ICTSD Project on Tropical Products

How Would a Trade Deal on Sugar Affect Exporting and Importing Countries?

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and Sustainable Development

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LIST OF ABBREVIATIONS AND ACRONYMS

ACP	African, Caribbean and Pacific
AUD	Australian dollar
AMS	Aggregate Measure of Support
AVE	*Ad valorem* equivalent
Bill.	Billion
CAD	Canadian dollar
CCC	Commodity Credit Corporation, United States Department of Agriculture
CAFTA	Central American Free Trade Agreement
CBI	Caribbean Basin Initiative
CEC	Commission of European Communities (European Commission)
c.i.f.	cost, insurance and freight
CMO	Common Market Organisation
EBA	Everything But Arms
EPA	Economic Partnership Agreements
ERS	Economic Research Service, United States Department of Agriculture
EU	European Union
FAO	Food and Agricultural Organisation of the United Nations
FAPRI	Food and Agricultural Policy Research Institute
FAS	Foreign Agricultural Service, United States Department of Agriculture
f.o.b.	free on board
GDP	Gross domestic product
Kg	Kilogram
LDC	Least developed country
MFN	Most favoured nation
Mill.	Million
MT	Metric ton
NAFTA	North American Free Trade Agreement
OECD	Organisation for Economic Co-operation and Development
OTDS	Overall Trade Distorting Support
PIK	Payment-in-Kind
PSD	Production, Supply and Utilisation Database, United States Department of Agriculture
RM	Ringgit (Malaysian currency)
Rp	Rupiah (Indonesian currency)
SSG	Special Agricultural Safeguard
SSM	Special Safeguard Mechanism
Thou	Thousand
TRQ	Tariff Rate Quota
URAA	Uruguay Round Agreement on Agriculture
US	United States
USD	US dollar
USDA	United States Department of Agriculture
WTO	World Trade Organisation

FOREWORD

The importance of tropical products for developing countries is undeniable. Their significance has been recognised in an array of studies, fora and organisations. As indicated in a document by the Common Fund for Basic Products (2004): "The livelihoods of hundreds of millions of the world's poorest people in developing countries, and in particularly in the least developed countries, are heavily dependent on commodities. Commodities form the backbone of the economies and account for the bulk of the export earnings of these countries. The development of commodities is thus vitally important in the global struggle to alleviate poverty." However, there are few studies estimating the importance of tropical and other basic products using economic, social and foreign trade indicators. Nonetheless, the participation of such products in exports from developing countries is significant: the fifteen main tropical products account for 37 per cent of developing countries' incoming foreign currency from agricultural exports. This proportion reaches 62 per cent for low income developing countries.

Exports from developing countries, of tropical products in particular, continue to face a variety of specific challenges, including tariff and non-tariff barriers, developed country subsidies, technical barriers to trade (such as sanitary and phytosanitary requirements), tariff escalation, preference erosion, price volatility and the long-term trend towards low and declining prices for agricultural commodities. The reform of the global agriculture trading system currently being negotiated in the context of the Doha Round – with the objective of establishing a "fair and market-oriented trading system" – could play in addressing some of these challenges.

The recent history of sugar trade has been characterised by the development of massive subsidies to sugar producers in various OECD countries, particularly the EU and US; relatively protected markets albeit with preferential access for some producers; and the gradual introduction of internal policy reforms in many developed countries with the aim of moving towards a more market oriented trading regime. More recently, growing attention to trade in biofuels, and particularly ethanol, has drawn increased attention to this dimension of sugar production and trade, as well as heightened controversy.

During the Doha Round, developing country groups from Latin America and from the African, Caribbean and Pacific Group (ACP) have found themselves at loggerheads over whether trade liberalisation for sugar should be accelerated and deepened – as favoured by the proponents of tropical product liberalisation – or slowed down and cushioned – as favoured by the ACP group, concerned about the impact on preference erosion. The negotiations over tropical products and preference erosion appeared to be close to resolution in July 2008, when seemingly related compromises were made on bananas and sugar by the main negotiating coalitions and individual WTO Members.

However, the subsequent stalemate in the talks has left the question of sugar – and the closely related issues of tropical product liberalisation and preference erosion – in limbo. Continued uncertainty over the treatment to be accorded to other products on the tropical product and preference erosion lists (especially bananas) has continued to cast a shadow of doubt over the implications for sugar trade.

However, it is possible to assess how the outline deal could affect individual exporting countries and import markets. Similarly, proposed treatment for 'tropical products', 'preference erosion products' and 'sensitive products' allow for simulations to be conducted on how sugar could be treated under different scenarios.

Ongoing internal EU market reforms are also likely to continue to have a decisive impact on the sugar trade regime as well as on the outcome of international negotiations in this area. This study therefore takes into consideration, amongst other things, the relevance of the most recent policy reforms, their impact on trade flows, and the likely implications of recent market trends.

This study seeks to provide policy-makers, negotiators and other stakeholders with a clear and accurate assessment of the likely implications of a trade deal on sugar along the lines of that being discussed in the WTO's Doha Round, as well as in bilateral and regional negotiations. The study examines the implications for specific exporting and importing countries, taking into consideration the various preferential access arrangements that currently exist, recent historical trends in sugar trade in different countries and geographical regions, and the internal market reforms being undertaken in importing regions such as the EU. As such, it seeks to provide an impartial, evidence-based input into the intricate deliberations over how trade policy in this area can best support sustainable development goals.

Ricardo Meléndez-Ortiz
Chief Executive

EXECUTIVE SUMMARY

In December 2008, the former chairperson of the agriculture negotiations of the World Trade Organization (WTO), Ambassador Crawford Falconer, presented the latest version of the draft modalities. The aim is to increase market access, reduce domestic support and eliminate export subsidies in agriculture. There is interest on the implications of the proposed modalities on agricultural trade in general and on specific product markets such as sugar in particular. This paper explores the implications on sugar markets in terms of the reductions in tariffs, domestic support and export subsidies as well as the treatment of sugar as a sensitive, preference erosion and tropical product. The preference erosion resulting from the EU sugar reforms is also examined. An international sugar model is used to run two scenarios analysing first the impact of the cuts in bound tariffs on major sugar exporting and importing WTO Member countries and then the impact of treating sugar as a tropical product. The results are compared to a baseline scenario.

In summary, the paper shows the following:

- A significant amount of sugar trade occurs under preferential trade agreements, which encourages production of sugar in non-competitive preference-receiving countries and at the expense of competitive low-cost sugar-producing countries.

- Natural sugar exporters like Australia, Brazil and Guatemala have little or no trade restrictions and domestic support. The sugar industry in high-cost sugar-producing countries like the EU, the US and Japan is highly protected.

- Trade barriers result in higher domestic sugar prices, and hence higher domestic production and lower sugar consumption. With higher domestic supply and restricted imports, the world sugar price is lower than it would be otherwise.

- The EU Common Market Organisation (CMO) sugar reforms have a significant impact on countries that are signatories to the African, Pacific and Caribbean (ACP) Sugar Protocol. The extent of the impact depends on how dependent the countries are on the EU sugar market and how important sugar is to their economies. The countries most adversely affected are higher-cost producers not classified as Least Developed Countries (LDCs). These include Fiji, Guyana and Mauritius.

