000 and 191M in 2016. The MVA share of GDP was 11.4 percent in 2000 and 6.6 percent in 2016 (UNIDO, 2018).

Guyana's economy as of 2017 is primarily comprised of four sectors, namely agriculture-forestry-fishing, mining-quarrying, manufacturing and services (Table 1). The agriculture-forestry-fishing sector includes rice, sugar, fishing, other crops, livestock and forestry. The mining sector includes gold, diamond and bauxite. They are the key drivers of export earnings, representing 40 to 60 percent of all export earnings. The manufacturing sector, largely dependent on sugar and rice milling, includes other manufacturing such as beverages, wood products and pharmaceuticals. The sector contributed six percent of the country's GDP in 2017. The services sector, which includes economic activities ranging from wholesale and retail trade to real estate, has experienced net positive growth since 2015 averaging three percent, and this trend is expected to continue with the advent of expanding oil and gas development.

Table 1: Sectoral distribution of GDP in 2017

Agriculture-forestry-fishing	Mining and quarrying	Manufacturing	Services	Other
15%	23%	6%	47%	9%

Source: Bureau of Statistics (2018)

It is worth mentioning that gold and other mining fell in 2017 by 8.3 percent and 4.9 percent relative to their 2016 performance, largely due to a 63 percent drop in the declaration of diamonds. Similarly, agriculture-forestry-fishing achieved only 0.4 percent growth after contracting by 10.2 percent in 2016,

which is attributed to a substantial decline in sugar outputs due to on-going efforts to restructure the sugar industry.

3.2 Guyana's Manufacturing Sector

As of December 2016, Guyana's manufacturing sector accounted for 5 percent of GDP; at the same period in 2017, the sector's contribution was 5.7 percent. The sector is dominated by rice and sugar, however, other notable manufacturing activities include gold, liquid pharmaceuticals, building materials, forest products, food and beverages (Table 2). Other notable manufactured products with potential for scaling up value added production include garments, traditional and non-traditional agro-products, packaging materials and fibre-tech products. In 2017, Guyana's manufacturing sector grew by 3.6 percent. Increased production of rice, beverages and building materials were the main contributors, while sugar and mining and quarrying declined by 25.2 percent and 8.8 percent respectively (Bank of Guyana, 2017).

Table 2: Manufacturing value added (Current Prices: G$millions)

Commodity	2016	% of total	2017	% of total
Sugar	4,662	13	3,643	9
Rice	9,383	26	12,725	33
Other Manufacturing	22,154	61	22,420	58
Total Manufacturing	36,200	100	38,789	100

Source: Bureau of Statistics (2018)

In 2016, Guyana's manufacturing sector represented 7.3% of GDP, however in 2016 growth declined by 9.5%. The sector rebounded in 2017, growing by 4%, largely due to improved performance of the processing of rice, fibre-tech products, beverages and liquid pharmaceuticals. It contributed 6% to GDP at the end of 2017.

The Ministry of Business notes that there are approximately 770 manufacturing establishments in Guyana, the vast majority being small and medium-sized operations. Occupancy levels at each of Guyana 2 operational industrial estates remain high, however manufacturing operations represent less than 50% of total registered business at both the Coldingen and Eccles industrial estates.

3.2.1 Sugar

The sugar industry accounted for 2.0 percent of GDP in 2016 and 2.7 percent of GDP in 2017. It contracted by 7.4 percent between 2015 and 2018, largely as a result of the abolishment of preferential price quotas under the Economic Partnership Agreement and the Everything But Arms Initiative for ACP countries. In 2017, sugar output decreased by 25.2 percent to 137,298 tonnes. Largely as a result of increased production costs and uncompetitive pricing of Guyana's sugar in the EU and world markets, the Government initiated a sugar industry reform process. At least four sugar mills were closed and are

being repurposed. In addition, the Government has secured a US$ 150,000,000 bond, which it intends to use for investment in equipment, technology and production improvements at operational estates.

3.2.2 Rice

The rice industry accounted for 3.4 percent of GDP in 2017, compared to 3 percent in 2016. Increased rice output in 2017 was largely due to better grades and varieties and increased access to markets in Latin America, namely Cuba, Panama and Mexico. Total output in 2017 stood at 630,104 tonnes, compared to 534,766 tonnes in 2016.

3.2.3 Forestry

Guyana's forestry sub-sector accounted for 2.3 percent of GDP in 2016 and 5.7 percent in 2017. Stronger performance was largely due to increased log production facilitated by a redistribution of forest concessions that resulted in an increase in the total number of small and medium-sized forest producers. Improved standards among local operators, under the trade agreement between Guyana and the EU, also helped expand access to European markets. Output of total logs increased by 3.2 percent in 2017, although plywood output declined by 51 percent due to increased global competition. Non-timber forest products also increased by 11.4 percent, i.e. from 4,017,142 pieces in 2017 compared to 3,603,210 pieces in 2016 (Table 3).

