AGRICULTURAL POLICY REPORTS

JUNE 2017

AUTHORS
WILLIAM FOSTER
ALBERTO VALDÉS
PEDRO MARTEL
CARMINE PAOLO DE SALVO

ANALYSIS OF AGRICULTURAL POLICIES IN BELIZE

IDB

Cataloging-in-Publication data provided by theInter-American Development BankFelipe Herrera Library.
Analysis of agricultural policies in Belize / William Foster, Alberto Valdés, Pedro Martel, Carmine Paolo De Salvo.
p. cm. — (IDB Monograph ; 537)
Includes bibliographic references.
1. Agriculture and state-Belize. 2. Agricultural price supports-Belize. 3. Farm produce-Belize. I. Foster, William. II. Valdés, Alberto, 1935- III. Martel, Pedro. IV. De Salvo, Carmine Paolo. V. Inter-American Development Bank. Environment, Rural Development and Disaster Risk Management Division. VI. Series.
IDB-MG-537

Authors: William Foster, Alberto Valdés, Pedro Martel, Carmine Paolo De Salvo.
Keywords: Agriculture, Public Policy, Agricultural Policy, Agricultural Support, Agricultural commodities, Belize.
JEL Codes: O54 Latin America; Q01 Sustainable Development; Q02 Commodity Markets; Q17 Agriculture in International Trade; Q18 Agricultural Policy.

Published June 2017
Design and Layout: Elena Sampedro | elena@lacasagrafica.com
Photo credits: IADB Photo Library (page 7), Shutterstock photos (pages 9, 18, 21, 28, 33, 39 and front cover)
Series of Publications on Monitoring Agricultural Policy

http://www.iadb.org
http://www.iadb.org/agrimonitor

For more information, including the full report, please contact:
Carmen del Río Paracolls | **cdelrio@iadb.org**

ANALYSIS OF AGRICULTURAL POLICIES IN BELIZE

AUTHORS
WILLIAM FOSTER
ALBERTO VALDÉS
PEDRO MARTEL
CARMINE PAOLO DE SALVO

ACKNOWLEDGMENTS

The authors would like to express their gratitude to Olga Shik, Juan Jose Egas, Carmen Del Río, Peter Krupa and Elena Sampedro who provided feedback and supported the editing and publication of this document.

LIST OF ABBREVIATIONS

NRP | Nominal Rate of Protection

BMDC | Belize Marketing and Development Corporation

CARICOM | Caribbean Community

CPI | Consumer Price Index

CSE | Consumer Support Estimate

ERP | Effective Rate of Production

GSSE | General Services Support Estimate

GST | General Sales Tax

HS | Harmonized System

MPS | Market Price Support

OECD | Organization for Economic Co-operation and Development

PSE | Producer Support Estimate

RRD | Revenue Replacement Duty

TSE | Total Support Estimate

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This monograph provides a review of current protection measures for agricultural and food products in Belize. The document offers details on the following key indicators of support and protection (or disprotection) for several agricultural products: nominal rates of protection (NRPs), effective rates of protection (ERPs), and the total support estimates (TSE) that includes government spending on agricultural programs that are not included in the protection measures.

Farming and livestock production employ approximately 23,000 people in Belize (a fifth of the employed population), principally in the main export crops of sugar, bananas, and citrus. Poultry and cattle, papaya, maize, and beans are also significant commercial crops. The agricultural sector in Belize is highly export oriented, with four products accounting for about 60 percent of total production value: oranges, poultry, sugarcane, and bananas. Of these, only poultry is not an export product. While performance of the export sector is important not only for the farm sector, but for the economy as a whole, findings suggest that the producers of export products are not well protected. In fact, the farm gate prices they receive are close to the farm gate equivalent of the border price, if not lower. In contrast, imports of competing products¬, such as poultry and maize, are indeed protected (especially poultry).

Belize imports approximately US$325 per person per year worth of agricultural products, food, and beverages (mainly alcoholic). With a per-capita income of approximately US$8,500, import dependence is not high. In 2012, total merchandise exports amounted to about US$630 million and total imports amounted to US$864 million, of which imports of food products accounted for US$106 million. Meanwhile, the country earned about US$1.3 billion from tourism, equivalent to about 18 percent of national GDP. The food import bill (US$106 million) was equivalent to approximately 5 percent of total foreign exchange earnings (merchandise exports and tourism), meaning a temporary increase in the food import bill due to a spike in global food prices and/or a sharp drop in domestic food production would not present an

THE AGRICULTURAL SECTOR IN BELIZE IS HIGHLY EXPORT ORIENTED, WITH FOUR PRODUCTS ACCOUNTING FOR ABOUT 60 PERCENT OF TOTAL PRODUCTION VALUE: ORANGES, POULTRY, SUGARCANE, AND BANANAS.

undue burden. Foreign exchange earnings are much less of a threat to the affordability of agricultural and food imports than the country's current heavy external debt load.

This monograph presents estimates on the levels of protection provided to 10 important Belizean crops: bananas, red beans, cacao, maize, onions, oranges, peppers (for hot sauce), poultry (chicken), rice, and sugar cane. Except for poultry, NRPs and ERPs are based on the price wedge between the farm-gate price paid to producers and the farm-gate price equivalent paid at the border. The farm-gate price equivalent at the border is calculated by adjusting for intermediate costs (transport, processing, etc.) where data are available and for conversion factors to account for differences between products from the farm (e.g., fresh peppers) and the border (e.g., hot sauce). Fully adjusted farm gate to border prices should also reflect marking margins, including those resulting from imperfectly competitive industry structures (e.g., monopsony); unfortunately, in the case of Belize, information on marketing margins for most crops is unavailable, meaning NRPs (and consequently ERPs) are approximate and should be viewed as such. In addition to calculating NRPs using direct price comparisons, the study also reports NRPs calculated as the tariff equivalent of measures implemented at the border, specifically tariffs and licenses on imports and taxes on exports.

THIS MONOGRAPH PRESENTS ESTIMATES ON THE LEVELS OF PROTECTION PROVIDED TO 10 IMPORTANT BELIZEAN CROPS: BANANAS, RED BEANS, CACAO, MAIZE, ONIONS, ORANGES, PEPPERS (FOR HOT SAUCE), POULTRY (CHICKEN), RICE, AND SUGAR CANE.

In addition to price protection measures for individual crops, the report includes the results of the analysis of total agriculture support in Belize. Estimates are based on the Organization for Economic Co-operation and Development's (OECD) Producer Support Estimate (PSE) method and comprise the PSE itself, which includes market price support (similar to the NRP) and direct payments to producers; the General Services Support Estimate (GSSE), which covers payments for agricultural programs not tied to individual commodities; and the Total Support Estimate (TSE), which includes the PSE, the GSSE, and any transfers to consumers for food purchases. The TSE estimates show that while the agricultural sector as a whole does receive government support, it has fluctuated between positive protection and disprotection due to recent negative market price support for some export crops. The average PSE as a proportion of the agricultural sector's gross revenue from 2010 to 2014 is 10.8 percent. During that same period, if the substantial protection received by the poultry and maize sectors is excluded, the aggregate market price support (MPS) is negative.

The estimate of transfers from consumers to producers (in OECD terms, the consumer support estimate, CSE) also plays an important role in evaluating agriculture policy in Belize. Consumers face

higher prices due to protections at the border that impact food and beverage products. The total cost of living index is approximately 6 percent higher —representing a six percent reduction in household real income— due to tariffs, the revenue replacement duty (RRD), and an "environmental tax" on imported goods. The cost of the market basket is roughly one third higher due to these taxes. Based on this, the general conclusion is that in Belize, the effective tariff rates faced by imports that compete with domestic agriculture are high compared to those in other countries in the hemisphere. Certainly, the main direct impact of trade policies is to add to government revenues while protecting domestic farm producers. But this comes at the cost of domestic consumers, who suffer a real income loss as result of higher food prices. It is worth noting that the tourism industry is also affected by border protections on food and beverage products.

Aside from the measures taken at the border, investment of public resources in the agricultural, forestry, and fisheries sector seems to be lacking. Given fiscal constraints, however, this relatively low level of government expenditures relative to agricultural value added is unlikely to increase significantly in the short and medium terms. Given that the government has such limited resources and is not able to provide a full range of public goods, the resources available should be concentrated on a limited number of activities with high social value, with a priority on infrastructure (including port facilities) and support services for sanitary and phytosanitary protection.

Although one recommendation would be to reform trade and price policy by removing licensing requirements and combining tariffs and para-tariffs into a single uniform *ad valorem* tariff, such a reform would have important fiscal implications. Customs officials report that they collect about 53 percent of total government revenues in the form of duties, RRD, environmental tax, and general sales tax (GST), meaning a high degree of sensitivity to any major reforms to the tariff schedule.

GIVEN THAT THE GOVERNMENT HAS SUCH LIMITED RESOURCES AND IS NOT ABLE TO PROVIDE A FULL RANGE OF PUBLIC GOODS, THE RESOURCES AVAILABLE SHOULD BE CONCENTRATED ON A LIMITED NUMBER OF ACTIVITIES WITH HIGH SOCIAL VALUE, WITH A PRIORITY ON INFRASTRUCTURE AND SUPPORT SERVICES FOR SANITARY AND PHYTOSANITARY PROTECTION.

1. INTRODUCTION

This monograph provides a review of current protection measures for agricultural and food products in Belize. It is meant to offer an overview of the role the government's policy framework plays in the sector's performance. Specifically, this document provides estimates of measures of protection (or disprotection) for several agricultural products, as well as of the transfers resulting from agricultural policy operating at or within the border. The first indicator presented is the nominal rate of protection (NRP), which estimates the direct impact of trade policy on the prices of tradable products produced by farmers. The NRP in its simplest form is the percentage tariff imposed on a product at the border. The second indicator estimated is the effective rate of protection (ERP), which measures the effect on domestic producer profitability (and therefore their effect as incentives) of trade and price policies. The ERP estimates the effects of interventions on both revenue and costs. The third set of indicators is provided by the OECD's Producer Support Estimates (PSE) methodology. It includes the Producer Support Estimate (PSE), the General Services Support Estimate (GSSE) and the Total Support Estimate (TSE)

along with the Consumer Support Estimate (CSE), which measure the total implicit transfers implicit in all the border and domestic policies aimed at the farm sector.

This monograph estimates recent price protection levels for 10 important crops: bananas, red beans, cacao, maize, onions, oranges, peppers (for hot sauce), poultry (chicken), rice, and sugar cane. It makes use of data and information from the Belize Statistical Institute (e.g., the Statistical Abstract) and from the Customs and Excise Department, supplemented with data from FAOSTAT and other international sources. The 2010 IDB report entitled Towards a Sustainable and Efficient State is also very helpful, as it contains several relevant chapters, especially the one devoted exclusively to agriculture (Horton and Norton). The 2010 study by Peña, Gurria, et al. on total support estimates was also used. In addition, data at the industry level for some products were collected by Mr. Jair Pol through interviews.

Section 2 of this monograph gives an overview of Belize agriculture and policy , while Section 3 provides a brief discussion of border measures. Section 4 gives the results of the nominal and effective rates of protection (NRPs and ERPs) calculations for the 10 crops selected. Section 5 gives the TSE and component estimates for the agricultural sector as a whole, and Section 6 uses Belize's official consumer price index calculations to estimate the effects of border taxes on consumer real incomes via the effect those taxes have on the cost of living of a representative consumer. Finally, Section 7 offers up some brief conclusions and policy implications.

THIS DOCUMENT PROVIDES ESTIMATES OF MEASURES OF PROTECTION (OR DISPROTECTION) FOR SEVERAL AGRICULTURAL PRODUCTS, AS WELL AS OF THE TRANSFERS RESULTING FROM AGRICULTURAL POLICY OPERATING AT OR WITHIN THE BORDER.

2. REVIEW OF BELIZE AGRICULTURE AND POLICY

Belize is a small, sparsely populated country with approximately 360,000 inhabitants. It is located on the Caribbean coast between Guatemala to the south and west and Mexico to the north. Much of the western border is dense forest and provides few opportunities for (legal) trade. The country has traditionally looked to its east for trade routes. As a former British colony (British Honduras), English is still widely spoken and its commercial orientation is similar to that of many of the Caribbean islands. Accordingly, Belize is a member of the CARICOM Community, including its Single Market and Economy agreements.

Agriculture in Belize appears to be an underperforming sector, with only about a quarter of potential farmland in use. With no obvious natural resource constraints or urban expansion to explain the relative underuse of land for raising crops and livestock, analysts often attribute the constraints on the agriculture sector's expansion to limited and inadequate infrastructure (transportation, electricity, irrigation networks) that reduces expected returns on private sector agricultural investments. Other barriers

to investing in the agriculture sector include government policies and the weakness of support agencies (e.g., sanitary and phytosanitary inspection services). Credit is also expensive and restricted, and port facilities are costly and in poor shape.

Although some basic facts about Belize's agriculture sector are needed here to put the trade protection measures described in the following sections into context, it should be noted that data on agriculture is poor and many of the estimates provided are derived from opinions. Martin and Mazano (2010) have observed that Belize's current system for gathering statistical information is weak and could be improved by using scientific sampling methods. It is thus difficult to assess the quality of estimates on crop production, area planted, input use, farm and farm worker income, and other indicators necessary to assess productivity and household welfare.

Based on the 2002 Farmers' Registry, the country had slightly fewer than 10,000 farms, a quarter of which had fewer than five acres and 57 percent of which had fewer than 20 acres. According to this registry, there were fewer than 500 farms with more than 100 acres. Larger-scale agriculture tends to be technically and commercially sophisticated and oriented toward both domestic and export markets to take advantage of economies of scale. While smaller-scale farms include farms that provide for subsistence and local markets, they also include many sugarcane and citrus producers (as well as, increasingly, producers of peppers and other non-traditional crops) that sell to processors and exporters. With respect to land tenure, 32 percent of farmland is held by farmers with title, 7 percent is rented, and about 31 percent is under long-term lease by the government; the remainder of the land is in informal and communal arrangements.

BASED ON THE 2002 FARMERS' REGISTRY, THE COUNTRY HAD SLIGHTLY FEWER THAN 10,000 FARMS, A QUARTER OF WHICH HAD FEWER THAN FIVE ACRES AND 57 PERCENT OF WHICH HAD FEWER THAN 20 ACRES.