- The effects of the EU CMO sugar reforms on LDCs are expected to be less pronounced as regional markets may be more attractive and the full access by these countries to the EU sugar market under the Everything But Arms Initiative (EBA) occurs after the implementation of the reforms. With full liberalisation in 2009, LDCs may be able to offset losses on their quota exports. Additionally, there are several competitive LDCs like Sudan that are expected to significantly increase their EU market share.

- The Falconer draft text proposes large cuts in bound tariffs, lower domestic support, expansions in tariff rate quotas (TRQs) and elimination of export subsidies. Developing countries have lower cuts and longer implementation periods relative to developed countries.

- According to the tiered formula, less than half of the Member Countries studied in this paper would be required to cut their tariffs. For the rest of the Members, the applied tariffs are well below the reduced bound rates thus no reductions apply. The EU, Japan and the US would reduce their tariffs by 70 per cent while for most developing countries, the reduction would be 36 per cent.[1]

- In countries where tariffs are cut, imports increase and consequently, the world sugar price increases by an average of 1 per cent when compared to the baseline. Countries where no tariff cuts occur respond to the higher world price by reducing their imports. Overall the impact on trade is small, about 0.7 per cent on average relative to the baseline.

- Less than 50 per cent of the Member countries covered in this paper have TRQ commitments. Since many of the Member countries with TRQ commitments import above their commitment levels, only a few countries would be required to expand their TRQs under the modalities.

- If these countries declare sugar as a sensitive product and therefore reduce the standard tariff cut by a specified amount, larger expansions in TRQ would be required.

- Depending on the size of the deviation from the tiered reduction formula in final bound tariffs chosen by individual countries, the required TRQ expansion would be no less than 3 per cent, 3.5 per cent or 4 per cent of domestic consumption. For example, in the case of the EU, this expansion would range between 0.5 million and 0.7 million metric tons, which would mean larger cuts in production and prices.

- At expansions of 4 per cent of consumption, Thailand, Malaysia and South Africa would face the largest expansions (over 100 per cent) while the lowest expansions would be in China, Venezuela and the US. Overall, the TRQ expansion would represent only 3 per cent of world trade.

- Two options are proposed if sugar is treated as a tropical product: reduction to zero if tariffs are less than or equal to 25 per cent and by 85 per cent if the tariff is over 25 per cent (sugar cannot be declared a sensitive product under this option); or reduction to zero if the tariff is less than 10 per cent and by 70 per cent if the tariff is equal to or greater than 10 per cent.

- Under the first option, the EU, Japan and the US would reduce their bound tariff rates by 85 per cent while Canada's tariff would be dropped to zero. There would be no change in Australia because its tariffs are already zero.

- The reduction in tariffs results in an increase in net imports, by an average of 9 per cent in Canada and the EU and by 5 per cent in Japan relative to the baseline. As a result, the world sugar price increases by 1.2 per cent on average. Consequently, exporting countries increase their supply of sugar while importing countries reduce their demand for sugar.

- To slow the liberalisation for products with long-standing preference, the draft text proposes two options: delaying the start of the tariff cuts by 10 years or increasing the implementation period to 13 years for the preference-granting Member. This would allow more time for preference-receiving countries to adjust to the eroding preferences. In terms of ACP countries, this would include countries like Mauritius and Guyana who would be able to reduce costs by investing in restructuring and modernizing their sugar industry.

- Under the proposed modalities, Amber Box Support, which is the most trade distorting, is targeted to be significantly reduced. *De minimis*, Blue Box and product-specific support are subject to reductions resulting in limits. The EU, with Overall Trade Distorting Support (OTDS) above 60 billion USD, would be subject to an 80 per cent reduction, while Japan and the US, with OTDS between 10 and 60 billion USD, would be faced with a 70 per cent reduction. All three countries would be required to implement an initial cut of 33.3 per cent at the start of the implementation period.

- In terms of reductions in Total Aggregate Measure of Support (AMS), the EU would face a 70 per cent reduction while the US would be required to reduce its Total AMS by 60 per cent. Since Japan's AMS is over 40 per cent of its total value of agricultural production, it would need to undertake the 60 per cent reduction plus an additional 10 per cent cut. These three countries also face an initial cut of 25 per cent. All other developed countries have Total AMS under 15 billion USD which would require a 45 per cent reduction with no initial cut and implemented in 6 equal instalments. All developing countries fall in the third tier with reductions by 30 per cent to be implemented equally over 8 years.

- Based on the latest notifications for Total AMS levels, the limits on Final Total AMS would be binding for only 5 countries. The EU and the US would have to reduce their Total AMS levels by 12 billion USD and 10 billion USD, respectively, to stay within the new lower Final Bund Total AMS.

- After *de minimis* adjustments, the product-specific AMS limits for the following countries would be as follows: 5.9 billion Euros for the EU, 55 billion Yen for Japan, 1.1 billion USD for the US, 0.8 billion Rand for South Africa, 39 million USD for Brazil and 16 million AUD for Australia. For Australia and Brazil, the product-specific AMS was below the *de minimis* levels in the base period (1995-2000).

- Few countries would be affected by the elimination of export subsidies (by 2013 for developed countries and by 2016 for developing countries) as a limited number of countries use export subsidies for sugar. One such country is the EU, which has an export subsidy quantity limit of 1.374 million metric tons and a value limit of 513.9 million Euros. The impact of the elimination of the export subsidies in the EU has been mitigated by the implementation of the EU CMO sugar reforms which reduced sugar production drastically. However, to meet its commitment to eliminate export subsidies while fulfilling its commitment to preferential sugar imports from developing countries, the EU may be compelled to further reduce domestic sugar prices and production.

- However, there are provisions which allow developing countries to continue providing subsidies such as those for internal transport and freight charges on export shipments, as is the case in India.

The study concludes that:

- Cutting bound tariffs rather than applied tariffs reduces the impact of the tariff reductions. This is because the cuts on bound tariffs only impact countries where the applied rates are large enough to require reductions in their applied tariffs to the lower bound levels.

- Countries that are affected by the proposed cuts and that experience significant tariff reductions include the EU, Japan and the US.

- The increased market access results in a higher world price for sugar as countries lower their trade barriers, thus reducing their domestic sugar price, decreasing domestic production and increasing domestic consumption. This leads to higher imports and allows competitive sugar-exporting countries like Brazil to increase their market share. However, the higher world price also reduces sugar demand in sugar-importing countries responding to the more expensive sugar.

- The overall impact of the cuts on bound rates are not large as not all countries are required to reduce their tariff barriers, either because they already have low applied tariffs or because of their classification as LDCs or recently acceded Members.

- Increased market access is also achieved through an expansion in TRQ. This expansion occurs only in countries that are at or below their TRQ commitments. Just as in the case of cuts in bound tariffs, only a limited number of countries are affected by the proposed TRQ expansions.

- If sugar is treated as a sensitive product, which means lower tariff cuts, even higher TRQ expansions are required.

- With the provisions targeting accelerated liberalisation if sugar is treated as a tropical product, more sugar imports occur as countries further reduce their tariffs.