Table 3: Forestry output (2015-2017)

Selected Forestry Indicators Total annual output (2015-2017)			
Commodity	**2015**	**2016**	**2017**
Logs	336,318 (cu.mt.)	272,309 (cu.mt.)	280,889 (cu.mt.)
Sawn wood	70,945 (cu.mt.)	42,082 (cu.mt.)	47,935 (cu.mt.)
Plywood	14,617 (cu.mt.)	14,956 (cu.mt.)	7,334 (cu.mt.)
Selected value-added (non-plywood)			
Wattle	343,608 (pieces)	304,438 (pieces)	391,522 (pieces)
Manicole palm	3,253,786 (pieces)	3,603,210 (pieces)	4,017,142 (pieces)

Source: Guyana Forestry Commission (2018)

3.2.4 Other Manufacturing

Other manufacturing activities make significant contributions to MVA (Table 4). The largest contributor was food and beverages followed by paper and paper products.

Table 4: Value-added by other manufacturing sectors, 2016 and 2017 (Current Prices: G$millions)

Current Value-Added Other Manufacturing	**2016**	**2017**
Food and beverages	10,251	10,374
Manufacture of food products		

Manufacture of beverages		
Manufacture of textiles		
Clothing	1,025	1,037
Foot wear and repairs	513	513
Furniture		
All other manufacturing	6,931	8,254
Manufacture of paper and paper products	2,409	2,869
Manufacture of chemicals and chemical products	974	1,160
Manufacture of pharmaceuticals, medicinal chemical and botanical products	371	442
Manufacture of rubber and plastics products	75	90
Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	147	164
Other	2,953	3,528
Reducing Other by ½		
VALUE-ADDED G$M	**19,939**	**20,178**
Add 11% for coverage		
VALUE-ADDED G$M	**22,154**	**22,420**

Source: Bureau of Statistics (2018)

3.3 Manufacturing Employment

Guyana's Labour Force Survey 2017 Quarter IV reports that 18.9% of the labour force (279,799) are employed in the forestry, agriculture and fisheries sector; this includes manufacturing value-added subsectors and industries Manufacturing employment in Guyana represents the fifth greatest source of employment, 8.4% of the labour force or 23,500 Guyanese. Guyana has about 22,000 small and medium-sized enterprises (MSEs) accounting for almost 30% of Guyana's GDP, and 70% of registered businesses.[4] ILO Stat reports that industry (broadly defined) accounts for 26% of total employment in Guyana.

Interestingly other economic domains such as mining and quarrying, construction and transportation and storage, which rely significantly on services and products from domestic manufacturing, demonstrate declining employment figures based on the 2012 employment figures reported by the Bureau of Statistics and its 2018 Quarter IV Guyana Labour Force Survey.[5] Considering that these sectors are prioritized for restructuring and are projected to be most impacted by environmental management policies and other green economy measures in this regard, a policy mix which includes

[4] Project Appraisal Document. Micro and Small Enterprise (MSE) development and building alternative livelihoods for vulnerable groups.

[5] See Guyana Bureau of Statistics (2018: Table 10) "Guyana Labour Force Survey 2017 Third Quarter Report", for more detail.

resource efficiency, employment and skills and environmental management measures and standards is needed to fully support Guyana's transition to green manufacturing and industrial production.

3.4 Profile of Guyana's Industrial Estates and manufacturing outputs of the country

3.4.1 Overview

Guyana currently has four notable industrial estates in three different regions in the country - Coldingen, Eccles, Belvedere and Lethem. There are diverse manufacturing activities carried out on two existing estates, Coldingen and Eccles in region 4 -- furniture, footwear, fish and food, windows, garments, chemicals and pharmaceuticals, water bottling, block and cement, mattresses, civil and electrical maintenance and printing. Similar activities are planned for the two new estates, Belvedere and Lethem in regions #6 and #9.

The Ministry of Business's Industrial Development Department is responsible for the management of these estates. The Department is mandated to develop value added industries in accordance with Sustainable Development Goal 9 of building resilient and sustainable industries. The Goal is complemented by the Green Initiative, which is to lower the carbon intensities of operational value-added business on these industrial estates. Some investors on these estates are involved in low carbon activities. However, their factory layouts are not in keeping with the aforementioned Sustainable Development Goal, nor are there operational common wastewater treatment plants or solid waste collection systems at the Coldingen and Eccles industrial estates. Investors are guided by the Industrial Building Code, the Manufacturers Occupational Safety and Health Legislation and the Environmental Protection Agency, in building new factories and retrofitting existing factories.

3.4.2 Coldingen

The Coldingen Industrial Estate is located on the East Bank of the Demerara River. It opened in 1997 to the tune of a $200M investment with 38 plots. There are more than a dozen businesses in operation on over 35 acres of land. It provides jobs for about 300 Guyanese. In recent times it has seen many business shutdowns. Activities within the estate are a mix of seafood processing, textiles, wood processing, block making and furniture making.