TABLE 1: KEY AGRICULTURAL INDICATORS

	2007	2008	2009	2010	2011	2012	2013	2014
AGRICULTURE AS % OF NATIONAL GDP	10.1	9.4	8.9	9.7	9.1	9.6	9.4	9.1
% REAL GROWTH OF AGRICULTURAL GDP	-1.3	-3.5	-5.5	13.2	-4.8	10.3	-1.3	1.1
% NATIONAL EMPLOYMENT IN AGRICULTURE	–	–	–	16.0	–	–	–	18.6**
FOOD EXPORTS (% OF MERCHANDISE EXPORTS)	65.6	56.8	70.0	59.3	53.5	68.5	76.8	80.2
FOOD IMPORTS (% OF MERCHANDISE IMPORTS)	10.0	9.6	12.0	11.0	10.0	11.2	10.9	11.3
FOOD AS % OF HOUSEHOLD EXPENDITURES*	–	–	–	–	16.7	–	–	–
% RURAL POPULATION	–	–	–	46.2	–	–	–	–

Source: Belize Statistical Institute. (*) The figure for 2011 excludes beverages; for example, beer represents 6.2% of total food expenditures. (**) For 2014, national employment in primary sectors.

National income accounts indicate that primary agriculture (crops and horticulture, livestock, and forestry and logging, excluding fisheries and aquaculture) accounts for about 10 percent of national GDP, and official trade statistics show that the sector recently accounted for over 60 percent (and rising) of merchandise export earnings (Table 1). Belize's main crops are sugar, bananas, and citrus, with pasture taking up a significant proportion of farm land. Papaya, maize, and beans are also significant commercial crops. According to government statistics, the primary production sector (mainly agriculture) employs approximately 23,000 people (as of April 2013).[1] Agricultural employment is concentrated in the main, traditional crops, although several thousand more workers are employed in downstream activities, such as processing. Although there are no data indicating how many families depend on farm income, the 2010 Census shows that of the 79,492 households surveyed, 23,243 (29 percent) were engaged in some form of farming activities. Over half of all households (40,330) live in areas officially designated as rural, but slightly less than half of rural households are engaged in some form of farming.

Very poor agricultural performance

As is to be expected for a small country, especially one exposed to severe weather events (including hurricanes) and international price fluctuations of the handful of export products on which the country depends, **net income from agriculture is highly volatile**. Official data show that the long-term trend over the past decade has been relatively weak: The agricultural sector has been

TABLE 2: VALUE EXPORTED OF MAJOR PRODUCTS (MILLIONS OF B$)

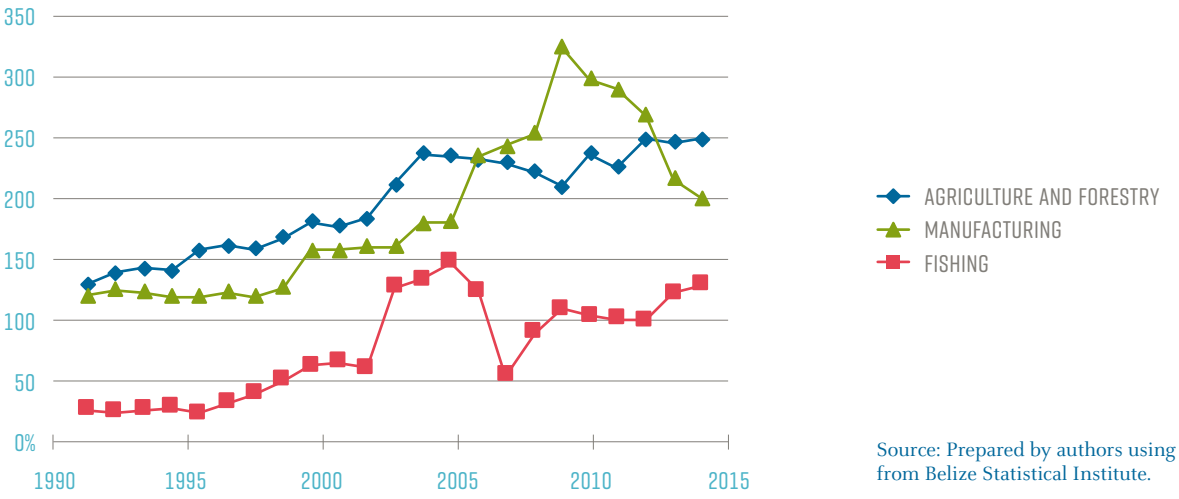
	2011	2012	2013	2014	2015
BANANAS	67.8	94.9	97.0	100.4	96.5
CITRUS CONCENTRATES	94.6	122.1	106.6	90.5	89.3
SUGAR	82.7	107.6	107.3	110.2	134.5
PETROLEUM	289.3	186.3	140.2	102.3	36.4

Source: Belize Statistical Institute and the Central Bank of Belize, Monthly Economic Reports (derived from BSI, BGA, CPBL, Geology and Petroleum Department).

[1] After a hiatus from 2008 to 2012, the Statistical Institute of Belize now says that "a labour force survey is conducted twice a year, in April and September. These surveys are conducted for the working age population (persons 14 years or older). Persons of working age who do not have any employment and who do not want employment are ot considered to be in the labour force." Data on labor force participation are reported by the Statistical Institute of Belize for the primary, secondary, and service sectors, but not for specific subsectors. See: http://www.sib.org.bz/statistics/labour-force

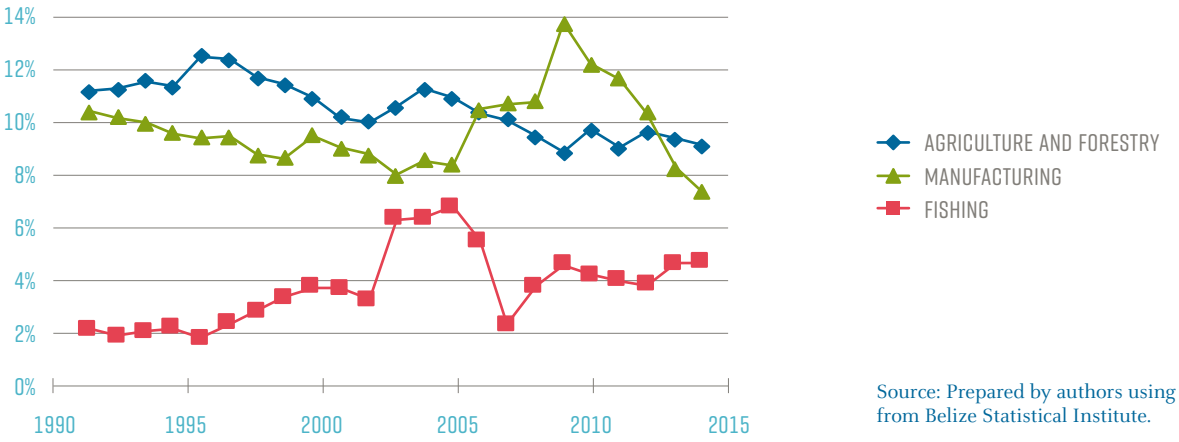
growing on average at a rate slightly lower than the rest of the economy. After a rapid increase during 2002-2004, output has remained almost stagnant. As Figure 1 shows, between 2005 and 2013, only two years show positive growth (at high rates); otherwise, the farm sector saw negative real growth rates. International commodity price spikes in 2008 and 2009 apparently did not translate into a significant increase in Belize agriculture's value added, as reflected in the national accounts data (Figure 1). Prices of purchased inputs (fuel, agrochemicals, equipment... almost all imports) have also increased. The recent increase in value added of the sector between 2011 and 2012 was driven in large part by the notable increase in exports of the major, traditional crops. As seen in Table 2, the value of banana exports increased by 36 percent between 2011 and 2012; citrus by 29 percent; and sugar by 30 percent. Finally, it should be noted that the sector's share in national income has declined (Figure 2).

FIGURE 1: EVOLUTION OF VALUE ADDED BY SECTOR AT BASIC PRICES B$ MILLIONS (2000 PRICES)



Source: Prepared by authors using data from Belize Statistical Institute.

FIGURE 2: EVOLUTION OF SHARE IN TOTAL VALUE ADDED BY SECTOR



Source: Prepared by authors using data from Belize Statistical Institute.

As can be seen from Table 3, the amount of land allocated to the major crops appears fairly stable over time, except for more than 40 percent growth in the area for red kidney (RK) beans production between 2007 and 2011. Four products account for about 60 percent of the total value of agricultural production: oranges, poultry, sugarcane, and bananas (see Table 5), of which three are export products. These traditional products also dominate exports (Tables 2 and 5), reaching BZ$245 million in 2011 and BZ$322 million in 2012. In contrast, only slightly less than BZ$190 million of petroleum was exported that year.

TABLE 3: BELIZE LAND USED BY MAJOR CROPS (ACRES)

	2007	2008	2009	2010	2011
ORANGE	39,361	39,361	37,786	37,378	39,330
SUGAR CANE	60,000	65,000	60,000	60,000	60,000
BANANA	6,021	6,280	6,524	6,528	6,633
CORN	33,510	28,954	37,810	33,676	34,130
RICE	9,172	8,373	11,311	11,381	11,003
RK BEANS	8,806	9,977	9,564	17,446	12,700
POTATO	6,800	11,555	12,037	8,151	9,853

Source: Ministry of Natural Resources and Agriculture, Statistical Institute of Belize.

Papaya exports have shown promise in the past, with over BZ$20 million in annual exports from 2007 to 2011, although exports declined recently to under BZ$ 15 million. Exports of red kidney beans, black-eyed peas and corn meal have increased considerably over the last decade (Table 5), demonstrating that these commercial sectors have potential. But data on output and export shares by product underscore that traditional crop productivity and market access for exporting them are still key to growth in revenue from agricultural exports. Export diversification is therefore only likely to alter the composition of export earnings and sectoral income slowly, as new products will be developing from a relatively small base.

Diversification into non-traditional crops that can be grown by large-scale and more sophisticated operations (say, in Mennonite communities) is also feasible, as evidenced by the recent privately-backed growth of successful subsectors such as chickens, eggs, and hogs, and to some extent papaya. The possible benefits of promoting small-scale farming of innovative and perhaps niche products must be balanced against foregoing benefits that

might have otherwise been had from promotion of larger-scale, successful, and already proven activities that currently lack public-good support (pest control, port facilities, among others).

CARICOM could be an attractive market for Belizean products with higher value added, due to the tariff escalation —higher tariffs on higher value products— that the organization applies to non-members. For other products, CARICOM would likely be less significant compared to larger markets in Central America, Mexico, and perhaps the United States. A trade agreement with its neighbors would likely be more significant than CARICOM for Belize's farm sector —and indeed, the amount of current exports to these markets is known to be understated in the official figures.

TABLE 4: VALUE (BZ$ MILLIONS) AND SHARE OF PRODUCTION AT FARM GATE

	2007		2008		2009		2010		2011	
ORANGE	71.2	19.1%	52.1	14.2%	52.8	13.1%	39.1	9.1%	50.4	11.4%
SUGARCANE	65.1	17.4%	54.1	14.7%	61.6	15.3%	51.4	11.9%	60.9	13.8%
POULTRY	52.2	14.0%	66.9	18.2%	62.9	15.6%	67.8	15.7%	70.3	15.9%
BANANA	42.7	11.4%	67.1	18.3%	68.1	16.9%	78.2	18.2%	74.7	16.9%
CORN	26.2	7.0%	17.6	4.8%	26.8	6.7%	29.8	6.9%	32.8	7.4%
BEEF MEAT	8.9	2.4%	7.4	2.0%	7.2	1.8%	6.7	1.5%	8.0	1.8%
RICE	8.6	2.3%	6.5	1.8%	15.0	3.7%	14.9	3.5%	13.9	3.1%
EGG	7.9	2.1%	9.0	2.5%	9.4	2.3%	12.1	2.8%	10.6	2.4%
BEANS (RK)	5.9	1.6%	6.6	1.8%	8.7	2.2%	21.1	4.9%	11.8	2.7%
POTATO	0.9	0.2%	1.6	0.4%	2.0	0.5%	1.6	0.4%	2.1	0.5%
GRAPE FRUIT	8.7	2.3%	5.4	1.5%	5.7	1.4%	7.4	1.7%	3.7	0.8%
OTHER	74.8	20.0%	72.5	19.8%	82.1	20.4%	100.5	23.4%	102.2	23.1%
TOTAL	**373.1**	100%	**366.9**	100%	**402.4**	100%	**430.5**	100%	**441.4**	100%

Source: Ministry of Natural Resources and Agriculture, Statistical Institute of Belize.

With respect to agricultural import dependence and food security, Belize imports approximately US$325 per person per year of agricultural products, food and beverages (mainly alcoholic). Wheat imports represent about US$20 per person per year. With a per capita income of approximately US$4,600 in 2013,[2] import dependence is not high. Compared with its neighbor Guatemala

[2] The World Bank reports a purchasing-power-parity per-capita income for Belize in 2013 of $8442 in current international dollars.

and with two CARICOM countries, Jamaica and Guyana, Belize has a moderate level of food import dependence as measured by its ratio of food import value to total merchandise exports (excluding tourism). The average of this ratio for the years for which FAOSTAT has comparable data (2008-2011) is 26 percent for Belize, 18 percent for both Guatemala and Guyana, and 47 percent for Jamaica. However, this ratio likely exaggerates Belize's food import dependence because it excludes tourism. In 2012, total merchandise exports from Belize amounted to about US$630 million—or about US$1900 per capita—and total imports (all items, not only food) amounted to US$864 million—or about US$2600 per capita. Earnings from tourism, however, amounted to US$1.3 billion and provide about 18 percent of national GDP. Any potential limits on agricultural and food imports would therefore not be due to the shortages of foreign exchange but rather to ongoing and heavy external indebtedness.

Table 6 shows average import values of selected agricultural and food products (those averaging more than a million US dollars) for three periods since 2000. The products with the highest import values are not produced competitively in Belize, due to agronomic conditions and the very small size of the market, which prevents economies of scale in the production and distribution of processed foods such as pet foods and alcoholic beverages. Wheat stands out as a product that will clearly continue to be imported.

A final note in this section regarding government revenues: during the last decade, Belize's tax revenue-to-GDP ratio has been 22 percent, higher than the regional average of less than 20 percent. As the IDB notes,[3] this does not mean that the overall tax burden is too high,[4] particularly as a relatively large government debt-to-GDP ratio (75 percent in 2012) imposes a high debt servicing burden (interest payments alone averaged 4.3 percent of GDP over the period). The taxation system is cause for concern, however, because it "damages incentives, is inequitable and is complex." The IDB report cites five main problems: "(i) too many different taxes; (ii) over-reliance on sub-optimal forms of taxation; (iii) relatively high nominal rates, counterbalanced by numerous exemptions; (iv) special tax regimes; and (v) fragmentation of tax administration". The final problem identified in the study concerns "the existence of various trade-related taxes," which makes their administration complex and calculating their true impact difficult.