- However, the preference erosion that occurs with trade liberalisation adversely affects preference-receiving countries that are not competitive in the world market but it benefits low-cost producers. The extent of the negative impact will be determined by how dependent the preference-receiving country is on the preferential access as well as how important sugar is to its economy.

- The EU, Japan and the US are impacted by reductions in domestic support as their sugar markets are highly protected. Reducing support lowers domestic prices and production and increases consumption. With increased imports, world prices increase and low-cost producers respond by increasing production and exports.

- The elimination of export subsidies also reduces sugar production and exports, thus increasing the world price.

- Thus, the lowering of trade barriers, reducing domestic support and removing export subsidies results in lower domestic production in countries providing support. Since these countries tend to be high-cost producers, the result is a diversion of trade to low-cost more efficient producers.

- Despite the fact that consumers will face a higher world price for sugar, they benefit from the reduction in the cost of supporting the domestic sugar industry.

- Because of provisions for special products, developing countries may still be able to continue trade-distorting policies.

INTRODUCTION

Sugar markets are characterised by policy interventions that protect sugar producers and keep domestic sugar prices at levels well above the world price. This is particularly true in developed countries, most noticeably in the EU, Japan and the US. However, these countries also offer market access through preferential trade agreements to developing countries. In fact, most of the sugar imports of countries like the EU and US occur through preferential trade agreements. Under these agreements, exporting countries are offered much higher sugar prices than those in the world market. Because preferential agreements are viewed as beneficial by many of the sugar-producing countries in the developing region, these countries have voiced concerns about the impact that trade liberalisation of sugar would have on their economies. Additionally, the recent EU Common Market Organisation (CMO) sugar reforms are expected to continue to have an effect on developing and least developed countries with preferential access to EU sugar markets.

The implementation of the Uruguay Round Agreement on Agriculture (URAA), which included progressive reforms aimed at liberalising world agricultural markets, began in 1995. This was followed by a second round of negotiations, the Doha Round, which commenced in 2001. Agreements under the Doha Round continue to be renegotiated and new agreements added. The Agriculture Agreement provides new rules and commitments for market access, domestic support and export subsidies. The agreement allows for support by Member countries but only through policies that are less distorting to trade. The most recent World Trade Organisation (WTO) draft modalities were proposed in July 2008 and revised in December 2008 by Ambassador Crawford Falconer, former chairperson of the agriculture negotiations. This proposal includes formulas for cutting tariffs, trade distorting subsidies and other provisions. The

modalities will impact sugar, especially in terms of its treatment as a sensitive product, a tropical product or a preference erosion product. Treating sugar as a tropical product would accelerate trade liberalisation for sugar. On the other hand, treating sugar as a preference erosion product would slow down trade liberalisation, an option favoured by some developing countries. With increased market access, higher-cost preference-receiving countries like some of the African, Caribbean and Pacific (ACP) countries, which receive preferential access under the EU's Sugar Protocol, would lose market share in the EU to lower-cost Latin American countries like Brazil.

This study examines the implications of the December 2008 draft modalities proposal for specific sugar exporting and importing countries, as well as prospective bilateral and regional agreements. Specifically, it looks at market access, domestic support, and export competition. On market access, the implementation of the general tariff cut formula is analysed as well as the treatment of sugar as a sensitive product, preference erosion product or tropical product. On domestic support, it examines the likely implications of reductions in Overall Trade Distorting Support (OTDS), Total Aggregate Measures of Support (AMS) as well as the effect of proposed product-specific support disciplines. It assesses the implications for trade in various producer and consumer countries in the context of recent historical trends, and provides analysis of trade outcomes under various possible scenarios. It also examines the evolution of internal EU market reforms and their implications for international trade. The objective of this study is to provide policymakers, negotiators and other stakeholders with a clear and accurate assessment of the likely implications of a trade deal on sugar along the lines of that being discussed in the WTO's Doha Round, as well as bilateral and regional negotiations.

1. OVERVIEW OF THE GLOBAL SUGAR MARKET: TRENDS AND POLICIES

1.1. Trends in the World Sugar Market

Figure 1 presents the world sugar production, consumption and net trade (exports minus imports) for the historical period 1998/99-2008/09 as well as ten-year projections (up to 2018/19) from the 2009 FAPRI US and World Agricultural Outlook.[2] As seen in Figure 1, the world sugar market has experienced ebbs and flows in the past decade.[3] Although sugar production is subject to annual fluctuations because of weather and market conditions, it has increased by an annual average of 3 per cent between 1998/99 and 2008/09. The fluctuation in world sugar prices, which have increased by as much as 51 per cent and fallen by as much as 26 per cent in just the last five years, is also an indication of how volatile the sugar market can be.[4]

Figure 1. World Sugar Production, Consumption, Net Trade and Price
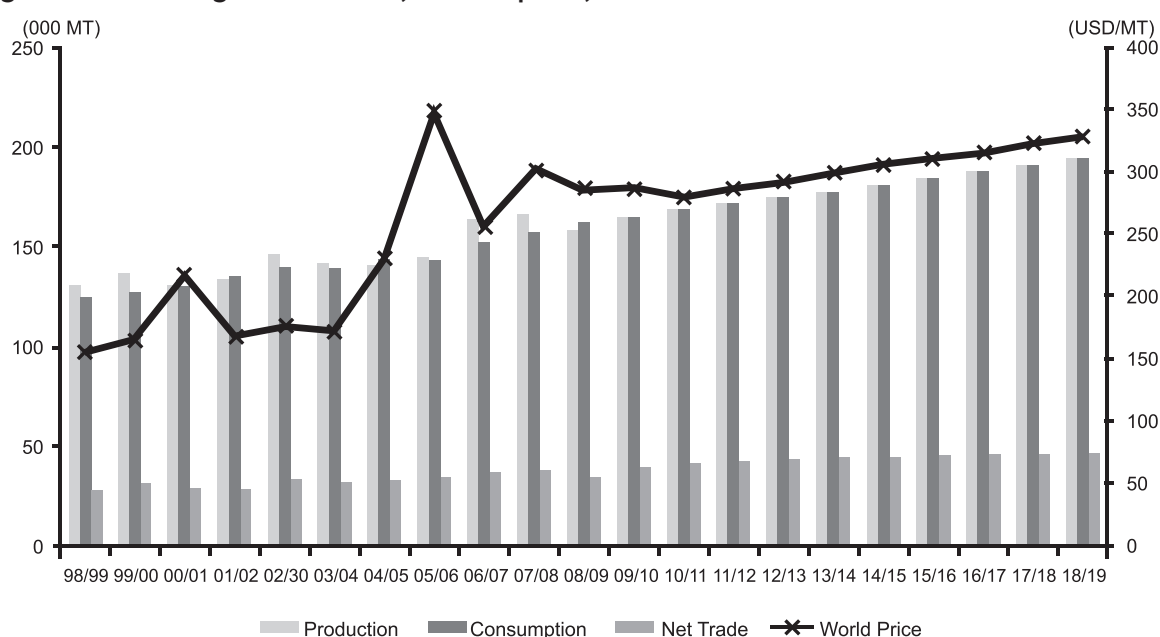
Source: FAPRI (2009)

Demand for sugar is fairly inelastic, thus world sugar consumption has increased steadily with an average annual increase of 2.5 per cent. Net trade increased by 3.4 per cent per year on average over the same period. According to the FAPRI (2009) projections, sugar production and consumption are projected to increase by over 20 per cent over the next 10 years. The world sugar price is expected to increase by 15 per cent because of increased import demand in countries like the EU and India as well as diversion of more sugarcane to ethanol and away from sugar, particularly in Brazil.