3.4.3 Eccles

The Eccles Industrial Estate is located on the lower East Bank of the Demerara River. It opened in 2000 with 55 acres divided into 84 plots housing 40 enterprises. It provides jobs for about 750 Guyanese. Activities within the estate are primarily in wood-processing and furniture manufacturing, pharmaceutical and services.

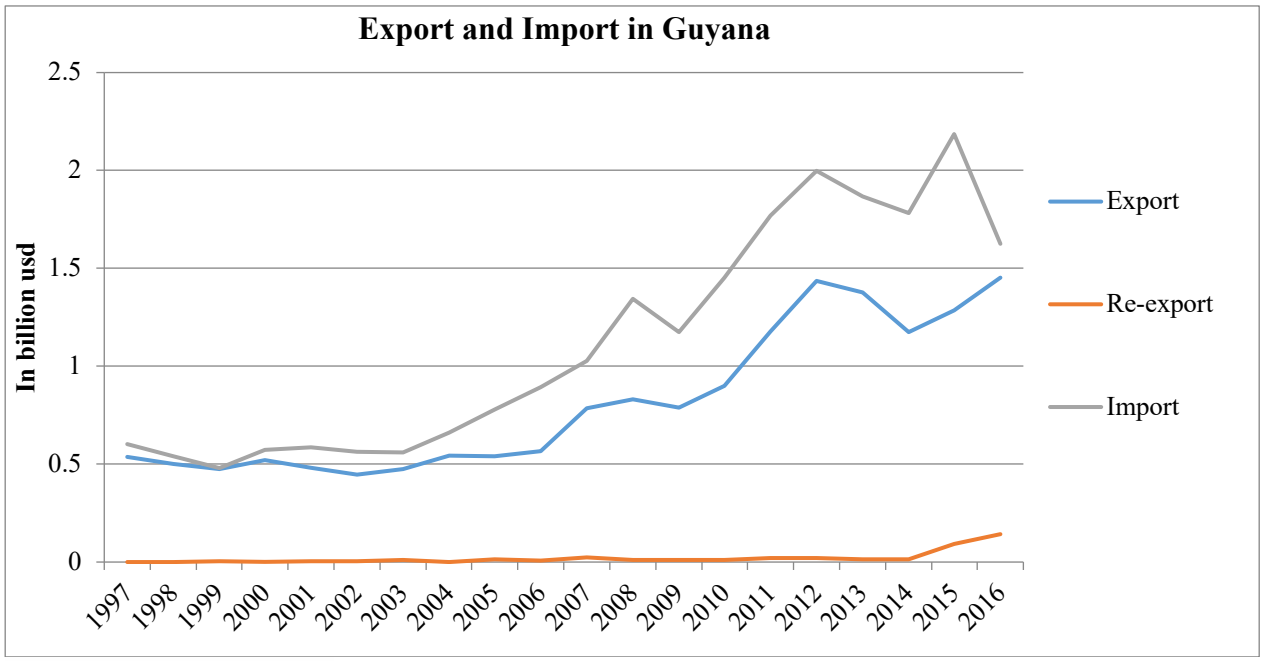
3.4.4 Belvedere and Lethem

The Ministry of Business has prepared a plan to resuscitate the Belvedere Industrial Estate and constructed a new industrial site at Lethem. The objectives for both estates are to foster increased value-added economic activity, job creation and manufacturing investment. An operation and management plan for the Lethem Industrial Estate was completed in 2018 and has been submitted to the Ministry of Business.

3.5 Exports status of Guyana

Guyana is the 134th economy in the world in terms of export volume. It exported G$1.60B and imported G$1.63B in 2016, which resulted in a trade deficit of G$0.03B. The trade deficit was G$0.57B in 2011 (Figure 1). The volume of exports has increased at an annual rate of 3.1 percent over the last 5 years. The bulk of Guyana's exports are primary commodities comprising sugar, coconut, rice, gold, bauxite (ILO, 2017).

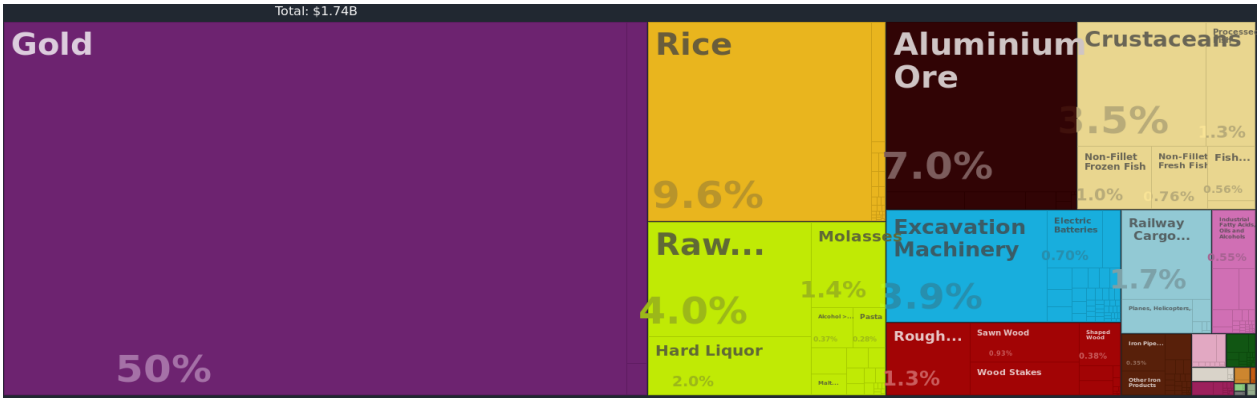
Figure 1: Export and Import in Guyana during 1997-2016