DURING THE LAST DECADE, BELIZE'S TAX REVENUE-TO-GDP RATIO HAS BEEN 22 PERCENT, HIGHER THAN THE REGIONAL AVERAGE OF LESS THAN 20 PERCENT.

[3] Page 1 of the IADB TECHNICAL COOPERATION (TC) ABSTRACT 2014. See: http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=38635162

[4] Indeed, as Martin and Manzano (2010) note, Belize's tax to GDP ratio is "slightly below what one would expect for a country of Belize's per capita income."

TABLE 5: AGRICULTURAL, MARINE, FORESTRY AND OTHER EXPORTS, 2003-2015 (BZ$ MILLIONS)

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
MARINE PRODUCTS	110.17	107.61	98.12	86.04	42.64	46.94	51.53	52.74	50.22	57.45	112.34	113.26	88.13
SUGAR	71.23	81.53	69.90	100.07	88.14	71.38	89.06	58.72	82.74	107.59	107.36	110.19	134.46
MOLASSES	2.48	1.77	2.82	4.21	5.51	2.85	3.33	6.20	3.16	3.94	7.81	5.86	6.46
ORANGE CONCENTRATE	67.02	57.62	88.35	86.18	101.17	92.88	73.51	63.70	92.49	129.94	95.14	82.58	81.87
GRAPEFRUIT CONCENTRATE	12.52	24.49	19.36	22.81	16.27	21.25	10.02	15.00	10.57	13.09	11.50	7.87	7.43
BANANA	52.58	52.37	49.87	50.59	41.48	58.26	57.50	71.34	67.81	92.60	97.01	100.39	96.54
GARMENTS	31.38	36.87	34.72	36.76	0.34	0.35	0.47	0.18	0.07	0.36	0.60	0.09	0.15
SAWN WOOD	3.43	2.55	2.28	1.18	2.56	3.37	1.80	6.85	7.77	9.83	5.65	5.71	7.41
PAPAYAS	16.75	22.82	26.86	31.01	26.25	22.54	20.34	25.27	26.23	15.51	20.67	13.26	13.04
CRUDE PETROLEUM	–	–	0.00	87.50	143.21	236.68	119.18	200.84	292.09	186.30	140.19	102.26	36.38
PEPPER SAUCE	0.61	1.12	1.32	1.61	1.69	1.73	1.89	1.24	2.29	1.99	2.51	2.80	2.55
ORANGE SQUASH	–	–	–	–	–	–	0.25	2.03	1.04	0.76	0.41	0.32	0.52
GRAPEFRUIT SQUASH	–	–	0.00	0.02	0.05	0.00	0.44	0.64	0.35	0.09	0.21	0.10	0.08
ORANGES	2.41	2.76	3.48	2.88	2.70	0.50	2.48	0.15	0.13	0.04	0.04	0.87	0.01
ORANGE OIL	0.57	1.96	2.79	2.81	2.33	2.99	3.09	3.24	5.84	9.78	2.78	5.90	8.23
GRAPEFRUIT OIL	0.02	1.57	6.08	2.85	0.68	1.00	1.51	1.00	0.71	0.59	1.29	0.85	2.51
RED KIDNEY BEANS	1.66	2.38	5.22	1.91	2.88	2.82	3.47	6.62	5.35	7.71	9.73	9.44	11.14
BLACK EYES PEAS	3.41	2.01	3.71	3.37	3.60	4.68	5.29	4.69	6.55	5.26	5.57	7.05	5.74
PULP CELLS	–	–	–	–	–	–	0.15	1.58	2.60	7.59	3.31	2.00	2.10
ANIMAL FEED	0.00	0.04	0.88	1.39	0.26	0.70	–	4.47	2.39	8.70	28.51	24.97	11.86
CORN MEAL	–	–	–	–	–	–	–	1.35	6.68	4.22	5.53	4.53	3.07
OTHER VALUE	4.40	9.57	9.84	10.35	5.91	10.09	16.46	12.13	13.84	15.26	9.82	14.12	15.6
TOTAL VALUE OF EXPORTS	**380.62**	**409.06**	**425.59**	**533.55**	**487.67**	**581.01**	**461.77**	**539.98**	**680.90**	**678.61**	**667.98**	**614.42**	**535.33**

Source: Belize Statistical Institute.

TABLE 6: AVERAGE IMPORT VALUES FOR SELECTED AGRICULTURAL AND FOOD PRODUCTS, 2006-2010

PRODUCT	AVERAGE IMPORT VALUE (US$1000) 2000-2005	AVERAGE IMPORT VALUE (US$1000) 2006-2010	AVERAGE IMPORT VALUE (US$1000) 2011-2013	COEFFICIENT OF VARIATION OF IMPORT VALUE (2000-2013)
AGRICULTURAL PRODUCTS, TOTAL	69,805	97,074	120,758	0.26
FOOD PREPARATIONS N.E.S.	7,915	10,759	14,240	0.48
WHEAT	4,137	6,132	8,318	0.52
BEVERAGES, DISTILLED ALCOHOLIC	5,778	9,506	7,257	0.36
CAKE, SOYBEANS	1,219	3,499	6,508	0.72
CIGARETTES	663	6,304	6,328	0.47
FOOD WASTES	4,538	5,458	4,718	0.41
PASTRY	1,811	3,112	3,821	0.18
CHEESE, PROCESSED	1,711	2,399	3,268	0.23
FAT, NES, PREPARED	744	1,785	2,909	1.08
MILK, SKIMMED DRIED	470	2,100	2,803	0.62
INFANT FOOD	919	1,622	2,800	0.68
COFFEE, EXTRACTS	741	1,584	2,484	0.28
BEEF, PORK SAUSAGES	913	1,496	2,265	0.46
WINE	848	1,180	2,186	0.62
BEER FROM BARLEY	1,289	2,080	2,178	0.61
CHEESE, WHOLE COW MILK	1,717	2,254	2,152	0.35
CEREALS, BREAKFAST	907	1,166	2,035	0.69
MAIZE	597	1,121	1,944	0.59
PET FOOD	1,278	1,909	1,807	0.25
MILK, WHOLE CONDENSED	926	1,601	1,760	0.70
BEEF, PORK, PREPARATIONS	1,207	1,094	1,733	0.44
MILK, WHOLE EVAPORATED	1,642	1,534	1,597	0.43
MARGARINE	572	1,538	1,505	0.20
MILK, WHOLE DRIED	3,283	2,357	1,490	0.34
MALT	882	1,101	1,416	0.25
CHOCOLATE PRODUCTS NES	918	1,075	1,348	0.22
BEVERAGES, NON-ALCOHOLIC	1,127	1,638	1,194	0.38
VEGETABLES, PRESERVED NES	915	1,107	972	0.53

Source: Prepared by the authors using FAOSTAT. A common measure of volatility, the coefficient of variation is defined as the ratio of the standard deviation to the mean. Low numbers indicate stability.

3. A REVIEW OF MEASURES APPLIED TO AGRICULTURAL PRODUCTS IN BELIZE AT THE BORDER

There are three relevant taxes that apply to imports that do not apply to domestic products: (1) the import customs duty, either *ad valorem* or a specific tax, (2) the RRD, and (3) an environmental tax. Taken together, these measures applied at the border effectively raise the price of domestically produced goods, thereby both protecting domestic industry and serving as a revenue source. In fact, this latter purpose cannot be emphasized enough in the case of Belize, as the Belize Customs and Excise Department is the country's largest source of revenue. As of 2014, it was responsible for providing around 53 percent of total recurrent revenue.[5]

In 2012, the most recent year for which detailed data are available, the average implicit tariff across imported agriculture and food-related product lines was 34 percent. This number accounts for tariffs on goods from all destinations, including CARICOM, to which lower tariffs are generally applied. The import-shared-weighted

[5] http://www.customs.gov.bz/ , last accessed in late May 2014.

border-measure NRP was 14 percent, mainly due to low tariffs on wheat and other major food imports, as well as tariff exemptions on some basic goods not produced in Belize, such as coffee, tea, and cooking oils. For these latter products, the Most Favored Nation rate and other taxes are set to zero regardless of origin. Table 7 shows the border-measure NRPs (in percentages) of imported agricultural and food goods by Harmonized System (HS) code line for 2012.[6] Higher HS code numbers are more likely to be associated with food and more processed products. The table shows significant tariff escalation: highly processed goods tend to pay higher border taxes. Most of these food goods with the highest NRPs, however, are items such as tobacco, alcohol, and mineral water and are less likely to affect the agricultural sector's productivity. Dairy products have low protection, whereas meats are significantly protected.

Over 35 percent of tariff lines are imported paying 10 percent or less in effective border taxes (excluding the GST). On the high-taxed side, however, approximately 15 percent of tariff lines are subject to an effective tariff of over 50 percent, and about 10 percent of lines pay over 90 percent.

Finally, it should be noted that in addition to tariffs and import permits for sanitary and phytosanitary purposes, import licenses are needed for a large range of agricultural and food products, including rice, beans, eggs, flour, various vegetables, some meat preparations, milk, poultry, and jams. All these measures increase the de facto protection enjoyed by the agricultural sector in Belize, though the exact impact varies by product and according to the license allocation process.

[6] HS is the abbreviation of the Harmonized System, or more formally the Harmonized Commodity Description and Coding System. This system, maintained by the World Customs Organization, standardizes the names of trade products and assigns classification numbers that governments have agreed to follow in their tariff schedules.

TABLE 7: NOMINAL RATES OF PROTECTION (TARIFFS) FOR IMPORTED AGRICULTURAL AND FOOD PRODUCTS ACROSS HS LINES, 2012

HS PRODUCT CATEGORY	AVERAGE EFFECTIVE BORDER PROTECTION %
01 LIVE ANIMALS	2.0%
02 MEAT & EDIBLE MEAT OFFAL	37.5%
03 FISH & CRUSTACEANS	39.8%
04 DAIRY, EGGS, HONEY, & ED. PRODUCTS	9.1%
05 PRODUCTS OF ANIMAL ORIGIN	4.0%
06 LIVE TREES & OTHER PLANTS	2.0%
07 EDIBLE VEGETABLES	29.6%
08 ED. FRUITS & NUTS, PEEL OF CITRUS/MELONS	33.2%
09 COFFEE, TEA, MATE & SPICES	20.2%
10 CEREALS	14.3%
11 MILLING INDUSTRY PRODUCTS	10.6%
12 OIL SEEDS/MISC. GRAINS/MED. PLANTS/STRAW	7.2%
13 LAC, GUMS, RESINS, ETC.	7.0%
14 VEGETABLE PLAITING MATERIALS	7.0%
15 ANIMAL OR VEGETABLE FATS, OILS & WAXES	4.4%
16 ED. PREP. OF MEAT, FISH, CRUSTACEANS, ETC	20.0%
17 SUGARS & SUGAR CONFECTIONERY	26.2%
18 COCOA & COCOA PREPARATIONS	15.8%
19 PREPS. OF CEREALS, FLOUR, STARCH OR MILK	24.7%
20 PREPS OF VEGS, FRUITS, NUTS, ETC.	45.4%
21 MISC. EDIBLE PREPARATIONS	17.6%
22 BEVERAGES, SPIRITS & VINEGAR	121.4%
23 RESIDUES FROM FOOD INDUSTRIES, ANIMAL FEED	11.7%
24 TOBACCO & MANUF. TOBACCO SUBSTITUTES	72.6%

Source: Prepared by the authors using data supplied by the Belize Customs and Excise Department. Note, border protection does not include the GST (sales tax).

4. ESTIMATED NPR AND ERP FOR BELIZE AGRICULTURAL PRODUCTS

There are three different approaches to measuring the impact of government interventions at the border on agricultural protection or taxation levels. The first two approaches allow for the estimation of an NRP, which is defined as a price wedge between the border and domestic price of a given product. This first method gives the most direct measurement of government interventions affecting domestic prices by estimating an ***ad valorem*** **tariff equivalent** for the various import and export taxes applied (per ton or some other unit) to commodities at the border. This approach shows the cumulative effect that the three basic border taxes in Belize (import customs duties, revenue replacement duties and the environmental tax) have on import-competing products. This is most relevant for estimating effects on consumers, and will be discussed in more detail below. In addition to this tax-based approach, the implicit import duty (or export tax) can be estimated using the observed revenues from border taxes, expressed as a percentage of the border price. This yields the **effective tariff equivalent** that should be equal to the officially applied tax rates if those taxes are really paid. It has the advantage of providing a trade-weighted average in cases where tariffs differ by sub-category of product.

The third approach is the **direct price comparison method**. This method calculates an *ad valorem* tariff equivalent to the trade taxes by directly comparing prices at the border with prices at the farm gate. This approach is used to capture nontariff restrictions on imports or exports, such as quantitative restrictions in the form of import quotas, licenses, export prohibitions, pre-import deposits, and administrative measures (both formal and sometimes informal). Looking at border taxes alone would fail to capture any measures or non-tariff barriers unrelated to taxation that are nonetheless influential in determining domestic prices. Instead, in this third approach, the observed border price is adjusted for various margins (transport costs, port fees, sometimes quality differences) so the farm-gate equivalent price can be used to represent the price of competing products that would face farmers in the hypothetical case of no government interventions. This is the approach typically taken in the OECD PSE methodology, where domestic and border prices are compared at a common location (the notional "farm gate").

In the specific case of Belize, import licenses are required for many items (see Annex 1). Such licensing schemes, which go beyond legitimate protection against diseases and invasive species, produce an environment of uncertainty for potential exporters and for domestic businesses looking to import goods. They also run contrary to the spirit of WTO rules and to the government's ostensible policy of export diversification. Although such licenses today appear intended to protect the agriculture sector, in reality, they present smaller non-farm enterprises looking to grow and achieve economies of scale by finding niche markets at home or abroad with obstacles in the form of higher costs for imports of inputs and more difficulties in becoming competitive in international markets.

The direct price comparisons approach requires an adjustment for domestic marketing margins (when they are observable) so that the border and the farm gate price can be compared based on a similar level of market competition. Unfortunately, in the case of Belize, little information is available regarding these marketing margins. The NRPs are therefore merely an approximation and should be interpreted accordingly.

To make an accurate price comparison, any processing done between the farm gate and the point where the product would be competing with imports must be accounted for. For example, in the case of Belize, this would involve accounting for the difference between peppers produced by farmers and pepper sauce prepared for export. The analysis must therefore rely to some degree on transformation coefficients to calculate the price equivalent at a given processing stage.