Australia, Brazil, Guatemala, South Africa and Thailand are the major sugar-exporting countries. Combined, their net exports make up 93 per cent of world trade in 2008/09. Brazil is the largest exporter of sugar and for most of the past decade it has been the largest producer (surpassing India). Brazil alone accounts for 60 per cent of world trade. Russia, the EU and Asia are the major sugar importing regions. In Asia, China, Indonesia, Japan, Malaysia, and South Korea together currently account for about 18 per cent of world trade while Russia, as a single country, accounts for 8.5 per cent. In 2006/07, after the implementation of the CMO sugar reforms, the EU switched from a net exporter to a net importer of sugar, with its net imports currently accounting for 7 per cent of world trade.

Figure 2 shows the net trade for major sugar exporters for 2008/09 and 2018/19 expressed in thousand metric tons (MT). Projections indicate

that Brazil will continue to be the major sugar-exporting country, accounting for over 66 per cent of world trade by the end of the decade. Most major exporters will continue to increase sugar exports with the exception of South Africa, whose net exports decline over the projection period because of increased domestic demand for sugar.

Figure 2. Net Exports for Major Sugar Exporters

(000 MT)
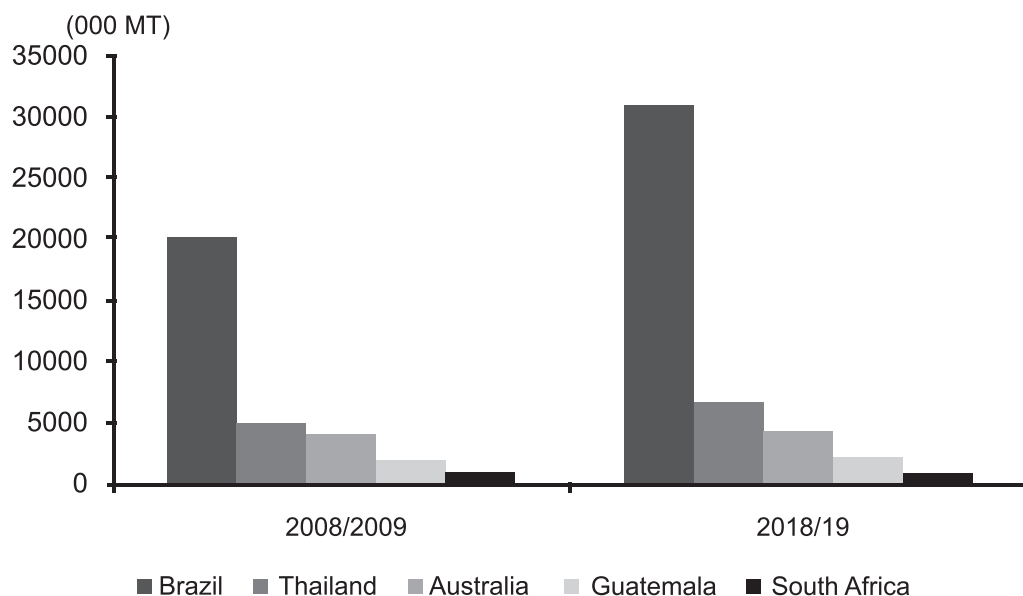
Source: FAPRI (2009)

Generally, sugar consumption has increased in most countries because of increased demand from both household and industry. Figure 3 presents the net imports of major sugar-importing countries for 2008/09 and 2018/19. Net imports are projected to increase except in the case of Japan, Russia and the US. In Japan, this is a result of the continuing decline in consumption as consumers move away from sugar and toward sugar substitutes. In Russia and the US, the growth in production is expected to exceed that in consumption resulting in lower net imports.

Figure 3. Net Imports for Major Sugar-Importing Countries

(000 MT)
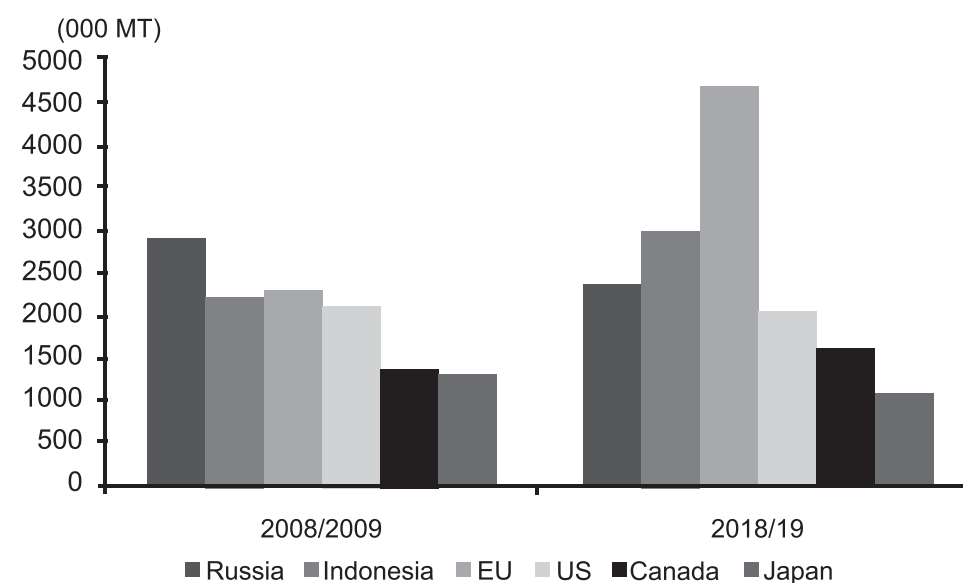
Source: FAPRI (2009)

1.2 Trends in ACP Countries

Among the ACP countries that are signatories to the EU/ACP Sugar Protocol, Mauritius and Swaziland are the largest sugar producers, followed by Kenya, Zimbabwe and Guyana.[5] Table 1 presents sugar production for the 18 Protocol ACP countries from 1998/99 to 2008/09. Sugar production in countries like Swaziland, Tanzania, Mozambique and Zambia has followed an increasing trend while in countries like Mauritius, Zimbabwe and Fiji, production has tended to trend downward. The countries with the lowest production have also experience declining production trends with St. Kitts and Nevis abandoning production all together after the implementation of the EU CMO sugar reforms.

ACP countries rely heavily on the EU market for their sugar exports. Over 40 percent of their sugar production is exported to the EU.

Mauritius held the largest import quota under the Protocol at 0.5 million metric tons (out of a total quota of 1.4 million metric tons). Fiji, Guyana, Jamaica and Swaziland followed with quotas totalling 0.6 million metric tons. Figure 4 compares total sugar exports of the 18 ACP countries between 1999/00 and 2007/08. Significant increases in exports can be seen in Malawi, Mauritius and Mozambique while sugar exports decreased in Fiji and Jamaica. Low sugar-producing countries have also experienced declines in sugar exports between 1999/00 and 2007/08. As Table 2 shows, many of the countries export over 70 per cent of their sugar to the EU. Only a few countries have less than 50 percent of their sugar exports destined for the EU. The countries with the lowest dependence on the EU market for their sugar exports are the Democratic Republic of Congo, Zambia and Zimbabwe.