Source: UN Comtrade (2018)

The top exports in 2016 were gold ($865M), rice ($166M), aluminium ore ($121M), raw sugar ($70M) and excavation machinery ($67.6M). Its top imports were refined petroleum ($278M), excavation machinery ($118M), automobiles ($39.7M), large construction vehicles ($34.4M) and cement ($27.1M) (Figure 2).

Figure 2: Major export products of Guyana in 2016



Source: Observatory of Economic Complexity (2018)

The products with greatest export potential from Guyana to the world are raw cane sugar, husked or brown rice and frozen shrimps and prawns. Guyana has a high supply capacity in husked or brown rice and frozen shrimps and prawns.

3.5.1 Manufacturing exports

The United Nations Statistical Handbook (2017) identifies three main trading partners for Guyana, according to the destination of its agriculture-including-forestry and fishing, manufacturing and service exports (Table 5). Panama, Cuba and Mexico have emerged as key partners in Latin America for Guyana's rice in particular.

Table 5: Leading export markets

Percentage of Export			
Partner	**2005**	**2010**	**2017**
Canada	16	39.6	22.9
United States	15	10.2	15.9
Trinidad and Tobago	5.5	3.5	11.4

Source: United Nations Statistical Handbook (2017)

3.5.2 Export basket and destination of Guyana's Exports

Based on Table 6, the export volume and earnings from sugar decreased significantly (50,465 tonnes less in 2017 compared to 2016). Guyana's rice exports have been relatively stable and are trending positively. Rice exports to the CARCOM region slightly decreased during 2015 to 2017 from 22.2 percent to 22.1 percent of total rice exports. The same trend is evident in exports to the EU, which declined significantly from 44.5 percent to 30.7 percent. Exports to Latin America picked up after an initial drop off (33.9

percent versus 33.4 percent), with the Mexican market alone receiving 14.2 percent of total rice exports. Gold and bauxite exports and earnings increased in 2017, however, this was after experiencing a contraction in 2015 and rebounding to below 2015 output levels in 2016 and 2017.

The volume of timber exports also decreased from 2015 to 2018. The Guyana Forestry Commission reported that the Asian market accounted for 99 percent of log exports from Guyana; the two main markets being China (77 percent) and India (20 percent). Latin America and the Caribbean accounted for 95 percent of plywood exports. Export revenue from other value-added products (value-added items other than plywood) increased by 16.6 percent in 2017. These primary value-added wood products were doors, door components and other building joinery.

Table 6. Selected Commodity Exports (2015-2017)

Commodity	**Unit**	**2015**	**2016**	**2017**
Sugar	Tonnes	212,660	158,404	107,946
	US$m	78.4	73.4	48.5
Rice	Tonnes	537,334	499,192	539,387
	US$m	220.8	178.8	201.0
Gold	Ounces	448,248	677,788	664,848
	US$m	501.1	830.7	817.5
Bauxite	Tonnes	1,501,387	1,493,678	1,400,613
	US$m	104.3	92.1	102.3
Timber	Cu. meters	137,625	118,565	115,172
	US$m	43.7	40.4	35.8

Source: Bank of Guyana (2018)

Chapter 4: Industrial Environmental Pollution and Resource Use

This chapter describes, to the extent that data permit, the environmental impact of industrial development and resource use by industry. It essentially takes data on industrial activities from the Guyana 2016 State of the Environment Report, gives an overview of environmental pressures in Guyana and then turns to the environmental and resource implications of industrial development.

4.1 Environment

This section begins with the only known comparative overview of environmental pressures in Guyana and then presents information about industrial environmental management and the environmental impacts of industrial development.

4.1.1 Overview

Probably the best and most current overview of environmental pressures in Guyana is to be found in the 2018 Environmental Performance Index (EPI) (Wendling et. al, 2018). It ranks 180 countries on 24

performance indicators across ten issue categories covering threats to human health and natural resources and ecosystem services. These metrics, the higher the score the better the performance, provide a gauge at a national scale of how close countries are to established environmental policy goals. The EPI thus offers a scorecard that highlights leaders and laggards in environmental performance, gives insight on best practices, and provides guidance for countries that aspire to be leaders in sustainability.

The Environmental Performance Index score for Guyana in 2018 is 47.93, ranking it 126 out of 180 countries. The country's situation improved from 2014 when it had a score of 38.07 and ranked 137 out of 176 countries. Its neighbour Surinam's score in 2018 is 54.2, ranking it 103 out of 180 countries. There are no data for French Guiana.