THERE ARE THREE DIFFERENT APPROACHES TO MEASURING THE IMPACT OF GOVERNMENT INTERVENTIONS AT THE BORDER ON AGRICULTURAL PROTECTION OR TAXATION LEVELS: (1) AD VALOREM TARIFF EQUIVALENT, (2) EFFECTIVE TARIFF EQUIVALENT, AND (3) DIRECT PRICE COMPARISON METHOD.

While the NRP is a useful indicator for examining the impact of trade policy on the price paid by food manufacturing companies or the final consumer at retail, it is not always an accurate indicator of the incentives facing agricultural producers, as it does not capture the impact of price and trade policy on the domestic price of intermediate inputs such as agrochemicals, machinery, equipment, fuel, and seed. For a more accurate measure of the impact of trade policy on farm income and therefore on economic incentives for farmers, a complementary approach estimates the impact of the policies on the value added per ton (or total value produced) at the level of the farm. The Effective Rate of Protection (ERP) indicator is defined as the percentage difference between value added at domestic prices and the value added at a farm-gate equivalent of the border price; that is (Vj – Vj*)/ Vj*, where Vj represents per-output value added over tradable inputs of sector j at domestic prices (the real case), and Vj* represents value added at the farm gate equivalent of border prices (the hypothetical case without government policy interventions), given the exchange rate. The ERP therefore accounts also for the impacts of interventions on the cost of tradable inputs, not just the product price[7].

NRP and ERP estimates for 10 agricultural products

The NRP and ERP results for the available years are summarized in Table 8. Detailed NRPs for each product are presented in Table 9 (a to j). Note that six of the 10 products have negative NRP values. That is, the results suggest that the overall effect of trade taxes is to reduce, rather than increase, the competitiveness of domestic producers, and in the cases of cacao, oranges, and rice —exportable products— the negative effect appears large. Moreover, the low NPR values for onions (positive) and sugar, peppers, and bananas (negative) are likely insignificant in the light of the quality of the available data, and could be interpreted as essentially zero. Certainly, the relatively small negative NRPs are within reasonable marketing margins, for which data are unavailable for this analysis. Essentially, trade taxes on all these products appear to provide no significant protection.

In the case of cacao, as in many other cases, there is little information on margins. In any event, relatively little of it is produced commercially, and there is only one major buyer, a UK chocolate firm (that produces a specialty "fair trade," organic product). The NRP may therefore be reflecting the specific case of this industry's monopsonistic structure rather than any effect of government policy.

---

[7] A problem with interpretation of the ERP is that the denominator (value added at border prices) can be negative. This gives wide swings in the ERP for products depending on small changes in input and product prices.

TABLE 8: SUMMARY - AVERAGE NPRS AND ERPS AND CROP VALUE AT FARM GATE

PRODUCTS	NPR %	ERP %	CROP VALUE BZ 1000S	YEARS
POULTRY	277.30	123.80	83,545	2010-2014
BANANAS	-7.80	-11.00	91,275	2007-2014
SUGAR (AND REFINED EQUIVALENTS)	-4.70	1.60	74,754	2009-2014
ORANGES	-29.60	-15.30	61,902	2010-2014
MAIZE	48.20	1239.00	43,947	2010-2014
RICE	-34.30	-215.80	23,845	2010-2014
RED BEANS	10.60	-20.90	15,688	2009-2014
ONIONS	0.72	0.63	600	2010-2013
PEPPERS	-2.20	-5.80	436	2010-2013
CACAO	-26.60	-26.70	252	2010-2013

Source: Authors' calculations. Note: ERPs are estimated using data for 2010-2013.

The NRP results show a large dispersion, from high negatives to high positives. The data certainly present difficulties, especially with respect to domestic marketing margins. But based on the data available, in one respect, the NRPs tend to raise concerns from the point of view of welfare and economic growth. The analysis indicates without question that two import-competing sectors have, on average, enjoyed protection during the last four years: poultry and maize.

The very high NRP for poultry is not new: In 1997, the IICA report on the Belize poultry sector estimated the nominal rate of protection in 1995 (with the USA as potential supplier) at 62 percent for whole chicken and at 132 percent for chicken legs and thighs (see Quirós and Benavides, 1997). Almost two decades later, the sector remains highly protected by both the licensing system and tariffs.[8]

[8] It should be noted that in these estimates for poultry/chicken, there was a problem in determining a border price. The data for farmer-level domestic prices are for live whole birds, and based on a conversion factor of 0.78 (from the Belize Poultry Association) one obtains the dressed-bird equivalent for the poultry price. Belize imports small amounts of chicken products. In lieu of a Belize border price for whole dressed birds, per ton cif prices for Honduras were obtained (cross checking against Costa Rica import prices), and then, because imports from the United States are usually dark meat (legs and thighs) with a significantly lower per unit value, these import prices for dark meat were converted to dressed whole-bird equivalents (in effect raising prices by about 60 percent, based on Georgia Dock wholesale price differentials).

In the case of maize, the high, positive average NRP (48 percent) is due to two years —2011 and 2014— during which the border price fell and the farm gate price was high. During 2012, the maize NRP averaged a negative 16.5 percent, perhaps within the range of a reasonable marketing margin.[9] The case of maize underscores the importance of price volatility in assessing NRPs and ERPs, which should be calculated over multiple years, especially in "thin" markets with lower price transmission rates.

Turning to ERP estimates, the results show the same notable dispersion across products, from high negative to high positive. In the case of maize, the ERP is twenty-five times greater than the NRP based on the product's farm gate price alone. Without protection, the maize's prospects in terms of commercial agriculture would seem dim, especially at the current scale of production. This is partly due to the high cost share of purchased (importable) inputs. In maize production, agrochemicals and fuel (all imported) account for about 46 percent of variable costs.

Notably, the poultry sector is a large consumer of maize, which accounts for 30 percent of its costs. Nevertheless, even accounting for the higher production costs resulting from maize protection, the poultry sector maintains a high ERP.

Finally, for rice, the very high negative ERP is due to prices observed after 2011, when domestic prices were low relative to border prices. In 2011, producer prices and border price equivalents at farm gate were similar. Going back a little further, domestic prices rose after the 2008 international price spikes, but proportionally much less than did border prices. The rate of price transmission from border to domestic appears to be very low. We also note that in recent years, commercial rice producers have been exiting the market due to competition from both imports and what some farmers consider to be "government subsidized" rice from the south.[10] For rice, it is likely that high negative ERP is due to low transmission of international prices to domestic producers at the farm gate, which is to some degree the result of other government policies and the presence of rice imported and distributed for charitable purposes.

---

[9] For information, The 1997 IICA poultry sector report estimates the maize NRP to be negative 17 percent.

[10] In addition to imported rice (both for commercial and charitable purposes), the Belize Marketing and Development Corporation (BMDC) assists small milpa farmers in the Toledo region in the planting and harvesting of rice. The BMDC also mills, packages and distributes what it purchases from small farmers, supposedly only supplying a fraction of the domestic rice market. Commercial farmers, however, have complained.

TABLE 9 (PART 1): NRP CALCULATIONS FOR SELECTED AGRICULTURAL PRODUCTS, BELIZE, 2011-2014

PRODUCT	CURRENCY / UNIT	2011	2012	2013	2014	AVERAGE
POULTRY						
LEVEL OF PRODUCTION	000 TONS	13.9	14.3	15.2	17.5	15.2
VALUE OF PRODUCTION (AT THE FARM GATE)	BZ$MN	70.3	77.3	93.6	93.0	83.5
PRODUCER PRICE	BZ$/T	5070.6	5401.3	6156.4	5313.1	5485.4
BORDER PRICE EQUIVALENT AT FARM GATE	BZ$/T	647.4	2370.2	2037.1	2492.4	2203.6
MARKET PRICE DIFFERENTIAL	BZ$/T	4423.3	2700.4	3364.2	3664.0	3109.6
NRP	PERCENT	683.3%	113.9%	165.1%	147.0%	277.3%
BANANAS						
LEVEL OF PRODUCTION	000 TONS	88.19	116.68	111.18	115.56	107.9
VALUE OF PRODUCTION (AT THE FARM GATE)	BZ$MN	76.56	98.46	93.24	96.84	91.3
PRODUCER PRICE	BZ$/T	868.14	843.88	838.62	837.99	847.2
BORDER PRICE EQUIVALENT AT FARM GATE	BZ$/T	914.92	892.87	895.25	976.66	919.9
MARKET PRICE DIFFERENTIAL	BZ$/T	-46.78	-48.99	-56.62	-138.66	-72.8
NRP	PERCENT	-5.1%	-5.5%	-6.3%	-14.2%	-0.1
RED BEANS						
LEVEL OF PRODUCTION (RICE PADDY)	000 TONS	3.70	6.04	5.66	4.23	4.9
VALUE OF PRODUCTION (AT THE FARM GATE)	BZ$MN	9.48	15.59	21.84	15.85	15.7
PRODUCER PRICE	BZ$/T	2557.80	2579.85	3858.75	3748.50	3186.2
BORDER PRICE EQUIVALENT AT FARM GATE	BZ$/T	2319.87	2327.13	3326.70	3845.84	2203.6
MARKET PRICE DIFFERENTIAL	BZ$/T	237.93	252.72	532.05	-97.34	3109.6
NRP	PERCENT	10%	11%	10%	11%	10.6%
CACAO						
LEVEL OF PRODUCTION	TONS	26.14	26.14	68.04	65.77	46.52
VALUE OF PRODUCTION (AT THE FARM GATE)	$ BZD	198,065	132,547	345,000	333,500	252,278
PRODUCER PRICE	$ BZD/ TON	5070.63	5070.63	5070.63	5070.63	5070.63
BORDER PRICE EQUIVALENT AT FARM GATE	$ BZD/ TON	6943.52	8102.36	7237.23	5754.34	7009.36
NOMINAL RATE OF PROTECTION	PERCENT	-27%	-37%	-30%	-12%	-27%
MAIZE						
LEVEL OF PRODUCTION	000 TONS	62.7	63.5	71.9	71.4	67.4
VALUE OF PRODUCTION (AT THE FARM GATE)	BZ$MN	41.47	38.99	47.57	47.76	43.9
PRODUCER PRICE	BZ$/T	661.4	614.2	661.4	669.1	651.5
BORDER PRICE EQUIVALENT AT FARM GATE	BZ$/T	360.9	735.5	494.3	347.9	484.7
MARKET PRICE DIFFERENTIAL	BZ$/T	300.5	-121.3	167.1	321.2	166.9
NOMINAL RATE OF PROTECTION	PERCENT	83.3%	-16.5%	33.8%	92.3%	48%

Source: Authors' calculations.

TABLE 9 (PART 2): NRP CALCULATIONS FOR SELECTED AGRICULTURAL PRODUCTS, BELIZE, 2011-2014

PRODUCT	CURRENCY / UNIT	2011	2012	2013	2014	AVERAGE
ONIONS						
LEVEL OF PRODUCTION	TONS	680	680	680	680	680
VALUE OF PRODUCTION (AT THE FARM GATE)	$ BZD	900,000	900,000	900,000	900,000	900,000
PRODUCER PRICE	$ BZD/ TON	1,322.77	1,322.77	1,322.77	1,322.77	1,323
BORDER PRICE EQUIVALENT AT FARM GATE	$ BZD/ TON	1,167.23	2,058.57	1,327.94	1,052.40	1,402
NOMINAL RATE OF PROTECTION	PERCENT	13%	-36%	0%	26%	1%
ORANGES						
LEVEL OF PRODUCTION (RICE PADDY)	000 TONS	200.7	273.5	178.5	182.7	208.8
VALUE OF PRODUCTION (AT THE FARM GATE)	BZ$MN	53.2	97.3	47.7	49.3	61.9
PRODUCER PRICE	BZ$/T	265.2	355.8	267.5	270.0	289.6
BORDER PRICE EQUIVALENT AT FARM GATE	BZ$/T	395.6	409.4	465.9	384.9	2203.6
MARKET PRICE DIFFERENTIAL	BZ$/T	-130.4	-53.6	-198.4	-114.9	3109.6
NOMINAL RATE OF PROTECTION	PERCENT	-33.0%	-13.1%	-42.6%	-29.8%	-29.6%
PEPPER						
LEVEL OF PRODUCTION	TONS	198	198	198	198	198
VALUE OF PRODUCTION (AT THE FARM GATE)	$ BZD	435,595	435,595	435,595	435,595	435,595
PRODUCER PRICE	$ BZD/ TON	2,205	2,205	2,205	2,205	2,205
BORDER PRICE EQUIVALENT AT FARM GATE	$ BZD/ TON	2,256	2,256	2,253	2,253	2,254
NOMINAL RATE OF PROTECTION	PERCENT	-2%	-2%	-2%	-2%	-2%
RICE						
LEVEL OF PRODUCTION (RICE PADDY)	000 TONS	19.08	12.32	20.50	15.82	16.9
VALUE OF PRODUCTION (AT THE FARM GATE)	BZ$MN	19.98	23.63	35.72	16.05	23.8
PRODUCER PRICE	BZ$/T	1047.38	1918.35	1741.95	1014.30	1430.5
BORDER PRICE EQUIVALENT AT FARM GATE	BZ$/T	995.74	3109.40	2581.89	3552.35	2203.6
MARKET PRICE DIFFERENTIAL	BZ$/T	51.63	-1191.05	-839.94	-2538.05	3109.6
NOMINAL RATE OF PROTECTION	PERCENT	5.2%	-38.3%	-32.5%	-71.4%	-34.3%
SUGAR (IN REFINED EQUIVALENTS)						
LEVEL OF PRODUCTION (RICE PADDY)	000 TONS	100.1	116.4	120.2	123.1	114.9
VALUE OF PRODUCTION (AT THE FARM GATE)	BZ$MN	60.9	77.2	79.0	82.0	74.8
PRODUCER PRICE	BZ$/T	608.6	663.3	656.6	666.0	648.6
BORDER PRICE EQUIVALENT AT FARM GATE	BZ$/T	655.0	736.0	654.8	679.3	2203.6
MARKET PRICE DIFFERENTIAL	BZ$/T	-46.4	-72.7	1.8	-13.3	3109.6
NOMINAL RATE OF PROTECTION	PERCENT	-7.1%	-9.9%	0.3%	-2.0%	-4.7%

Source: Authors' calculations.

5. THE PSE, GSSE AND TSE CALCULATIONS

The Producer Support Estimate (PSE) and associated measurements were developed by the OECD to monitor agricultural policies in member states. Estimates have been published since the mid-1980s. More recently, the OECD has begun applying the same methodology to some non-member countries (such as China, Indonesia, South Africa, and Brazil). The IDB decided to adopt the PSE methodology for a number of countries in the Latin American and Caribbean region and to publish the estimates in the Agrimonitor database. The methodology was first applied to Belize by Peña and Gurria in their 2010 study.