Table 1. Sugar Production in ACP Countries

Country	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
					(Thousand Metric Tons)						
Swaziland	560	550	545	501	583	628	598	653	634	625	630
Mauritius	670	396	603	684	552	550	580	550	510	534	560
Kenya	449	471	377	494	448	517	489	476	476	520	540
Zimbabwe	570	583	530	544	580	508	525	445	446	452	411
Guyana	350	325	260	324	320	322	270	270	305	315	315
Tanzania	120	125	135	175	190	230	255	265	270	290	290
Zambia	200	197	200	221	230	244	250	250	233	275	290
Mozambique	260	155	165	145	200	240	260	250	245	285	265
Malawi	222	225	209	260	260	260	215	220	280	272	250
Fiji	270	392	372	300	340	315	330	330	305	250	240
Jamaica	205	216	205	175	152	184	124	147	164	160	170
Cote d'Ivoire	137	179	177	175	160	110	140	145	145	143	145
Belize	125	118	102	110	112	125	105	111	98	90	90
DR Congo	75	73	72	72	70	75	75	75	75	75	75
Barbados	45	58	52	45	36	33	40	35	41	40	38
Madagascar	87	77	70	40	30	30	26	20	16	25	25
St. Kitts and Nevis	24	18	21	21	22	15	15	0	0	0	0
Trinidad and Tobago	64	115	89	104	68	45	35	25	33	0	0

Source: USDA PSD Online Database.

Figure 4. Total Sugar Exports of ACP Countries
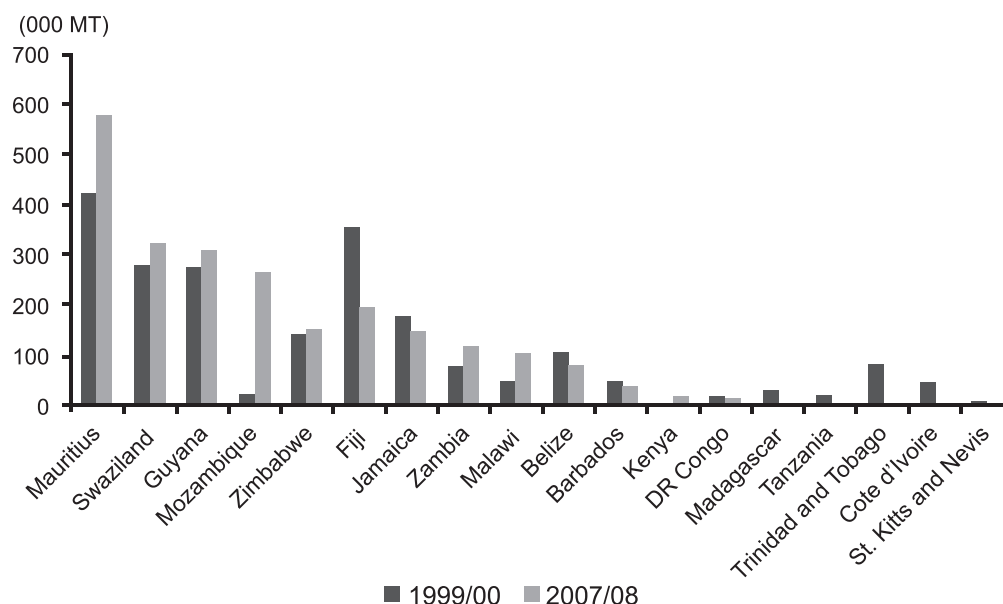
Source: USDA PSD Online Database

Table 2. Share of Sugar Exports to the EU as Per Cent of Total Exports by ACP Country

Less than 30%	Between 30% - 60%	Between 60 - 90%	Between 90% - 100%
Dem. Republic of Congo (15%)	Swaziland (42%)	Fiji (72%)	Mauritius (97%)
Zambia (24%)	Malawi (51%)	Madagascar (73%)	Barbados (100%)
Zimbabwe (27%)	Belize (52%)	Guyana (74%)	Jamaica (100%)
	Cote d'Ivoire (52%)	Trinidad & Tobago (89%)	Kenya (100%)
			St. Kitts & Nevis (100%)
			Tanzania (100%)

Source: Garside et al. (2005)

1.3 Sugar Policies in Select Countries

Sugar markets are highly distorted with developed countries like the EU, US and Japan providing considerable support to their domestic sugar industries and imposing high trade barriers. These policy interventions artificially increase their domestic sugar prices significantly above the world price and increase their domestic production of sugar despite relatively high costs of production. The interventions come at the expense of competitive sugar producers who face a lower world sugar price because of the increased supply. Even developing countries have some form of production, consumption or trade policy which distorts their domestic sugar markets (Mitchell, 2004; OECD, 2003). In many of these countries, domestic prices are also maintained at a higher level than the world price through domestic support and trade restrictions.

Additionally, a significant amount of trade in sugar occurs under preferential trade agreements. These preferential trade agreements are intended to improve market access and integrate the developing countries and least-developed countries (LDCs) into the global market. The agreements are also

intended to act as substitutes of developed countries' direct financial assistance benefiting developing and least developed countries. However, opponents of these agreements argue that the agreements result in inefficient allocation of resources in the developing countries, particularly in high-cost producers. Also, the greatest access is usually provided for low value-added primary products. This section outlines the domestic and trade sugar policies in major sugar exporters and importers. The information is obtained mainly from the United States Department of Agriculture Foreign Agricultural Service Attaché Reports (USDA FAS 2008) for individual countries unless indicated otherwise.

Because of its low cost of production, Brazil is a major sugar producer and exporter. Although the government previously imposed sugar price supports and restrictions on exports, these interventions were removed in the 1990s. Currently Brazil has incentives and mandates related to the production of ethanol, which impacts sugar production as sugarcane is used in the production of both sugar and ethanol.

Thailand is also a low-cost producer of sugar and is currently the second largest sugar exporter after Brazil. Thailand supports sugarcane prices by setting a support price and has production quotas and tax incentives designed to expand exports. The government also subsidizes credit to millers and exporters (Mitchell 2004). Thailand has a tariff rate quota (TRQ) for sugar under WTO of 13,760 MT with an in-quota rate of 65 per cent and out-of-quota rate of 94 per cent.

Australia, another major exporter, abolished import tariffs in 1997 and does not provide direct support to domestic sugarcane producers and millers. However, all raw sugar is acquired and sold by an industry-owned body (Queensland Sugar Limited), which markets 95 per cent of exports. In 2002, because of severe financial troubles in the sugar industry, the Australian government announced a Sugar Industry Reform Program.

Under the program, 444 million AUD of assistance was allocated to the sugar industry over a multiple-year period to provide income support, interest rate subsidies and financing for efficiency programs.