The EPI is a composite of two sub-indexes—environmental health and ecosystem viability. Guyana ranks 98 out of 180 countries with a score of 61.55 on the environmental health index. Within this index, it scores higher (75.49) on the air quality index (68 out of 180) but it scores lower (38.67) on the water and sanitation index (116 out of 180) and very low (17.58) on the heavy metals index (174 out of 180 countries).

Guyana ranks 161 out of 180 countries with a score of 38.86 on the ecosystem vitality index. Within this index, its scores on separate components are above and below the average-- it scores 54.3 on the biodiversity and habitat index (136 out of 180); 48.62 on the forest index (20 out of 180); 48.62 on the fisheries index (81 out of 180); 34.82 on the climate and energy index (151 out of 180); 32.86 on the air pollution index (141 out of 180); 0.00 on the water resources index (145 out of 180); and 29.4 on the agriculture index (91 out of 180). Tellingly, the zero score for water resources (estimated by the extent of wastewater treatment) indicates that there is no wastewater treatment in the country.

4.1.2 Manufacturing-related environmental data

The most significant challenge in writing the GITA was the lack of environmental data, which was lamented in the 2016 State of the Environment. "There is an extensive lack of data on some of the most pressing socio-environmental issues the country is facing. While isolated pockets of data have been found among sector agencies and key institutions, these were disaggregated by location and/or available in incompatible or non-standardised format. Most, if not all, of the data sets were results of specific spatial and temporal monitoring/assessment activities, making comparisons and trend assessments difficult. Even though extensive climate data were found, there were some considerable data gaps due to technical issues during data collection (EPA, 2016, Pg. 303).

4.1.2.1 Water withdrawal

Informed decision-making and the development of relevant policies and plans to manage water resources in Guyana is difficult and challenging in the absence of viable and concrete data on pressures. While no official information or data are available, in 2010, the estimated values of water withdrawal were 1,445 cm^3, whereby industrial activities accounted for 1.4 percent, municipal 4.2 percent and agricultural activities 94.4 percent (FAO, 2015).

4.1.2.2 Wastewater discharge

About 90 percent of Guyana's industries can be found in the Demerara basin along the Atlantic coast, the key sectors of which include food, beverages, tobacco, paint, footwear, clothing, furniture, tourism and pharmaceuticals. These industries can have adverse effects on water extraction and surface water contamination through waste water generation, most of which is discharged untreated directly into the surrounding drainage systems and eventually flows into rivers and the Atlantic Ocean. There is very little available data on industrial discharge. Attempts have been made to characterise industrial pollution as shown in Table 7.

Table 7: Generic Estimates of Sectoral Pollutants

INDUSTRY	**NUMBER**	**POTENTIAL POLLUTANTS**
Sawmills	66	BOD, dust
Food processing	47	BOD, phosphates, solids, dust, pathogens
Detergents/soaps	9	BOD, phosphates, caustics
Metalworking/foundry	8	Heavy metals, solids
Raw Sugar Refining	7	BOD, solids, caustics, phosphates
Chemical/pharmaceutical	6	Acids, alkalizes, phosphates, solids
Distilleries/breweries	5	BOD, phosphates, thermal
Plastics	4	CFCs, solids

Source: EPA (2016)

The seafood processing industry uses a significant quantity of water and generates a large amount of effluent, which it discharges directly into rivers. The larger industrial operations, such as Banks DIH and Demerara Distillers Limited (DDL), have installed wastewater treatment facilities and a bio-methanisation plant, respectively, to treat wastewater effluent (EPA, 2016).

There are no operational common wastewater treatment plants at the two largest industrial estates (Coldingen and Eccles). However, plants are not needed as there is only one wet processor (fish) at each estate and both ship their waste off-site and screen and chlorinate their minimal water discharge.

4.1.2.3 Water pollution

The Atlantic Ocean receives discharges from land-based activities directly (discharge of sewage from coastal communities) and indirectly (material suspended or dissolved in river waters flowing to the ocean). There is no sewage treatment at any location in Guyana, including Georgetown, where raw sewage is pumped directly into the ocean.

Land-based sources of pollution are also significant but not quantified. The population centres are almost exclusively coastal and there is no sewage treatment. Raw sewage is pumped into the ocean at several locations via canals and from trucks which clean the septic tanks of homes and businesses.

Pollution in freshwater systems on the coast, including the network of manmade canals, is mainly from improper solid waste disposal, domestic and industrial effluents and agricultural runoff. Solid waste, dumped directly or washed into waterways from the surface, litters the bed of water bodies, blocking light, obstructing normal ecological functions and releasing harmful chemicals.

4.1.2.4 Solid waste

There are no data on industrial solid waste generation and disposal. What is known is that there are no organized solid waste collection systems at the two largest and more active industrial estates, Coldingen and Eccles.

Scrap metal recycling is coordinated through the Guyana Metal Recyclers Association with 23 scrap metal dealers. In 2013, over 20,115 tons of ferrous and non-ferrous scrap metal and used lead acid batteries were exported, while 11,103 tons were exported for the first half of 2014.