The PSE is defined as the amount producers would need to be paid to replace the array of actual farm policies employed in a particular country while leaving farm income unchanged. The PSE is made up of three components: the transfer from consumers as a result of higher prices (due to border measures and price fixing); the subsidies on inputs used in production; and any direct payments received by producers tied or not to production. In addition to the PSE, the OECD methodology includes general support

THE PSE IS DEFINED AS THE AMOUNT PRODUCERS WOULD NEED TO BE PAID TO REPLACE THE ARRAY OF ACTUAL FARM POLICIES EMPLOYED IN A PARTICULAR COUNTRY WHILE LEAVING FARM INCOME UNCHANGED.

from government programs that benefit producers in general (the General Services Support Estimate, GSSE). The overall consumer impact of farm policies is captured in the Consumer Support Estimate (CSE) which is often negative. The Total Support Estimate (TSE) aggregates the PSE, the CSSE and any payments that are made to consumers related to purchases of food.[11]

The relationship between the PSE indicators and the protection measures discussed in previous sections should be clarified. The PSE component derived from the price effect of government policies is known as Market Price Support (MPS). The PSE provides more information than the NRP which measures only the commodity-specific price-support component of the PSE. The PSE comes closer to the ERP because it includes transfers to farmers through input subsidies, such as credit and fertilizer (the methodology does not, however, include the impacts of border protection on input prices.) But the main difference is that the PSE includes payments that are not based on the production of individual commodities. Specifically, the PSE includes direct payments to farmers, though these are largely absent in Belize.[12]

Table 10 lists the different types of government spending included in to calculate the TSE. Interventions range from direct input subsidies to investment spending on irrigation systems to expenditures on agrarian reforms. On the revenue side, governments have access to tariff revenues and export taxes. Other sources of revenue include sales taxes and operating profit (or losses) on state enterprises, such as monopsony marketing boards, although these are not included in the TSE calculations shown in this section.

Government expenditures in Belize related to the farm sector are relatively small in absolute terms, although the EU programs to "aid the restructuring" of the sugar and banana sectors are significantly large in value. Note that the "spending" policy that provides a tax exemption on fuel for sugar cane farmers has not been calculated. While this policy, is not an explicit outlay, it nonetheless constitutes foregone revenue and therefore implicit support for cane farmers.

---

[11] The amount consumers pay to the government in the form of tariffs on imported goods is subtracted from estimates of the transfers the government makes to consumers.

[12] As a result of the prevalence of non-commodity-specific payments in many member countries, the OECD no longer estimates PSE according to commodity. However, one component of the PSE is "commodity-specific transfers" (CST) that can be attributed directly to the production of particular products. The CST associated with particular products is therefore the closest thing to a measurement of a protection measure. For that reason, the CST estimates are not included in this section to avoid repetition.

TABLE 10: CLASSIFICATION OF GOVERNMENT AGRICULTURE-RELATED REVENUES AND EXPENDITURES

CATEGORY	EXAMPLES
EXPENDITURES	–
EXPLICIT OUTLAYS	INPUT SUBSIDIES (FERTILIZER, MACHINERY AND MACHINERY OPERATIONS, PESTICIDES, POWER TARIFFS FOR TUBE WELLS)
	CREDIT SUBSIDIES (INTEREST-FREE OR LOW-INTEREST LOANS)
	MARKETING SUBSIDES (STORAGE AND RAILWAY TRANSPORTATIONS)
	EXPORT SUBSIDIES (FINANCING, DRAWBACKS, ETC.)
	CONSUMER SUBSIDIES (PRODUCTS SOLD AT LESS THAN THE MARKET PRICE)
	DIRECT PRODUCT SUBSIDIES ON OUTPUT
CONCEALED SUBSIDIES	SUBSIDIES ON IRRIGATION (OPERATION AND MAINTENANCE)
	CONCESSIONAL RATES ON ELECTRICITY USE
OPERATIONAL LOSSES	LOSSES BY STATE-OWNED OR PARA-STATE COMPANIES INVOLVED IN PROCUREMENT AND TRADE (NET OF EXPORT AND OF CONSUMER SUBSIDIES LISTED ABOVE)
PUBLIC INVESTMENT ON INFRASTRUCTURE*	AGRICULTURAL RESEARCH AND EXTENSION
	CONSTRUCTION OF IRRIGATION SYSTEMS, DAMS, AND PROCESSING FACILITIES
	LAND RECLAMATION PROJECTS
OTHER PROGRAMS*	AGRARIAN REFORM AND OTHER PROGRAMS
REVENUES	–
DIRECT TAXES	LAND TAX
	AGRICULTURAL INCOME TAX**
EXPLICIT COMMODITY TAXES	EXPLICIT BORDER TAXES ON IMPORTS AND EXPORTS OF FARM PRODUCTS, INCLUDING INTERMEDIATE INPUTS FOR AGRICULTURAL PRODUCTION
	PRODUCTION TAXES ON SPECIFIC COMMODITIES
	SALES TAXES** (VALUE ADDED TAXES IN SOME COUNTRIES)
OPERATIONAL GAINS	PROFITS OF STATE-OWNED COMPANIES OR PARASTATALS INVOLVED IN PROCUREMENT AND TRADE (NET OF COMMODITY BORDER TAXES LISTED ABOVE)

(*) These categories are not fully included in the analysis in this study because of insufficient data (subsidies on irrigation and electricity use).
(**) Includes the difference between the rates that apply to agriculture and those in the rest of the economy.

The TSE estimates and their components are given in Table 11. The calculations include the estimated MPS for the products covered in the NRP and ERP sections of this monograph (plus eggs, beef, and pork), as well as the non-commodity-specific government expenditures on agricultural programs. The products covered in the TSE calculations are those considered the most interesting commercial crops in Belize.

For the years in question, the TSE and the PSE were positive, mainly due to the significant poultry price MPS . Indeed, if not for poultry, the MPS would be much smaller every year, if not negative. For example, the MPS calculated without poultry would have been negative for 2012 and 2014, due mainly to negative protection on some crops, particularly rice. The average PSE over the period 2011-2014 was 10.8 percent of producer receipts.

TABLE 11: THE TOTAL SUPPORT ESTIMATE FOR BELIZE

	UNIT	2011	2012	2013	2014
I. TOTAL VALUE OF PRODUCTION (AT FARM GATE)	BZ$ MN	450.10	547.64	532.08	522.45
SHARE OF COMMODITIES FOR WHICH MPS CALCULATIONS WERE MADE (%)	%	79.90	83.74	85.48	83.69
II. TOTAL VALUE OF CONSUMPTION (AT FARM GATE)	BZ$ MN	231.75	239.84	309.65	290.83
III (I). PRODUCER SUPPORT ESTIMATE (PSE)	BZ$ MN	62.03	46.45	88.56	29.64
A. SUPPORT BASED ON COMMODITY OUTPUTS	BZ$ MN	54.99	31.76	57.80	25.44
B. PAYMENTS BASED ON INPUT USE	BZ$ MN	7.05	14.69	30.76	4.20
C. MISCELLANEOUS PAYMENTS	BZ$ MN	0.10	0.16	0.79	0.27
III (II). PERCENTAGE PSE	%	13.57	8.26	15.71	5.63
IV. GENERAL SERVICES SUPPORT ESTIMATE (GSSE)	BZ$ MN	11.72	14.64	27.79	11.33
EU-SUGAR SUPPORT PROGRAM	BZ$ MN	6.52	11.07	19.69	6.44
AGRICULTURE SERVICE PROGRAM (CAPITAL II EXPENDITURE)	BZ$ MN	0.04	0.02	0.11	0.05
AGRICULTURE SERVICE PROGRAM (CAPITAL III EXPENDITURE)	BZ$ MN	1.70	0.17	2.73	1.53
EU BRDP (CAPITAL III EXPENDITURE)	BZ$ MN	0.55	2.41	4.55	2.92
SUPPORT TO DISTRICTS	BZ$ MN	0.19	0.09	0.15	0.14
FOOD SECURITY PROGRAM/ALBA	BZ$ MN	1.92	0.22	0.25	0.03
V (I). CONSUMER SUPPORT ESTIMATE (CSE)	BZ$ MN	-63.05	-44.51	-62.55	-30.22
V (II). TOTAL SUPPORT ESTIMATE (TSE)	BZ$ MN	85.77	56.84	123.87	54.84
BELIZE GDP (CURRENT PRICES)	BZ$ MN	2,974	3,147	3,248	3,398
TSE AS SHARE OF GDP	%	0.03	0.02	0.04	0.02

Source: Authors' calculations.

Poultry is highly protected, both by import licenses and by border taxes. Onions and rice, which supposedly enjoy the protection of the BMDC, have low (onions) and even negative (rice) MPS estimates. The case of rice, as mentioned earlier, is particularly interesting due to the evidently low price transmission from international to domestic markets. The rice case is also complicated by food aid imports, quality differences, and the intervention of the BMDC in the production, harvesting and marketing of the rice in milpa farming areas.

These results have significant policy implications. Based on available data, the generally low and often negative MPS (and also the NPR) indicate the existence of an implicit tax on a portion of commercial agriculture, although certainly not poultry and maize. An implicit tax would lead to a lower rate of return and reduce investment in some sectors, as well as impact agricultural growth and exports.

Of the 16 countries from the Latin America and Caribbean region for which recent PSE estimates are available in Agrimonitor (see Annex 4), all but Argentina and Suriname have positive PSEs. Most small countries (El Salvador, Costa Rica, Honduras, and Nicaragua), have PSEs above 15 percent. Guatemala and the Dominican Republic have moderate PSEs in the range of 5 to 7 percent. Suriname is a special case, showing a negative PSE in 2011.

With respect to general services, the GSSE is also listed in Table 11 (with details on specific budget items for the years 2010-2013 provided in Annex 3). The GSSE total has averaged 16.4 million Belize dollars between 2011 and 2014, with significant expenditure on items such as infrastructure. Relative to the gross value of output of the selected crops in this monograph, the GSSE averages about 3 percent, although it should be noted that the total value of all agricultural production is likely to be somewhat larger than the official statistics indicate. On average, the GSSE accounts for about one-fifth (2011-2013) of the TSE.

THE CASE OF RICE IS PARTICULARLY INTERESTING DUE TO THE EVIDENTLY LOW PRICE TRANSMISSION FROM INTERNATIONAL TO DOMESTIC MARKETS.

6. EFFECTS OF BORDER INTERVENTIONS ON THE CONSUMER

This monograph's approach to evaluating the effects that border interventions have on consumers is **to measure the price wedge (or tariff equivalent) that results from border protections**. This is an indicator of the impact that policy measures have on households' real income: the higher the nominal protection, the higher the income loss. This approach does not account for consumption subsidies.

Belize's food and agricultural imports

Belize is a net importer in terms of goods, but thanks to earnings from tourism, it runs a small trade surplus in combined goods and services. To put food imports into perspective, Table 12 shows the trade and payments balance trend since 2007. Its current account deficit was about 1.5 percent of GDP in 2012. Reserves from imports have been increasing. In terms of food insecurity, therefore, the country does not face foreign exchange constraints on maintaining its current level of food imports.

BELIZE IS A NET IMPORTER IN TERMS OF GOODS, BUT THANKS TO EARNINGS FROM TOURISM, IT RUNS A SMALL TRADE SURPLUS IN COMBINED GOODS AND SERVICES.

TABLE 12: BALANCE OF TRADE AND PAYMENTS (US$ MILLIONS)								
	2007	2008	2009	2010	2011	2012	2013	2014
MERCHANDISE EXPORTS (F.O.B.)	425.6	480.1	382.1	475.7	603.6	621.6	608.1	588.7
MERCHANDISE IMPORTS (F.O.B.)	642.0	788.2	620.5	649.8	778.2	818.1	888.6	938.7
TRADE BALANCE	-216.5	-308.2	-238.4	-174.0	-174.6	-196.5	-280.5	-350.1
REMITTANCES (INFLOWS)	70.8	74.1	76.2	75.8	73.0	73.6	72.0	78.0
TOURISM (INFLOWS)	288.7	278.5	256.2	264.4	247.6	292.4	344.4	372.5
SERVICES (NET)	229.9	216.9	182.6	200.1	169.1	221.6	252.9	282.9
CURRENT ACCOUNT BALANCE	-52.1	-132.4	-84.6	-40.6	-19.9	-19.3	-72.6	-135.9
CAPITAL AND FINANCIAL FLOWS	123.7	235.7	135.5	33.0	44.7	84.3	174.1	198.2
GROSS CHANGE IN INTERNAT'L RESERVES	22.9	57.9	47.3	4.3	18.1	47.7	113.8	81.8
GROSS OFFICIAL INTERNATIONAL RESERVES	108.5	166.4	213.7	218.0	236.1	291.5	405.1	486.8
IMPORT COVER OF RESERVES (IN MONTHS)	1.8	2.3	3.7	3.7	3.3	3.9	5.0	5.7

Source: Ministry of Finance and the Office of the Prime Minister.

According to the latest data reported by FAOSTAT (Table 13), in 2011 the country was a net exporter of food and agricultural products, exporting US$165 million and importing US$106 million. Tobacco and alcoholic beverages accounted for at least US$14 million of its imports. These figures confirm that Belize is not at risk of food insecurity at the national level. However, with a large portion of its population near or below the poverty line, food insecurity does exist at the household level, where the price of food becomes more relevant.

The consumption basket for the average consumer

To assess the impact of border measures on consumers, this note estimates the increase in the cost of the household food basket due to the higher domestic prices resulting from protection. Table 14 shows the weights of individual food items in the consumer price index (CPI) taken from the Statistical Institute of Belize, last updated in 2011. The weights associated with food and beverages (items 1 to 83) make up 21 percent of the CPI. While these weights hold for the representative consumer, household expenditure weights vary by income level, with the weight of food typically declining as income increases. Within the food category, only 15 items account for 50 percent of the food basket, with beer (6.2%), rice (6.2%), and chicken (11% whole and in parts) making up 23 percent of all food expenditures.