Guatemala is a low-cost producer of sugar and exports 75 per cent of its sugar production. There is no direct control of the domestic sugar price by the government. The Guatemalan Sugar Association determines the sugarcane price and allocates Guatemala's U.S. sugar quota to the different sugar mills. Guatemala has no quotas for sugar and the import tariff is assessed at 20 per cent. Since Guatemala is a natural exporter, there are no sugar imports entering the country.

The sugar industry in Mexico is regulated through the setting of a reference price for sugarcane and imposing high tariffs for sugar imports (360 USD per ton for raw sugar), which has resulted in domestic prices well above the world price. Mexico is a part of the North American Free Trade Agreement (NAFTA), which allows for the free trade of sugar between Canada, Mexico and the United States. Free liberalization occurred for sugar trade between Mexico and the US in 2008. Mexico still manages 13 out of the 27 sugar mills it expropriated in 2001 because of large debts that the mills were unable to pay. In 2007, Mexico announced its National Sugar Program aimed at increasing sugarcane production through increased investments. Mexico also has a re-export program through which companies can import sugar at lower world prices, process the sugar and export the final product.

India's sugar industry is heavily regulated and politically driven, which has resulted in dramatic fluctuations in its sugarcane production. This has led India to switch between being a net exporter and net importer of sugar every few years. The Indian government sets a minimum support price for sugarcane, which is further augmented by 20-25 per cent by several state governments. The government requires sugar mills to pay sugarcane farmers the state-advised minimum

price irrespective of the market price of sugar. India imposes a 60 per cent import tariff plus countervailing tariff of 950 Rupees per MT. The countervailing duty is in lieu of local taxes and fees imposed on domestic sugar. Sugar mills are allowed to import raw sugar duty free against a future export commitment under an advance license scheme. However, they must re-export an equal amount of refined sugar for every ton of raw sugar they import within a specified period. Sugar imports are also subject to various non-tariff barriers such as the levy sugar obligation and a market quota release system. In addition to other exemptions, India periodically announces export incentives in the form of transport subsidies for sugar exports when there is a surplus in the domestic market. The sugar mills are required to supply 10 per cent of their production to the government as 'levy sugar' at below-market prices. This sugar is distributed at subsidised rates by the government to low-income consumers through the Public Distribution System. In order to maintain price stability, the government administers the sale of all sugar through periodic quotas.

The EU sugar policy includes production quotas, support prices, import controls and export subsidies to support high sugar prices above the world price.[6] Farmers receive a guaranteed minimum price. Pre-reform, the EU used an intervention price to guarantee the minimum price of sugar such that if prices fell below the intervention price, the government would buy the sugar and store it until it was sold domestically or exported. Post reform, in place of the intervention system, a private storage system acts as a safety net if the market price of sugar falls below the intervention price and the intervention price is replaced by a reference price. The EU imposes an import duty of 339 Euros per MT for raw sugar for refining and 419 Euros per MT for refined sugar. Additional import duties may be imposed when necessary to prevent imbalances in the EU sugar market. The EU also provides export subsidies to exporters in the amount of the difference between the EU price and the world price. However,

the majority of sugar imported into the EU occurs under preferential trade agreements including duty-free import quotas offered to India and the ACP countries under the ACP-EU Partnership Agreement (1.3 million MT in white sugar equivalent); special import arrangements provided to Balkan countries participating in the EU's Stabilization and Association process (0.4 million MT); an annual MFN tariff quota (CXL quota) for the supply of raw cane sugar to Community refineries from Brazil, Cuba and other third countries (0.13 million MT); Special Preferential Imports from India and ACP countries (0.2 million tons); and the Everything But Arms (EBA).[7]

In the US, which is a net importer of sugar, the government provides loan rates for sugarcane and sugar beet as effective floor prices. Farmers can obtain loans from the United States Department of Agriculture (USDA) Commodity Credit Corporation (CCC) by pledging their commodity as collateral. If the farmer is unable to repay the loan with interest within a specified period of time because the market price is below the level necessary to repay the loan plus interest, he or she can default on the loan as payment of the loan and interest. In order to operate the program at no cost, the government keeps the domestic sugar price above the world price to avoid forfeitures under the loan program. This is done by restricting imports through high import tariffs and TRQs. Marketing allotments on domestically produced sugar are imposed when imports are less than 1.532 million tons. The allotments can be adjusted to avoid forfeitures and to balance the market. A sugar Payment-in-Kind (PIK) program is used to reduce CCC inventories in exchange for farmers not harvesting planted acreage. Its WTO commitments require the US to have a TRQ of 1.139 million tons of sugar (raw value). The raw cane sugar TRQ is allocated to 40 quota-holding countries. Under NAFTA, the US gradually liberalised sugar trade with Mexico with full liberalisation in 2008. In addition to the US Tariff Import Quota and NAFTA, the US also provides market access through several preferential trade agreements including the

Caribbean Basin Initiative (CBI), Central American Free Trade Agreement (CAFTA) and the African Growth and Opportunity Act.

Japan is among the top five sugar importers. It relies heavily on imports to meet domestic demand. Domestic production is highly subsidised and the government sets guaranteed minimum prices for sugarcane and sugar beet. The government also sets a raw sugar price for refiners to allow them to pay the guaranteed minimum price to producers and it provides a subsidy to cover the difference between the domestic price and the target price. The government purchases sugar at the set price and then resells the sugar to the refiners at a lower price. This subsidy is partly financed by a surcharge on imported sugar. Domestic and trade policies in Japan have resulted in domestic prices that are significantly higher than the world price. Unlike the EU and US, Japan does not have extensive trade agreements, and it has relied primarily on multinational negotiation on trade. However, it has recently entered into a number of Economic Partnership Agreements (EPAs) including ones with Mexico and Singapore.

China is also a net importer of sugar. A large portion of the imports come from Cuba, with which China has a long-term trade agreement. The government provides strong price incentives to producers, exercises import controls and intervenes in the domestic market through intervention stocks to maintain high internal domestic prices. Although a guidance purchase price is provided to sugar refiners for sugarcane and sugar beet prices, the market determines the price of sugar. Under its WTO commitments, China has a sugar TRQ of 1.945 million MT with an in-quota rate of 15 per cent and out-of-quota rate of 50 per cent. However, China has continued to import below its TRQ using different methods of administering the TRQ to influence the quota fill rate (Mitchell 2004).

1.4 EU Sugar Reform and Its Impacts on Preference-Receiving Countries

Brief description of the EU CMO sugar reform

The EU CMO sugar reforms, which began in July 2006, resulted in a major shift in both EU and world sugar markets. The reforms include a 4-year restructuring period. The first marketing year lasted fifteen months (July 2006 through September 2007), followed by 3 marketing years (October-September). The restructuring period is scheduled to end in 2009/10. As part of the reforms, the guaranteed minimum sugar price is reduced by a total of 36 per cent (20 per cent in the first year, 25 per cent in the second year, 30 per cent in the third year and 36 percent in the final year of restructuring). Farmers are compensated at an average of 64.2 per cent of the price cut as part of the Single Farm Payment linked to environmental and land management standards (USDA FAS 2007).