The sugar industry reutilises its bagasse to fuel its boilers and its filter press mud from the factories as a soil ameliorant.

4.1.2.5 Hazardous Waste

There are no quantitative data about hazardous waste generated and disposed of by the manufacturing sector. What is reported is that the generation of hazardous waste has been steadily increasing and is likely to continue to increase. The improper management, treatment, and disposal of hazardous waste are significant environmental problems in Guyana since there are no industrial hazardous waste disposal facilities. There are only two facilities authorised to treat hazardous waste, one specifically focused on medical waste sterilisation and the other dedicated to the treatment of hazardous waste generated from petroleum exploration. It should be noted also that there has been an increase in the number of persons authorised to export used lead acid batteries.

4.1.2.6 CO_2 Emissions from Industry

As a result of a small manufacturing/industrial sector, emissions are minimal. Its share of the total emissions is less than 0.2 percent and limited to non-methane volatile organic compounds. Road paving (asphalt), alcoholic beverage manufacturing and food production are the main contributors of GHG emissions (Government of Guyana, 2012).

4.2 Energy Use Consumption

Although final industrial energy consumption in Guyana is not reported by the International Energy Agency's Energy Statistics of Non-OECD Countries, there are data on the consumption of petroleum-based imports in Guyana. Transportation is the top consumer sector, driven mainly by the use of the private vehicle fleet in the country, which has grown significantly over the past ten years. The electric power sector (Guyana Power and Light Inc.) accounts for a third of total consumption of petroleum imports and generates 96 percent of electricity in the country. The manufacturing sector consumes only 3 percent of the petroleum-based inputs, but uses 19 percent of the electricity generated by Guyana Power and Light. The cost of electricity for the manufacturing sector is said to be the highest in the Caribbean regions, ranging from USD 0.25 to USD 0.35 per kWh (GEA, 2017).

Chapter 5: Interventions for greening industry

Three preliminary recommendations for greening industry have emerged from the initial efforts to prepare a GITA. They are: (1) preparation of environmental management plans for the two existing industrial estates, i.e. Eccles and Coldingen; (2) a national industrial efficiency policy and programme and (3) expansion of the environmental regulatory programme to address priority pollution problems identified by the EPA.

5.1 Environmental Management Plans for Industrial Estates

Guyana currently has four industrial estates (Coldingen, Eccles, Belvedere and Lethem), none of which has an environmental management plans (EMP) that would drive compliance with national environmental regulations and sustainability goals.

The starting point for the preparation of an industrial environmental management plan for large-scale and diversified industrial estates should be the "International Framework for Eco-Industrial Parks" (UNIDO/World Bank/GIZ, 2017). The framework is an innovative approach to set "minimum requirements" or "sustainability performance standards" for industrial parks, covering legal compliance as well as socio-economic, environmental, and management aspects. Such standards provide benchmarks for

assessing existing industrial parks, planning retrofitting measures for existing parks, and better planning for new industrial parks, with the end goal of driving inclusive and sustainable industrialisation.

Given the small-scale and few manufacturing as distinct from service enterprises at the two existing major estates (Coldingen and Eccles), a simplified EMP is needed and would be sufficient. It would consist of: (a) an inventory of the number and size of industrial units located in the estates; (b) identification of the basic infrastructure needed to manage and reduce the environmental and social impacts (e.g., common waste water treatment [not needed at this time given that the one fish processing plant at each estate has virtually no water discharge]), the collection and safe disposal of solid and hazardous waste [needed at this time] and air emission controls [no evidence that they are needed]; (c) a community outreach programme to ensure that the estates address local environmental concerns, such as noise and dust, as well as pollutant releases; and (d) training for the management of the industrial estates. Moreover, the management committees at the two estates need to be resuscitated to ensure ownership and monitoring of the EMPs.

5.2 Industrial Resource efficiency policy and programme

Given the high cost of electricity for the manufacturing sector, a resource efficiency initiative (focused on electricity savings) is recommended for three compelling reasons--to enhance the productivity of the industrial sector by reducing the cost of electricity used in production processes; to improve energy security by transiting to the use of renewable energy sources; and to reduce the generation of pollutants, both conventional pollutants such as particulate matter and sulphur dioxide, and of global pollutants (specifically GHGs).

A national resource efficiency initiative would consist of the following components--a goal and associated rationale for moving towards a resource efficient and low carbon manufacturing sector; quantified sector and sub-sector targets for decoupling resource use (energy, water, raw materials and chemicals) from industrial output; a generic approach for integrating these sub-sector decoupling resource use targets into sector development plans; government programmes to assist industry in meeting targets; information dissemination; and a comprehensive monitoring and evaluation scheme.