TABLE 13: MAJOR FOOD AND AGRICULTURAL IMPORTS IN BELIZE, 2011

FOOD ITEM	VALUE IN US$1000S
AGRICULTURAL PRODUCTS (TOTAL)	131,862
OTHER PREPARED FOODS*	16,658
CIGARETTES	8,821
WHEAT	8,520
CAKE, SOYBEANS	8,093
BEVERAGES, DISTILLED ALCOHOLIC	6,961
FOOD WASTES	4,084
PASTRY	3,867
FAT, NES, PREPARED	3,415
CHEESE, PROCESSED	3,384
INFANT FOOD	3,300
COFFEE, EXTRACTS	3,246
BEER OF BARLEY	2,976
MILK, SKIMMED DRIED	2,669
MAIZE	2,532
WINE	2,474
BEEF, PORK SAUSAGES	2,337
CHEESE, WHOLE COW MILK	2,283
CEREALS, BREAKFAST	2,181
MILK, WHOLE CONDENSED	1,746
BEEF, PORK, PREPARATIONS	1,701
PET FOOD	1,695
MARGARINE, SHORT	1,540
CHOCOLATE PRODUCTS NES	1,480
MALT	1,463
MILK, WHOLE DRIED	1,330
MILK, WHOLE EVAPORATED	1,176
BEVERAGES, NON ALCOHOLIC	1,174
VEGETABLES, PRESERVED NES	893
AGRICULT.PRODUCTS,TOTAL	131,862
FOOD PREP NES	16,658
CIGARETTES	8,821
WHEAT	8,520
CAKE, SOYBEANS	8,093

Source: FAOSTAT.
(*) Food preparations not elsewhere specified (nes) in the list of imports.

Estimates of impact of border taxes on real household income

The estimates are calculated by taking the border-measure NRPs (tariffs and taxes applied as a percentage of CIF price) for each food and beverage item and multiplying them by their respective CPI weights to estimate the increase in the cost of living attributable to those border measures. Table 7 shows the border taxes for broad product categories.

Table 14 shows beer and rice as having the highest single shares in the food basket (both at 6.2 percent). Beer is subject to a substantial effective tariff of 44 percent, but bulk rice (representing by far the largest share of rice imports) enters with zero tariffs or taxes. Whole chicken and chicken parts together make up 11 percent of the food basket but are relatively highly protected with a total border tax of 37.5 percent. Soft drinks and bottled water also have relatively large weights in the food basket, and both have high border taxes.

The increase in the average cost of living caused by border taxes and other measures imposed on agricultural and food products alone is 6.8 percent. The increase in the cost of the food basket (which represents 21 percent of the total CPI) is more substantial, at 32.5 percent. These increases are estimated for the average consumer, but for the lowest quintile, which spends a larger portion of its income on food, the increase would be higher. Border protections on food products therefore represent a significant regressive tax.

THE INCREASE IN THE AVERAGE COST OF LIVING CAUSED BY BORDER TAXES AND OTHER MEASURES IMPOSED ON AGRICULTURAL AND FOOD PRODUCTS ALONE IS 6.8 PERCENT. THE INCREASE IN THE COST OF THE FOOD BASKET IS MORE SUBSTANTIAL, AT 32.5 PERCENT.

In addition to effects of border measures discussed above, some products —rice, beans, sugar, bread, flour, butane, and fuel— fall under the 1987 Supplies Control Regulations, which imposes price controls. For instance, in the case of sugar, which Belize exports, a price ceiling on retail sales within the domestic economy is coupled with an agreement with the monopsony sugar cane buyer and refiner, the Belize Sugar Industry (BSI) to supply a certain quota to the Belize domestic market. The government has implemented what is in effect an inverse export-quota approach, under which once a minimum quantity is dedicated to the domestic market, BSI can export freely. Unsurprisingly, price controls ostensibly meant to benefit consumers lead to perverse consequences. Although BSI supplies 14,000 tons to domestic markets, there are often shortages of sugar on store shelves. This domestic quota is supplemented by a price ceiling, but as economic reasoning would predict, the government's attempt to fix consumer prices produces simple arbitrage opportunities when prices in Guatemala and Mexico are sufficiently high relative to

the fixed price in Belize. Fixed consumer prices for exchange are merely superseded by higher effective prices in the form of shortages, waiting in line and rationing, or under-the-table payments. In any event, despite the officially fixed prices, consumers pay a higher price in some form. Although it would be politically uncomfortable in the short term, freeing prices and allowing them to adjust would likely benefit consumers in the long run. This as has been demonstrated in many countries in Latin America over the last decade, where price controls were lifted after realizations that they were ineffective, expensive to enforce, and often lead to regressive outcomes.

TABLE 14 (PART 1): WEIGHTS ASSOCIATED WITH FOOD ITEMS IN THE CONSUMER PRICE INDEX FOR BELIZE, 2011

ITEM	WEIGHT IN TOTAL CPI	WEIGHT IN FOOD BASKET	ITEM	WEIGHT IN TOTAL CPI	WEIGHT IN FOOD BASKET
RICE	1.31%	6.24%	BEEF STEAK	0.26%	1.24%
BEER	1.31%	6.24%	GROUND BEEF	0.26%	1.24%
CHICKEN, WHOLE FROZEN	1.06%	5.05%	PORK CHOPS	0.22%	1.05%
CHICKEN, PARTS FROZEN	1.06%	5.05%	PIG TAIL	0.22%	1.05%
FLOUR	0.97%	4.62%	BUTTER/MARGARINE	0.21%	1.00%
CORN FLAKES	0.97%	4.62%	NATURAL MILK	0.21%	1.00%
WHITE BREAD	0.58%	2.76%	BLACK BEANS	0.20%	0.95%
SUGAR	0.48%	2.29%	POTATO CHIPS	0.20%	0.95%
CHEESE	0.45%	2.14%	BAKED BEANS, CANNED	0.20%	0.95%
LARD/SHORTENING	0.44%	2.10%	RED KIDNEY BEANS	0.20%	0.95%
COOKING OIL	0.44%	2.10%	MIXED VEGETABLES, CANNED	0.20%	0.95%
EGGS	0.43%	2.05%	CORNED BEEF	0.19%	0.91%
SOFT DRINKS	0.42%	2.00%	LUNCHEON MEATS	0.19%	0.91%
ENERGY DRINK	0.42%	2.00%	VIENNA SAUSAGE	0.19%	0.91%
POWDERED DRINKS	0.42%	2.00%	HAM	0.19%	0.91%
PURIFIED WATER	0.42%	2.00%	SAUSAGE	0.19%	0.91%
FRUIT JUICES AND SQUASHES	0.41%	1.95%	SHRIMP	0.17%	0.81%
COFFEE	0.36%	1.72%	IRISH POTATO	0.17%	0.81%
SNAPPER	0.35%	1.67%	CABBAGE	0.15%	0.71%
CREAMER	0.30%	1.43%	TOMATOS	0.15%	0.71%
POWDERED MILK	0.30%	1.43%	LETTUCE	0.15%	0.71%
CONDENSED MILK	0.30%	1.43%	GREEN CORN	0.15%	0.71%
EVAPORATED MILK	0.30%	1.43%	SWEET PEPPER	0.15%	0.71%

Source: Mimeo supplied to authors by the Belize Statistical Institute.

TABLE 14 (PART 2): WEIGHTS ASSOCIATED WITH FOOD ITEMS IN THE CONSUMER PRICE INDEX FOR BELIZE, 2011

ITEM	WEIGHT IN TOTAL CPI	WEIGHT IN FOOD BASKET
ONIONS	0.15%	0.71%
CARROTS	0.15%	0.71%
MACARONI	0.12%	0.57%
RUM	0.12%	0.57%
COCONUT MILK	0.11%	0.52%
INFANT FORMULA	0.11%	0.52%
BUN	0.11%	0.52%
CORN TORTILLA	0.11%	0.52%
CAKE	0.11%	0.52%
WSOUP	0.11%	0.52%
BAKING POWDER	0.11%	0.52%
SALAD DRESSING	0.11%	0.52%
CATSUP	0.11%	0.52%
SALT	0.11%	0.52%
MAYONNAISE	0.11%	0.52%
HOT SAUCE	0.11%	0.52%
RECADO	0.11%	0.52%
VINEGAR	0.11%	0.52%
CHOCOLATE DRINK	0.10%	0.48%
ICE CREAM	0.08%	0.38%
ICE	0.08%	0.38%
TEA	0.07%	0.33%
WINE	0.07%	0.33%
CHOCOLATE BAR	0.06%	0.29%
SWEETS	0.06%	0.29%
CANNED FISH (TUNA)	0.05%	0.24%
ORANGE	0.04%	0.19%
MANGO	0.04%	0.19%
BANANA	0.04%	0.19%
APPLE	0.04%	0.19%
WATERMELON	0.04%	0.19%
PLANTAIN	0.04%	0.19%
PINEAPPLE	0.04%	0.19%
LIMES	0.04%	0.19%
JAM/JELLY	0.04%	0.19%
RAISINS	0.03%	0.14%
PEANUTS	0.03%	0.14%
TOTAL	**21%**	**100%**

Source: Mimeo supplied to authors by the Belize Statistical Institute.

7. CONCLUDING COMMENTS AND POLICY RECOMMENDATIONS

Farming and livestock production employ approximately one-fifth of the employed labor force in Belize. The most important commercial products are the main export products of sugar, bananas, and citrus. Poultry and cattle, papaya, maize, and beans are also significant commercial products. Belize's agriculture sector is export-oriented, with four products accounting for about 60 percent official production value: oranges, poultry, sugarcane, and bananas. Of these, only poultry is not an export product. Agricultural export earnings are significant: for the sector itself but also for the economy as a whole. This note has sought to measure the impact of the government's agricultural trade and price interventions, first on incentives for producers, and second on Belize's consumers. The findings suggest that, contrary to the policies' objectives, producers of most export products are not strongly protected; in fact, if anything, the overall effect is to discourage investment and production, as farmers are receiving prices at the farm gate that are close to or lower than the farm-gate equivalent price at the border. Only two products, poultry and maize, both of

THE MOST IMPORTANT COMMERCIAL PRODUCTS ARE THE MAIN EXPORT PRODUCTS: SUGAR, BANANAS, AND CITRUS. POULTRY AND CATTLE, PAPAYA, MAIZE, AND BEANS ARE ALSO SIGNIFICANT.

which are mainly import-competing, rather than export-generating, can be said to be protected, and of these, poultry enjoys the strongest protection. The consumer food basket is mainly composed of imports and import-competing products, with export products having much less weight. The effect on consumers is therefore an increase in the cost of the food basket by one-third. This increases the cost of living, especially for poorer households for whom food has a greater weight in the consumption basket. On average, consumers' total cost of living index —or its equivalent, the household's real income loss— is approximately 6.8 percent higher due to a combination of tariffs, the revenue replacement duty, and the environmental tax on imported goods.

At the aggregate level, food import dependence in Belize is not high. Food imports account for only about 5 percent of total foreign exchange earnings (merchandise exports and tourism) and are therefore not a significant burden on the financial resources, allowing the country to cover a temporary increases in food import costs if necessary. Belize is a net exporter of food by a wide margin, mainly due to its resource wealth. Furthermore, given the size of the population and availability of land and water, Belize's agricultural sector has potential for expansion, especially given its relatively low yields that could be increased with investment.

The PSEs show that while the agricultural sector as a whole does receive government support, interventions have fluctuated between positive protection and dis-protection, as demonstrated by the recent negative NRPs observed in the case of some export crops. The average PSE as a proportion of the sector's gross revenue during 2011-2014 is 10.8 percent. From 2011-2014 the aggregate MPS is significantly smaller when the substantial protection received by the poultry sector is excluded.

These results show that in Belize, imports competing with domestic agriculture receive high effective tariffs compared to other countries in the hemisphere. These tariffs contribute to government revenues and protect domestic farm producers, but at a cost to domestic consumers, who suffer a real income loss as result of higher food prices. The findings also demonstrate that, as broadly recognized in international trade theory, significant protection for import-competing activities is an implicit tax on exports: by raising the costs of inputs (both imported and domestically-produced), they reduce the margins on, and therefore relative incentives for, the production of exports. In the long run, this trade strategy could reduce investment and innovations in the export-oriented part of Belize's agriculture sector, which is relatively large and whose growth potential is otherwise promising.

BELIZE IS A NET EXPORTER OF FOOD BY A WIDE MARGIN, MAINLY DUE TO ITS RESOURCE WEALTH.

IN BELIZE, IMPORTS COMPETING WITH DOMESTIC AGRICULTURE RECEIVE HIGH EFFECTIVE TARIFFS COMPARED TO OTHER COUNTRIES IN THE HEMISPHERE.

Although not a focus of this report, Belize's trade protection system is also burdened by a significant degree of discretion, with its tariffs and para-tariffs having wide ranges. Also, small domestic producers and potential exporters often face bottlenecks when trying to import raw materials.

The reforms to tariffs, licenses, and price controls recommended based on this analysis would, of course, present a challenge in political terms: they would reduce tax revenue, raise the prices of some goods, and have shor-term redistributive effects for certain producers. Nevertheless, the study highlights the benefits that would be gained in terms of living standards—and likely economic dynamism—in the longer term. An advantage of a low, uniform tariff rate on imports (i.e., without exemptions and quantitative restrictions, licensing, etc.) is that it would reduce the uncertainty of the cost of key imports and elevate returns. This would boost business activity in general, but more specifically it could help small export manufacturers grow and encourage other activities whose cost structures are biased towards imported goods.

THE REFORMS TO TARIFFS, LICENSES, AND PRICE CONTROLS RECOMMENDED WOULD PRESENT A CHALLENGE IN POLITICAL TERMS: THEY WOULD REDUCE TAX REVENUE, RAISE THE PRICES OF SOME GOODS, AND HAVE SHOR-TERM REDISTRIBUTIVE EFFECTS FOR CERTAIN PRODUCERS.

Other important policies that represent disincentives for agricultural producers in Belize are the use of price controls and import licenses and the activities of the Belize Marketing and Development Corporation. The country is one of only a few in Latin America and the OECD that maintain price controls on goods (most of which are tradable) despite their demonstrated distortive effect on markets. Import licensing is another anachronism that imposes a burden on the economy, particularly on small-scale manufacturers.

In addition to all these distortive policy measures, the government appears to be underinvesting in public services for the agricultural, forestry, and fisheries sector. Given fiscal constraints in the short and medium terms, the relatively low level of government expenditures relative to agricultural value added is unlikely to increase significantly. Available resources should be focused on a limited number of activities with significant social benefits: infrastructure and support services for sanitary and phytosanitary protection should be the priority.