The A and B sugar production quotas are now merged into a single quota and payments are provided to encourage renunciation of quota by sugar producers unable to compete at the lower sugar price. The payments, financed by a levy on quota holders and lasting 3 years, were initially set at 730 Euros per metric ton in the first two years, 625 Euros per metric ton in the third year and 520 Euros per metric ton in the fourth year. However, not enough quota was renounced in the first 2 years of the restructuring period to meet the targeted reduction of 6 million MT by 2009/10, which prompted the European Commission to propose an added incentive. The percentage of the aid provided to growers and machinery contractors was fixed at 10 per cent, but growers who renounce quota get an additional payment, which is to be paid retroactively so as to avoid penalising those who had already given up their quotas. Beet growers could also apply directly for aid from the restructuring fund, up to a certain limit. As an additional incentive, companies that renounce a certain amount of their quota in 2008/09 will be exempted from paying the restructuring levy on the part of

their quota which was subject to preventive withdrawal in the 2007/2008 marketing year.[8] By the end of the restructuring period, the Commission will make more compulsory quota cuts if insufficient quota has been renounced. These cuts will vary depending on each Member States' quota renunciation under the restructuring scheme.

There were added incentives provided to countries giving up 50 per cent or more of their quota. A 1.1 million MT quota was also available to countries that had been producing over-

ACP and EBA agreements

In 2001, the Everything But Arms Regulation (EBA) liberalised tariffs for all EU imports from LDCs[9], except for armaments, sugar, rice and bananas. The liberalisation of the three latter products was set for July 1, 2009. The LDCs initially had a small TRQ for sugar exports to the EU, though with a guaranteed price of 497 Euros per MT. This will also be lowered post reform, and at the new lower price, the ability of the LDCs to export will be greatly reduced.

The EBA programme provides free access to EU sugar markets by 50 LDCs through a process of progressive tariff elimination starting in 2006 and ending in 2009 with full liberalisation. Import duties were reduced by 20 percent in July 2006, by 50 percent in July 2007, and by 80 percent in July 2008 and to zero in July 2009. Starting in 2001, the EU opened EBA zero-duty tariff quotas for raw cane sugar for refining, initially amounting to 74,185 MT white sugar equivalent and increasing by 15 percent in each subsequent marketing year. Although the EBA initiative does not provide any price guarantee for EBA sugar imports, LDCs benefit from the higher EU domestic price for sugar. Under the sugar reforms the LDCs continue to receive unlimited zero duty access to EU sugar markets from 2009/10, but the minimum raw sugar price they receive declines from 497 Euros per MT to Euro 303 per MT.

quota C-sugar prior to the reforms. The quota was available with a payment corresponding to the amount of the aid per metric ton in the first year.

Under the reforms, the intervention system is scheduled to be abolished at the end of the restructuring period and the intervention price replaced by a reference price. If the market price falls below the reference price, a private storage system will be introduced as a safety net. The sugar reforms maintain the EU's trade policy in terms of import duties.

The EU-ACP Sugar Protocol guarantees 18 ACP countries (and India) access to the EU sugar market through a raw sugar duty-free quota of 1.4 million MT of raw sugar and at a guaranteed intervention sugar price.[10] This enables ACP countries to receive the higher EU price for sugar. The Special Preferential Sugar agreement also allows further duty-free exports of raw sugar to cover specific needs of certain sugar refineries.[11] This is, however, a non-binding commitment by the EU. Because of incompatibility with the CMO reforms and WTO rules on discriminatory access, the EU rescinded the EU-ACP Sugar Protocol in 2007, with a commitment to include sugar in the EPAs.[12] The transition from EU-ACP Sugar Protocol to EPAs would occur between 2009 and 2015 with EU budgetary assistance to ACP countries to adjust to the reduction in the EU price. The price cut will not be effective until 2008/09 giving ACP producers more time to transition. However, the EU has a safeguard clause that allows the EU to suspend duty-free EBA imports for ACP non-LDCs if they exceed 3.5 million MT.[13]

Further, the new sugar reforms introduce a measure to 'review' EBA sugar exports to the EU if they increase by more than 25 per cent year on year. A review would enable the EU to impose restrictions or even withdraw the EBA import concessions for sugar. However, because of the political sensitivity

surrounding the restriction of access to EU markets by LDCs, the Commission is careful in its language on this issue. In practice, this review measure means that LDCs may not be able to export a substantial amount of sugar to the EU. Additionally, rules of origin require 80 per cent of products fully originating in the LDC.

The EU export subsidies are limited by the EU's WTO commitments to 1.2735 million MT in volume and EUR 499.1 million in value. Before the implementation of the EU CMO sugar reforms, the EU exported with subsidy an amount of sugar equal to its preferential imports of about 1.6 million metric tons. However, the EU did not count these subsidised exports against the WTO export subsidy commitments. This changed with the 2004 WTO ruling, which determined that EU sugar exported against its preferential imports were incompatible with WTO rules.

Impact of EU sugar reform on ACP and least developed countries

Impact on ACP countries

The extent of the impact of the EU sugar reforms on ACP countries differs depending on the classification of the ACP countries, i.e., whether they are part of both ACP and LDCs or whether they are only ACP but are not LDCs (ACP-only). Additionally the impact is also determined by the dependency of these countries on EU CMO sugar. All countries experience a loss in export earnings because of the reduction in the guaranteed minimum price they receive from the EU (from 497 Euros per ton in 2006/07 to 303 Euros per ton from 2009/10 onward). Chaplin and Matthews (2005) estimate that this loss could add up to 250 million Euros, which they expect is likely to be underestimated because of a number of factors including not accounting for uncompetitive countries which will exit the market. The European Commission (CEC 2003) estimates that a 38 per cent drop in the EU sugar price could result in a reduction of 350 million Euros in ACP revenues. According to an FAS 2004 report, estimated loss of revenue resulting from the price reduction could range between 50 USD per ton in the Cote d'Ivoire to almost 200 USD per ton for Malawi.

LDCs may be able to offset losses on their current quota exports to the EU by increasing their exports with the 2009 full liberalization under the EBA Initiative. The impact of the CMO reform would depend on the size of the exports to the EU relative to other countries and the extent to which they benefit from preference agreements with other (non-EU) countries (Chaplin and Matthews 2005). Low-cost, competitive producers for which the EU is not the only and/or significant market, such as Malawi and Zambia, would benefit from increasing their exports to countries to which the EU exported pre-reform. The increased world price resulting from a reduction in EU supply in the world market, if substantially higher, could also be beneficial to low-cost sugar producers who could divert trade to other countries. However, if countries export sugar only with the help of preference agreements, then a reduction in their exports to EU may not be offset by increased exports to other preference-granting countries even with an increase in the world price.

ACP-only countries which rely heavily on the EU market for their sugar exports would be adversely affected by the EU sugar reforms.[14] High-cost producers like Fiji, whose long-term preferential access to the EU has led to high cost structures, would not be able to compete at the lower EU price (Larson and Borrell, 2001). Countries like Guyana and Mauritius are investing in restructuring and modernizing their sugar facilities to reduce costs in order to compete at the lower EU price (Gudoshnikov 2009). However, other countries, like Barbados and Trinidad and Tobago, may cease production of sugar for export to the EU (CEC 2003). In fact, as a result of the reforms, St. Kitts and Nevis

has abandoned sugar production. This may provide an opportunity for lower-cost ACP-only countries (for example, Swaziland and Zimbabwe) to benefit from the reduction or elimination of exports, particularly if investments are made to restructure their sugar industry and lower their costs.