The Government should kick start this ambitious effort with a review of a recently completed industrial energy efficiency report (GMSA and IDB, 2013), which reported on energy efficiency audits at five companies and described the basic components of a national industrial energy efficiency programme. The review would assess the barriers that limited the implemented energy efficiency measures and why no steps were taken to implement a national industrial energy efficiency programme. The proposed effort would undertake more comprehensive energy audits than done for the five companies, at least at two new companies, and draw on international experience that would effectively address economic, behavioural and organizational barriers that inhibit the investment in energy efficiency technologies.

5.3 Environmental regulation

Guided by the Environmental Protection Act and the Guyana Water Sewerage Act, the Government has issued many environmental policies, each with characteristics that promote green practices in the economy. These practices come under some broad categories, namely air emissions control and reduction, water effluent control, environmental sustainability, materials and energy efficiency and/or waste reduction, reuse and management.

The sections on air emission and water effluent control and reduction in the Environmental Protection Act set forth the traditional command-and-control regulatory approach used in most countries to reduce pollution. It consists of four activities: standards, licenses, compliance monitoring and enforcement. The combined purpose of these four activities is to encourage and guide conduct that is protective of human health and the environment.

The proposed recommendation is to design environmental strategies/regulations that address priority industry-related pollution problems. Based on an interview with the Director of the Environmental Protection Agency, there are two priority pollution problems that need effective environmental regulation or corrective measures. These are large-scale gold mining, which contributes is destroying riverine ecosystems, design failures (such as the leachate treatment system) at the Haags Bosch controlled dump near the Eccles industrial estate and inappropriate location of the controlled dump at Lethem industrial estate.

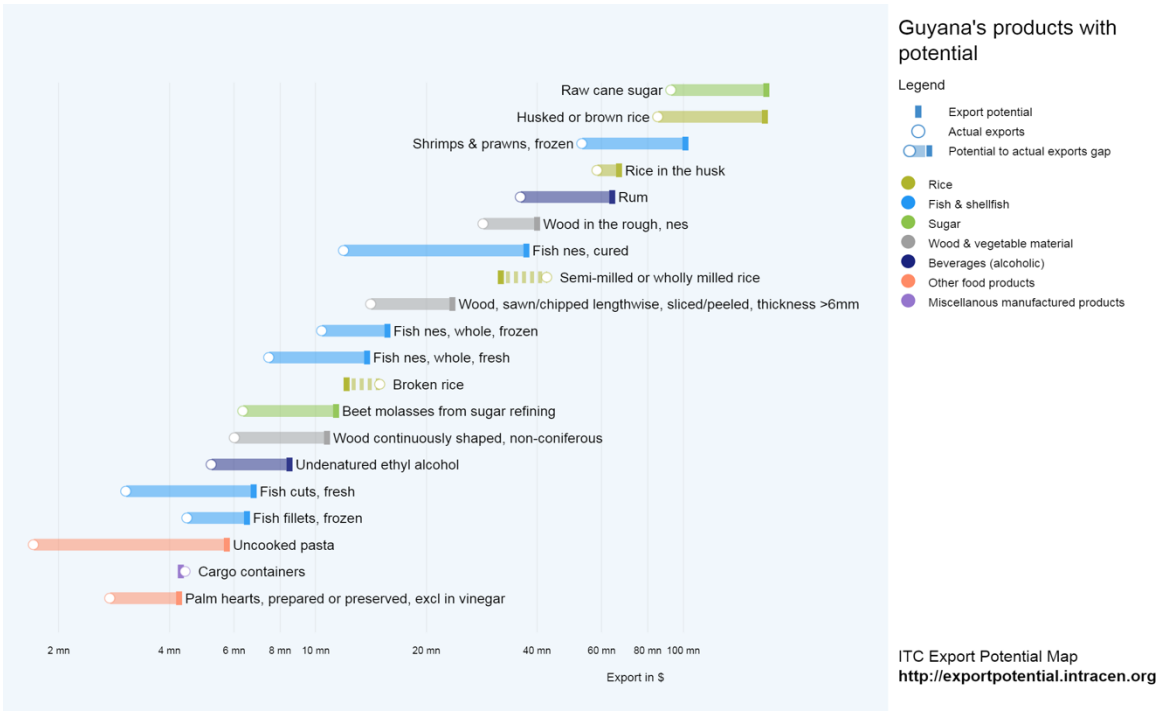
Chapter 6: Potential green goods production and export

6.1 Products with Export potential

Data from the International Trade Centre (ITC) show that current significant export potentials from Guyana to the world are raw cane sugar, husked or brown rice, and frozen shrimp and prawns.[6] Raw cane sugar shows in Figure 3 the largest absolute difference between potential and actual exports in value terms, leaving room to realise additional exports worth US$104.9 million.

Figure 3: Export Potential

[6] ITC assists developing countries in identifying promising products for inclusion into export promotion activities. ITC uses the Product Diversification Indicator. It is estimated by using the Product Space methodology, which establishes links between products based on how frequently they coincide in countries' export baskets. It assumes that products that are often exported together rely on similar capabilities for their production. Supply is combined with the target market's demand and market access conditions to ensure that feasible products for the exporter also have favourable chances of export success (ITC, 2018).