REFERENCES

- **Central Bank of Belize**. *Monthly Economic Reports* (from several months).
- **Horton, J., and R. Norton (2010)**. *Agricultural Sector: Assessment and priorities for Public Investment and Policy*. Chapter 7 in Martin and Manzano, eds.
- **Josling, T., and S. Tangermann (1989)**. *Measuring Levels of Protection in Agriculture: A Survey of Approaches and Results;* in Alan Maunder and Alberto Valdés (ed.) *Agriculture and Governments in an Interdependent World: Proceedings of the Twentieth International Conference of Agricultural Economists*. Dartmouth Publishing Company for the IAAE.
- **Ministry of Agriculture and Fisheries (2003)**. *The National Food and Agriculture Policy (2002-2020)*. Government of Belize.
- **Peña, H., and M. Gurria (2010)**. *Agriculture Support Structure in Belize, 2010: Towards a more competitive agriculture.* Report for the Inter-American Development Bank.
- **Quirós, R. and Henry Benavides (1997)**. *Protección nominal del sector avícola de Belice frente a los compromisos en el marco del CARICOM y la OMC.* IICA/CIDAE. In addition, the study estimated the NRP for eggs at 42 percent.
- **Statistical Institute of Belize (2012)**. *Abstract of Statistics 2012*.
- **Valdés, A. and W. Foster (2013)**. *A Review of Agriculture in Belize.* Report for the Agricultural Sector Study for Belize, Inter-American Development.

ANNEX 1: GOODS WHICH REQUIRE LICENSE PRIOR TO IMPORTATION IN BELIZE

ANNEX 1 (PART 1)

Q.R. ITEM	H.S. '96 NUMBER	H.S. '02 NUMBER	DESCRIPTION OF PRODUCT
RICE	10.06	10.06	RICE
BEANS	708.10	708.10.20	BLACK-EYED PEAS, FRESH, SHELLED OR UNSHELLED
	708.209000	708.20.90	OTHER BEANS, SHELLED OR UNSHELLED, FRESH OR CHILLED
	710.20	710.20.00	LEGUMINOUS VEGETABLES (UNCOOKED OR COOKED BY STEAMING OR BOILING IN WATER), SHELLED OR UNSHELLED, FROZEN
	713.10300	713.10.30	BLACK-EYED PEAS, DRIED, SHELLED, WHETHER OR NOT SKINNED
	713.30	713.30	BEANS (VIGNA SPP; PHASEOLUS SPP): DRIED, SHELLED, WHETHER OR NOT SKINNED OR SPLIT
	1201.09000	1201.09.00	OTHER SOYA BEANS, WHETHER OR NOT BROKEN, NOT FOR SOWING
EGGS	407.001000	407.00.10	HATCHING EGGS FOR BREEDER FLOCK OF THE SPECIES GALLUS DOMESTICUS
	407.002000	407.00.20	HATCHING EGGS FOR BREEDER FLOCK OF THE SPECIES GALLUS DOMESTICUS
	407.003000	407.00.30	OTHER FRESH EGGS, OF THE SPECIES GALLUS DOMESTICUS
FLOUR *	1101.001000	1101.00.10	FLOUR OF DURUM WHEAT
	1102.200000	1102.20.00	MAIZE FLOUR
FRUITS AND VEGETABLES	701.900000	701.90.00	OTHER POTATOES, FRESH OR CHILLED
	702.000000	702.00.00	TOMATOES, FRESH OR CHILLED
	704.101000	704.10.10	CAULIFLOWERS, FRESH OR CHILLED
	704.901000	704.90.10	CABBAGES, FRESH OR CHILLED
	705.110000	705.11.00	CABBAGE LETTUCE (HEAD LETTUCE), FRESH OR CHILLED
	705.190000	705.19.00	OTHER LETTUCE, FRESH OR CHILLED
	706.101000	706.10.10	CARROTS, FRESH OR CHILLED
	707.001000	707.00.10	CUCUMBERS, FRESH OR CHILLED
	708.201000	708.20.10	STRING BEANS, SHELLED OR UNSHELLED, FRESH OR CHILLED
	709.300000	709.30.00	AUBERGINES (EGGPLANT), FRESH OR CHILLED

ANNEX 1 (PART 2): GOODS WHICH REQUIRE LICENSE PRIOR TO IMPORTATION IN BELIZE

Q.R. ITEM	H.S. '96 NUMBER	H.S. '02 NUMBER	DESCRIPTION OF PRODUCT
FRUITS AND VEGETABLES	709.601000	709.60.10	SWEET PEPPERS, FRESH OR CHILLED
	709.609000	709.60.90	OTHER PEPPERS, FRESH OR CHILLED
	709.901000	709.90.10	ZUCCHINI, FRESH OR CHILLED
	709.902000	709.90.20	OCHROES, FRESH OR CHILLED
	709.903000	709.90.30	PUMPKINS, FRESH OR CHILLED
	709.904000	709.90.40	SWEET CORN (ON THE COB), FRESH OR CHILLED
	710.100000	710.10.00	POTATOES (UNCOOKED/COOKED BY STEAMING/BOILING IN WATER), FROZEN
	710.40	710.40	SWEET CORN (UNCOOKED/COOKED BY STEAMING/BOILING IN WATER), FROZEN
	710.803000	710.80.30	CARROTS (UNCOOKED/COOKED BY STEAMING/BOILING IN WATER), FOR USE IN INDUSTRY, FROZEN
	710.804000	710.80.40	OTHER CARROTS (UNCOOKED/COOKED BY STEAMING/BOILING IN WATER), FROZEN
	710.808000	710.80.80	OTHER VEGETABLES (UNCOOKED/COOKED BY STEAMING/BOILING IN WATER), FOR USE IN INDUSTRY, FROZEN
	710.809000	710.80.90	OTHER VEGETABLES (UNCOOKED/COOKED BY STEAMING/BOILING IN WATER), FROZEN
	7.14	7.14	MANIOC, SALEP, JERUSALEM ARTICHOKES, SWEET POTATOES, AND SIMILAR ROOTS AND TUBERS WITH HIGH STARCH OR INULIN CONTENT, FRESH, CHILLED, FROZEN OR DRIED, WHETHER OR NOT SLICED OR IN THE FORM OF PELLETS; SAGO PITH (EXCLUDING ARROWROOT OF HS NO. 0714.901000
	801.10	801.10.00	COCONUTS, FRESH OR DRIED , WHETHER OR NOT SHELLED OR PEELED
	8.03	8.03	BANANAS, INCLUDING PLANTAINS, FRESH OR DRIED
	804.300000	804.30.00	PINEAPPLES, FRESH
	804.400000	804.40.00	AVOCADOS, FRESH
	804.501000	804.50.10	GUAVAS, FRESH
	804.502000	804.50.20	MANGOES, FRESH
	804.503000	804.50.30	MANGOSTEENS, FRESH
	807.110000	807.11.00	WATERMELONS, FRESH
	807.191000	807.19.10	CANTALOUPES, FRESH
	807.192000	807.19.20	MUSKMELONS, FRESH
	807.199000	807.19.90	OTHER MELONS, FRESH
	807.200000	807.20.00	PAPAWS (PAPAYAS), FRESH

ANNEX 1 (PART 3): GOODS WHICH REQUIRE LICENSE PRIOR TO IMPORTATION IN BELIZE

Q.R. ITEM	H.S. '96 NUMBER	H.S. '02 NUMBER	DESCRIPTION OF PRODUCT
FRUITS AND VEGETABLES	810.901000	810.90.10	SAPODILLAS, FRESH
	810.902000	810.90.20	GOLDEN APPLES, FRESH
	810.903000	810.90.30	PASSION FRUIT, FRESH
	810.904000	810.90.40	SOURSOP, FRESH
	810.905000	810.90.50	BREADFRUIT, FRESH
	810.906000	810.90.60	CARAMBOLAS, FRESH
	810.908000	810.90.80	CHRISTOPHINE (CHOYOTE), FRESH
	811.901000	811.90.10	PINEAPPLES, UNCOOKED OR COOKED BY STEAMING OR BOILING IN WATER, FROZEN, WHETHER OR NOT CONTAINING ADDED SUGAR OR OTHER SWEETENING MATTER
MEATS AND MEAT PREPARA-TIONS	2.01		MEAT OF BOVINE ANIMALS, FRESH OR CHILLED MEAT OF BOVINE ANIMALS, FROZEN
	2.02		MEAT OF SWINE, FRESH, CHILLED OR FROZEN
	2.03		EDIBLE OFFAL OF BOVINE ANIMALS, SWINE, SHEEP AND GOATS, FRESH, CHILLED OR FROZEN
	2.06		HAMS, SHOULDERS AND CUTS THEREOF, WITH BONE IN
	210.111000	210.11.10	BACON
	210.121000	210.12.10	BELLIES (STREAKY) AND CUTS THEREOF: SALTED, IN BRINE, DRIED OR SMOKED
	210.120000	210.12.00	OTHER CHICKEN SAUSAGES (EXCEPT CANNED)
	1601.002000	1601.00.20	SALAMI SAUSAGES (EXCEPT CANNED)
	1601.003000	1601.00.30	OTHER SAUSAGES (EXCEPT CANNED)
	1601.009000	1601.00.90	OTHER PREPARED OR PRESERVED MEAT, MEAT OFFAL OR BLOOD, EXCEPT GOODS CLASSIFIED UNDER HS NO. 1602.102000; 1602.491000 (CANNED ONLY); AND 1602.501000
	16.02	16.02	CANE SUGAR, EXCLUDING ICING SUGAR OF HS NO. 1701.991 MOLASSES RESULTING FROM THE EXTRACTION OR REFINING OF SUGAR WATERS, INCLUDING MINERAL WATERS AERATED WATER, CONTAINING ADDED SUGAR OR OTHER SWEETENING MATTER OR FLAVOURED, AND OTHER NON-ALCOHOLIC BEVERAGES BEER MADE FROM MALT.

ANNEX 1 (PART 4): GOODS WHICH REQUIRE LICENSE PRIOR TO IMPORTATION IN BELIZE

Q.R. ITEM	H.S. '96 NUMBER	H.S. '02 NUMBER	DESCRIPTION OF PRODUCT
MOLASSES AND SUGAR (EXCLUDING ICING SUGAR)	17.01 17.03	17.01	FRUIT AND VEGETABLE JUICES AND MIXTURES THEREOF (EXCLUDING CITRUS JUICES AND PREPARATION FOR INFANT USE, PUT UP FOR RETAIL SALE)
BEER AND BEVERAGES AS CLASSIFIED UNDER H.S. 22.02 AND 22.03 RESPECTIVELY*	22.02 22.03	22.02	MAIZE (CORN)
FRUIT AND VEGETABLE JUICES **S.I. NO 94 OF 2005**	20.09		FRUIT & VEGETABLE JUICES & MIXTURES THEREOF (EXCLUDING CITRUS JUICES AND PREPARATION FOR INFANT USE, PUT UP FOR RETAIL SALE
MAIZE	10.05		MAIZE (CORN)
MILK	4.01		MILK AND CREAM, NOT CONCENTRATED NOR CONTAINING ADDED SUGAR OR OTHER SWEETENING MATTER
POULTRY: LIVE OR FROZEN (EXCLUDING BABY CHICKS)	1.05		LIVE POULTRY, THAT IS TO SAY, FOWLS OF THE SPECIES FRESH, CHILLED GUINEA FOWLS (EXCLUDING BABY CHICKS)
	207.10	207.10	MEAT AND EDIBLE OFFAL, OF FOWLS OF THE SPECIES GALLUS DOMESTICUS (HEADING NO. 01.05), FRESH, CHILLED OR FROZEN
	207.20	207.20	MEAT AND EDIBLE OFFAL, OF TURKEYS, FRESH, CHILLED, OR FROZEN
CITRUS AND BEVERAGES CONTAINING CITRUS PRODUCTS	8.05	8.05	CITRUS FRUIT, FRESH OR DRIED
	2007.911000	2007.91.10	CITRUS FRUIT PUREE AND FRUIT PASTE, NOT IN RETAIL PACKAGES
	2007.919000	2007.91.90	OTHER CITRUS FRUIT COOKED PREPARATIONS, WHETHER OR NOT CONTAINING ADDED SUGAR OR OTHER SWEETENING MATTER
	2008.30 2009.10 2009.20 2009.30 2009.902000	2008.30.00 2009.10.00 2009.20.00 2009.30.00 2009.90.20	CITRUS FRUIT, OTHERWISE PREPARED OR PRESERVED, WHETHER OR NOT CONTAINING ADDED SUGAR OR OTHER SWEETENING MATTER OR SPIRIT, NOT ELSEWHERE SPECIFIED OR INCLUDED. ORANGE JUICE, UNFERMENTED AND NOT CONTAINING ADDED SPIRIT, WHETHER OR NOT CONTAINING ADDED SUGAR OR OTHER SWEETENING MATTER. GRAPEFRUIT JUICE, UNFERMENTED AND NOT CONTAINING ADDED SPIRIT, WHETHER OR NOT CONTAINING ADDED SUGAR OR OTHER SWEETENING MATTER. JUICE OF ANY OTHER SINGLE CITRUS FRUIT, UNFERMENTED AND NOT CONTAINING ADDED SPIRIT, WHETHER OR NOT CONTAINING ADDED SUGAR OR OTHER SWEETENING MATTER. OTHER MIXTURES OF GRAPEFRUIT AND ORANGE JUICES.

ANNEX 1 (PART 5): GOODS WHICH REQUIRE LICENSE PRIOR TO IMPORTATION IN BELIZE

Q.R. ITEM	H.S. '96 NUMBER	H.S. '02 NUMBER	DESCRIPTION OF PRODUCT
JAMS, JELLIES	2007.992000	2007.99.20	PINEAPPLE BASED JAMS AND JELLIES
AND PEPPER SAUCE	2007.993000	2007.99.30	GUAVA JAMS AND JELLIES
JAMS ONLY	2007.999000	2007.99.90	CITRUS-BASED MARMALADES AND CITRUS-BASED
	2103.901000	2103.90.10	PEPPER SAUCE
ANIMAL FEED	2309.903000	2309.90.30	PREPARED COMPLETE POULTRY FEED
CLASSIFIED	2309.904000	2309.90.40	PREPARED COMPLETE CATTLE FEED. PREPARED COMPLETE PIG FEED
UNDER H.S.23.09	2309.905000	2309.90.50	OTHER PREPARED COMPLETE ANIMAL FEEDS
	2309.906000	2309.90.60	(EXCEPT BIRD, CAT, OR DOG FOOD)
PEANUTS	1202.100000	1202.10.00	PEANUTS, NOT ROASTED OR OTHERWISE COOKED, IN SHELL
	1202.209000	1202.20.90	OTHER PEANUTS, NOT ROASTED OR OTHERWISE COOKED, SHELLED
FUELS	2710.13	27.10.13.00	MOTOR SPIRIT: GASOLINE
(PETROLEUM	2710.20	2710.20.00	KEROSENE
PRODUCTS)	2710.31	2710.31.00	DIESEL
GASES **S.I. NO 94 OF 2005**	27 11.00000	2711	LIQUEFIED PETROLEUM GASES (BUTANES, PROPANE AND MIXTURES THEREOF, FOR HOUSEHOLD OR SIMILAR USE)
TOILET PAPER **S.I. NO 94 OF 2005**	4818.1	4818.10.00	TOILET PAPER
YACHTS AND OTHER VESSELS **S.I. NO 94 OF 2005**	89.03	89.03	YACHTS AND OTHER VESSELS FOR PLEASURE OR SPORTS (EXCLUDING ROWING BOATS AND CANOES)
SOAPS	3401.112	–	OTHER SOAP (FOR TOILET USE), IN THE FORM OF

ANNEX 2: THE ALGEBRA OF EFFECTIVE PROTECTION

In this annex, we quickly review how to calculate effective rates of protection, incorporating possible output and input taxes and subsidies. The ERP is defined as the percent by which an industry's value added deviates from what it would otherwise be in the absence of protection (both formal applied tariffs and NTBs). This definition includes both protection on the product side that might increase gross revenues, as well protection on the input side that might increase costs. The following algebraic presentation is designed to give a final, practical equation for calculating ERPs from observed cost-share data and applied tariffs (and, where available, *ad valorem* equivalents of NTBs).

The observed value added in industry **g, VA_g**, is defined as gross revenues less the costs of tradable inputs; this net is therefore the fund available for payments of the non-tradable inputs (labor and capital) used in the industry. Gross revenues in industry **g, R_g**, are simply the quantity produced of the good, $\mathbf{y_g}$, sold at its domestic price, which is the unprotected price, $\mathbf{p_g}$, (referred to as the border price) adjusted by the *ad valorem* equivalent of domestic protection, $\mathbf{(1+t_g)}$, and any net subsidies per unit of output, $\mathbf{(1+s_g)}$; that is, value added at exchange prices might be less to the degree subsidies are positive (a negative subsidy would be a tax). The tariff could be the "formal" rate as stated in the tariff schedules, which is different from the nominal tariff rate (or nominal rate of protection), usually defined as the *ad valorem* equivalent of tariffs and non-tariff barriers expressed in relation to the CIF price of imports. (In addition, the two tariffs differ if, as in some countries, the formal rate is applied to FOB prices.) The tariff adjustment factors $\mathbf{(1+t_i)}$ includes the formal applied tariffs on output and inputs and the *ad valorem* tariff equivalents due to NTBs.

The costs of tradable inputs are similarly obtained by adding up the individual costs, $\mathbf{C_{gi}}$, of inputs ***i*** used in the industry ***g*** $\mathbf{(i \epsilon Ig)}$; the cost of a specific tradable input, ***i***, is its quantity used in the industry, $\mathbf{x_{gi}}$, purchased at its unprotected price, $\mathbf{p_i}$, adjusted by an appropriate *ad valorem* protection $\mathbf{(1+t_i)}$.

That is:

$$VA_g = p_g(1+t_g)(1+s_g)y_g - \sum_{i \epsilon Ig} p_i(1+t_i)x_{gi} = R_g - \sum_{i \epsilon Ig} C_{gi}$$

which can be rewritten in terms of tradable input costs as shares of gross revenue, $\mathbf{a_{gi}}$:

$$VA_g = p_g(1+t_g)(1+s_g)y_g \left(1 - \sum_{i \epsilon Ig} \frac{p_i(1+t_i)x_{gi}}{p_g(1+t_g)(1+s_g)y_g}\right) = R_g\left(1 - \sum_{i \epsilon Ig} \frac{C_{gi}}{R_g}\right) = R_g\left(1 - \sum_{i \epsilon Ig} a_{gi}\right)$$

The hypothetical value added for the industry —the value added which would prevail without any protections and subsidies whatsoever on the revenue or cost sides— can be at least approximated under the assumption that the industry technology is of the fixed-coefficient type (that is, the average input use in physical units is unresponsive to marginal relative price changes). In that case, the cost share of gross revenues that would otherwise prevail without protection for an individual input, a_{gi}^H, can be written in terms of the observed cost share, a_{gi}, and the ad valorem protection rates:

$$a_{gi} = \frac{p_i x_{gi}(1+t_i)}{p_g y_g (1+t_g)(1+s_g)} = a_{gi}^H \frac{(1+t_i)}{(1+t_g)(1+s_g)} <> a_{gi}^H = a_{gi}\left(\frac{(1+t_g)(1+s_g)}{1+t_i}\right)$$

And so, from observed costs as shares of gross revenues, a_{gi}, and *ad valorem* protection rates —usually observed tariff levels— one can estimate the hypothetical cost shares that would prevail without protection. Using the notation defined above, and using VA^H as the hypothetical value added without protection and subsidies, the ERP is then estimated as the percent difference of the observed value added with and without the tariffs, taxes and subsidies:

$$ERP_g = \frac{VA_g}{VA_g^H} - 1 = \frac{\left(t_g + (1+t_g)s_g\right) - \sum a_{gi}^H t_i}{\left(1 - \sum a_{gi}^H\right)}$$

ANNEX 3: GENERAL SERVICES SUPPORT ESTIMATE (GSSE) FOR BELIZE, 2011-2013

ANNEX 3 (PART 1)

Units: BZ	2011	2012	2013
GENERAL SERVICES SUPPORT ESTIMATE (GSSE)	**15,483,247.00**	**26,287,122.00**	**14,191,653.00**
I. RESEARCH AND DEVELOPMENT	**4,776,613.00**	**6,558,992.00**	**2,602,766.00**
J. AGRICULTURAL SCHOOLS	**1,065,636.00**	**1,406,339.00**	**80,000.00**
BELIZE HIGH SCHOOL OF AGRICULTURE	598,112.00	572,861.00	–
BELIZE RURAL HIGH SCHOOL	433,699.00	403,271.00	–
AGRICULTURE & NATURAL RESOURCE INSTITUTE	33,825.00	408,057.00	–
IDB COUNTERPART FUNDING (AGRICULTURE EDUCATION EXTENSION SERVICES)	–	22,150.00	80,000.00
K. INSPECTION SERVICES	**2,248,545.00**	**2,500,000.00**	**1,500,000.00**
CATTLE SWEEP PROJECT (TESTING FOR DISEASE)	2,248,545.00	2,500,000.00	1,500,000.00
L. INFRASTRUCTURE	**462,845.00**	**2,543,879.00**	**1,661,333.00**
RURAL WATER & SANITATION PROJECT- SIF	462,845.00	426,403.00	498,714.00
EU- RURAL ELECTRIFICATION COUNTERPART	–	1,750,000.00	138,206.00
RURAL ELECTRIFICATION	–	49,072.00	24,413.00
SOLID WASTE MANAGEMENT PROJECT	–	318,404.00	1,000,000.00
M. MARKETING AND PROMOTION	**–**	**30,470.00**	**51,100.00**
AGRO MARKETING DEVELOPMENT	–	30,470.00	51,100.00
N. PUBLIC STOCKHOLDING	**–**	**–**	**–**
O. MISCELLANEOUS	**6,929,608**	**13,247,442**	**8,296,454**
AGRICULTURE DIVERSIFICATION	97,869.00	150,000.00	35,501.00
RURAL FINANCE PROJECT (IFAD COUNTERPART)		250,000.00	250,000.00
RURAL COMMUNITY DEVELOPMENT	739,534.00	728,639.00	737,897.00
AGRICULTURE SERVICES PROGRAMME	1,697,677.00	1,500,000.00	168,229.00
AGRICULTURAL SERVICES PROGRAM COUNTERPART FUNDS		400,000.00	80,000.00

ANNEX 3 (PART 2)

Units: BZ	2011	2012	2013
AGRICULTURAL NATIONAL EXTENSION PROGRAM	2,275,007.00	2,906,873.00	2,524,687.00
FOOD SECURITY ALBA	1,918,280.00	1,500,000.00	216,424.00
SPARES- FARM EQUIPMENT (AGRICULTURE PROGRAMME CENTRAL FARM ADMINISTRATION)	398.00	20,000.00	12,675.00
ANIMAL FEED (AGRICULTURE PROGRAMME CENTRAL FARM ADMINISTRATION)	418.00	9,800.00	9,800.00
ANIMAL PASTURE (AGRICULTURE PROGRAMME CENTRAL FARM ADMINISTRATION)	2,490.00	4,500.00	4,500.00
SPARES- FARM EQUIPMENT (AGRICULTURE PROGRAMME COROZAL DISTRICT ADMINISTRATION)	398.00	3,800.00	–
ANIMAL PASTURE (AGRICULTURE PROGRAMME COROZAL DISTRICT ADMINISTRATION)	418.00	1,448.00	–
SPARES- FARM EQUIPMENT (AGRICULTURE PROGRAMME ORANGE WALK DISTRICT ADMINISTRATION)	240.00	1,837.00	2,492.00
ANIMAL FEED (AGRICULTURE PROGRAMME ORANGE WALK DISTRICT ADMINISTRATION)	23,173.00	22,000.00	21,220.00
ANIMAL PASTURE (AGRICULTURE PROGRAMME ORANGE WALK DISTRICT ADMINISTRATION)	4,358.00	5,400.00	5,400.00
SPARES- FARM EQUIPMENT (AGRICULTURE PROGRAMME STANN CREEK DISTRICT ADMINISTRATION)	4,971.00	12,000.00	14,149.00
ANIMAL FEED (AGRICULTURE PROGRAMME STANN CREEK DISTRICT ADMINISTRATION)	12,905.00	13,395.00	8,298.00
SPARES- FARM EQUIPMENT (AGRICULTURE PROGRAMME TOLEDO DISTRICT ADMINISTRATION)	5,862.00	8,500.00	10,500.00
ANIMAL FEED (AGRICULTURE PROGRAMME TOLEDO DISTRICT ADMINISTRATION)	7,088.00	7,000.00	3,625.00
ANIMAL PASTURE (AGRICULTURE PROGRAMME TOLEDO DISTRICT ADMINISTRATION)	–	2,250.00	1,094.00
EXPANDING SMALL SCALE FISH FARMING FOR RURAL COMMUNITIES	–	150,000.00	97,550.00
SOLID WASTE MANAGEMENT PROJECT - OPERATIONS	–	3,900,000.00	1,000,000.00
RURAL FINANCE PROGRAM (IFAD)	–	1,500,000.00	1,042,200.00
EU - BELIZE RURAL DEVELOPMENT PJ.	–	–	2,000,000.00
AGRO-PROCESSING DEVELOPMENT	138,522.00	150,000.00	50,213.00

ANNEX 4: RECENT PSE ESTIMATES FOR SELECTED COUNTRIES IN THE LAC REGION

ANNEX 4

COUNTRY	PSE%	YEAR
JAMAICA	33.26	2012
EL SALVADOR	25.32	2010
COLOMBIA	19.29	2009
BOLIVIA	18.17	2009
HONDURAS	16.46	2009
COSTA RICA	16.12	2012
NICARAGUA	15.00	2010
MEXICO	12.30	2013
ECUADOR	7.04	2012
GUATEMALA	6.98	2010
DOMINICAN R.	5.35	2012
BRAZIL	4.61	2012
PERU	3.70	2013
CHILE	2.72	2013
SURINAME	-3.13	2011
ARGENTINA	-43.27	2011

Source: Inter-American Development Bank Agrimonitor.

ANNEX 5: WEIGHTS ASSOCIATED WITH ALL GOODS AND SERVICES IN THE CONSUMER PRICE INDEX OF BELIZE, UPDATED 2011

ANNEX 5 (PART 1)

ITEM #	ITEM	WEIGHT
1	RICE	0.0131
2	FLOUR	0.0097
3	CORN FLAKES	0.0097
4	WHITE BREAD	0.0058
5	CORN TORTILLA	0.0011
6	CAKE	0.0011
7	BUN	0.0011
8	MACARONI	0.0012
9	GROUND BEEF	0.0026
10	BEEF STEAK	0.0026
11	PORK CHOPS	0.0022
12	PIG TAIL	0.0022
13	CHICKEN, WHOLE FROZEN	0.0106
14	CHICKEN, PARTS FROZEN	0.0106
15	SAUSAGE	0.0019
16	HAM	0.0019
17	VIENNA SAUSAGE	0.0019
18	LUNCHEON MEATS	0.0019
19	CORNED BEEF	0.0019
20	SNAPPER	0.0035
21	SHRIMP	0.0017
22	CANNED FISH (TUNA)	0.0005
23	NATURAL MILK	0.0021
24	CONDENSED MILK	0.0030
25	EVAPORATED MILK	0.0030
26	POWDERED MILK	0.0030
27	CREAMER	0.0030
28	CHEESE	0.0045
29	EGGS	0.0043
30	BUTTER/MARGARINE	0.0021
31	COOKING OIL	0.0044
32	LARD/SHORTENING	0.0044
33	LIMES	0.0004
34	ORANGE	0.0004
35	BANANA	0.0004
36	APPLE	0.0004
37	PINEAPPLE	0.0004
38	MANGO	0.0004
39	WATERMELON	0.0004
40	PLANTAIN	0.0004
41	RAISINS	0.0003
42	PEANUTS	0.0003
43	LETTUCE	0.0015
44	CABBAGE	0.0015
45	TOMATOS	0.0015
46	GREEN CORN	0.0015

ANNEX 5 (PART 2)

ITEM #	ITEM	WEIGHT
47	CARROTS	0.0015
48	ONIONS	0.0015
49	SWEET PEPPER	0.0015
50	IRISH POTATO	0.0017
51	BLACK BEANS	0.0020
52	RED KIDNEY BEANS	0.0020
53	BAKED BEANS, CANNED	0.0020
54	MIXED VEGETABLES, CANNED	0.0020
55	POTATO CHIPS	0.0020
56	SUGAR	0.0048
57	JAM/JELLY	0.0004
58	CHOCOLATE BAR	0.0006
59	SWEETS	0.0006
60	ICE CREAM	0.0008
61	ICE	0.0008
62	MAYONNAISE	0.0011
63	SALAD DRESSING	0.0011
64	CATSUP	0.0011
65	HOT SAUCE	0.0011
66	BAKING POWDER	0.0011
67	VINEGAR	0.0011
68	SALT	0.0011
69	COCONUT MILK	0.0011
70	RECADO	0.0011
71	SOUP	0.0011
72	INFANT FORMULA	0.0011
73	COFFEE	0.0036
74	TEA	0.0007
75	CHOCOLATE DRINK	0.0010
76	PURIFIED WATER	0.0042
77	SOFT DRINKS	0.0042
78	ENERGY DRINK	0.0042
79	POWDERED DRINKS	0.0042
80	FRUIT JUICES AND SQUASHES	0.0041
81	RUM	0.0012
82	WINE	0.0007
83	BEER	0.0131
84	IMPORTED CIGARETTES	0.0008
85	LOCAL CIGARETTES	0.0008

WWW.IADB.ORG