6.2 Green Manufactured Goods Export Potential

There are several reports on the export potential of many agro-industry products. The Food and Agriculture Organization and the International Trade Centre, as reported by Craig and Shephard (2017), have undertaken a value chain analysis of four export commodity value chains (pineapple, eddo, sweet potato and ginger) and an analysis of the coconut value chain, as part of a regional effort to develop value-added products and intraregional trade to enhance livelihoods. These two analyses provide a good foundation for understanding areas of under-performance and the high-level drivers causing it within the value chains. The findings are generalizable across the fruit and vegetable sector.

A more recent report by the International Labour Organization (ILO, 2017a and 2017b) fills a research gap by specifically focusing on the promotion and expansion of value-added products and exports to support inclusive growth in the fruit and vegetable sectors.

Green manufactured products could include sustainably produced sugar, maybe organic sugar and/or rice; biofuels from sugar, if there is a possibility to produce it sustainably; crustaceans and fresh fish; certified wood products, for example certified furniture; sustainably mined gold and gold products like jewellery; products derived from upcycling agro-wastes; bio-chemicals such as bio-solvents from citric fruit waste, bio-plastics, etc.; and products derived from recycled plastic wastes. Another line of “green products” are those that can contribute to maintain biodiversity, for example natural ingredients for cosmetics, food and medicine, extracted from local species through sustainable practices.

6.3 Recommendation for Greening Exports

Our recommendation is to complement the soon to be launched Go-Invest assessments of the export potential of five sectors along with other exporting already being promoted with guidelines for assessing the environmental and social effects of value chain development.[7] It is well known that value chain developments can affect the sustainable use of natural resources and cause environmental damage. The guidelines would assist analysts in identifying "hot spots" along the value chain and recommending how to capture maximum beneficial use of exploited resources, to ensure sustainable use and to minimize pollution effects. The guidelines will focus only on those parts of the value chain that engage in production and not those that enter into household consumption. Nor will the guideline replace comprehensive analysis of energy and material flow, which can only be achieved through life cycle analysis and environmental impact assessment. However, the guidelines will introduce of some degree of "life cycle thinking" into the assessment of environmental and social impacts.

For example, an assessment for the rice sector would review the use of pesticides and fertilizers in rice production, the processing efficiency of rice milling and the potential to use the residual biomass for energy generation. An assessment of the coconut sector would review not only the use of pesticides and fertilizers with expansion of production, but also the potential for using the green coconut husks and fibres as inputs for producing green goods.

Chapter 7: Findings and recommendations

7.1 Findings

In spite of some significant data gaps primarily environmental and energy data, we found that:

- The manufacturing sector accounted for 6.6 percent of GDP in 2017, down from 11.4 percent in 2001 and up from 5.9 in 2010. The sector is dominated by rice and sugar. Other notable manufacturing activities include gold, liquid pharmaceuticals, building materials, forest products, food and beverages.
- There are value added data that identify the economic contribution of most manufacturing sectors, not only sugar and rice but also many other sectors that create significant employment.
- There are data about current exports from Guyana, which is a good start for assessing the potential to expand the export of green goods.
- There are no quantitative data on industrial water pollution nor on solid and hazardous waste generation and disposal. According to the 2016 State of the Environment report, a large majority

[7] See ILO (2017a and 2017b) for potential export sectors.

of operations in Guyana had a very low level of awareness of hazardous waste management and the national obligations associated with the implementation of the Basel Convention.

- There are no basic environmental management plans for the two existing industrial estates. Nor are there data on industrial water pollution generation, which appears to be minimal, or the disposal of solid and hazardous waste generation and disposal at properly constructed sanitary landfills.
- The International Energy Agency does not report industrial energy consumption for Guyana. The Guyana Energy Agency reports that the manufacturing sector consumes three percent of petroleum based imports and uses 19 percent of the electricity generated by Guyana Power and Light. There are no data on energy consumption by manufacturing sub-sectors.
- There are estimates of export potential from the International Trade Centre. The greatest potentials are for raw cane sugar, husked and brown rice and frozen shrimp and prawns.
- Agro-industry products appear to have the greatest potential for green exports.

7.2 Recommendations for Greening industry

Three recommendations for greening industry have emerged from our assessment. They are as follows:

- Formulation of a national industrial energy efficiency policy and implementation programme based on the results of comprehensive energy audits and a review of effective national programmes in other countries;
- Enhancement of the EPA environmental regulatory programme with a focus on waste management; and
- Preparation of basic environmental management plans, which would include measures for improving resource efficiency, for the two existing industrial estates, i.e. Eccles and Coldingen;

7.3 Recommendation for Greening the Supply Chain of Exported Manufactured Goods

Our recommendation is to complement the soon to be launched Go-Invest assessments of the export potential of five sectors along with other exporting already being promoted with guidelines for assessing the environmental and social effects of value chain development. The guidelines would assist analysts in identifying "hot spots" along the value chain and recommending how to capture maximum beneficial use of exploited resources, to ensure sustainable use and to minimize pollution effects.

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