On the other hand, in high-cost ACP-only countries, where only sugarcane can be grown because of climatic constraints and where there is less opportunity for diversification, (e.g., Jamaica, Barbados and St. Kitts and Nevis), the impact is expected to be very significant. In these countries, sugar exports are mainly destined to the EU market and therefore their export earnings would be greatly diminished by the CMO reforms. This would mean that they would likely stop production of sugar. This would prove detrimental if their economies rely mostly on sugar production and if they are unable to diversify to other sectors (e.g.,

tourism in Barbados; oil and gas in Trinidad and Tobago) (Chaplin and Matthews 2005).

ACP countries have argued that despite the benefit of preferential access in terms of increased export earnings and investments in the sugar industry by some countries, the EU sugar reforms would have a devastating effect on their economies because of their dependence on EU sugar. Consequently, the European Commission has proposed, as part of the reforms, to offer financial assistance covering a wide range of social, economic and environmental actions and aimed at helping ACP countries adapt to the changes brought about by the reforms. This financial support, totalling Euros 1.244 billion, is provided through the Accompanying Measures for Sugar Protocol countries and is allocated from 2007 to 2013. The support will be distributed based on the National Adaptation Strategies developed by each country.

Impact on least developed countries

Since the sugar reforms were implemented before the full liberalization of the EBA imports, the impact of the EU sugar reforms is likely to be less pronounced in LDCs compared to ACP countries.[15] The lower EU price would result in reduced export earnings in the future relative to pre-reform levels and thus would impact the level of investments in their sugar industries.[16] But since the EU sugar price remains above the world price, preferential duty-free access to the EU market would still benefit LDCs especially low-cost net exporters such as Ethiopia, Mozambique and Sudan. Many of these countries are looking for ways to reduce costs and expand production. For example, Sudan is projected to double its production by 2015 (Gudoshnikov 2009). Thus, the reforms would encourage efficient producers to increase production to benefit from the increased access to the EU markets. The price reduction may discourage less-efficient producers from producing sugar for export to the EU especially countries that are net importers of sugar such as Democratic Republic of Congo, Laos and Nepal. These higher-cost producers may also consolidate production to achieve efficiency.

How large the sugar exports of LDCs will be to the EU will depend greatly on whether these countries are able to expand their production capabilities and compete at the lower EU price and whether the EU will exercise its safeguard clause and review of EBA exports to restrict a substantial amount of imports. According to van Berkum, Roza and van Tongeren (2005), even without the sugar reforms, the additional imports from LDCs total only 384 thousand tons and decline to 211,000 under the reforms.[17] Many of these countries face infrastructure costs, lack of investment, and political instability. High transportation costs are also a hindrance for land-locked countries such as Zambia and Malawi, which are other-wise low-cost producers. Furthermore, rules governing trade under EBA, such as rules of origin, increase trade costs and prevent LDCs from taking advantage of the access to EU markets (USDA FAS 2003).

The level of EBA imports will also be determined by a provision (called swaps) in the EBA Initiative under which LDCs would be able to import sugar at world prices and then export locally produced sugar to

the EU. Countries like Cambodia and Laos may choose to export their domestic sugar production to the EU and satisfy their domestic market by importing sugar from large exporting countries in close proximity like Thailand (Chaplin and Matthews, 2006). This, however, will depend on the world sugar price and exchange rate fluctuations. Depending on a number of assumptions, the estimated EBA sugar exports to the EU range from 0.5 million to over 4 million tons (CEC 2005b; for a review of the studies with varying assumptions, see van Berkum, Roza and van Tongeren 2005).[18]

2. OUTLINE OF THE DECEMBER 2008 DRAFT MODALITIES

The modalities used in this analysis are derived from the December 2008 *Revised Draft Modalities for Agriculture* put forth by Ambassador Crawford Falconer, former chairperson of the agriculture negotiations (WTO 2008a). The current draft (December 2008) is a revision of a July 2008 draft. The aim is to reform agricultural trade in three areas: market access, domestic support and export subsidies. Annex B outlines in more detail the formulas for the cuts in tariffs and domestic support.

2.1 Market Access

In terms of market access, tariffs are cut according to a tiered formula requiring steeper cuts for bound tariffs in the higher tier. Developing countries face lower cuts (two-thirds of the cut of the equivalent tier for developed countries) to be implemented over a longer period of time (10 years versus 5 for developed countries). Additional concessions are provided for developing countries to account for their vulnerabilities and special circumstances for some products. LDC Members are not required to undertake reductions in bound duties.

Some products have smaller cuts. A product declared as sensitive is subject to lower tariff cuts (specified as deviations from the normal tariff cuts) but with corresponding TRQ expansions allowing for more access based on the deviation from the normal tariff reductions. As is the case for the tariff cuts, the TRQ expansion for developing countries is smaller. Special products, designated by developing countries for food security, livelihood security and rural development purposes, could have smaller cuts or be exempt completely from any reductions. A special safeguard mechanism can be invoked if import volumes increase above or import prices fall below a certain threshold allowing countries to increase the tariff temporarily. Additional tariff reductions are to be implemented if a product is treated as a tropical product. For products with long standing preferences, two options are proposed: the preference-granting countries can delay tariff cuts by 10 years or extend the implementation period by 2 years. The provisions are designed to accelerate liberalisation of tropical products and to slow liberalisation of the products with long-standing preferences (10-year delay in implementing the tariff cuts or extending the implementation period by 2 years).

2.2 Domestic Support

Like tariffs, overall trade distorting support (OTDS) and Amber Box support (AMS) are to be cut based on a tiered formula with support in the highest tier receiving the largest cut. There is an initial cut at the beginning of the implementation period with the rest to be reduced over 5 years for developed countries and 8 years for developing countries. Countries are allowed a *de minimis* amount limited to 2.5 per cent of the value of production for developed countries immediately and 6.7 per cent for developing countries to be cut over 3 years. The reductions apply mainly to developed countries with a few exceptions in the developing region. Blue Box maximum value of support is also capped at 2.5 per cent (5 per cent for developing countries) of the average total value of agricultural production based on 1995-2000 (or an option of using 1995-2004 for developing countries). There are also limits on product-specific support. Support which falls under the Green Box is considered to have no or minimal trade- and production-distorting effects and is therefore exempt from reduction commitments.

2.3 Export Subsidies

Export subsidies are to be eliminated by the end of 2013 for developed countries with commitments to be cut by 50 per cent by the end of 2010. For developing counties, the subsidies are to be reduced to zero by the end of 2016. Additional provisions are also proposed for export credit and insurance programmes, agricultural exporting state trading enterprises, and international food aid programs. These would be disciplined to avoid hidden subsidies and displacement of commercial trade.

3. IMPLEMENTATION OF THE DRAFT MODALITIES

3.1 Structure of the International Sugar Model

In order to analyze the effect of the modalities on the world sugar market, two scenarios are run. The scenarios are run using the international sugar model, which is a non-spatial, partial-equilibrium world model consisting of 30 countries/regions, including a Rest-of-the-World aggregate to close the model.[19] The model is used to establish a baseline and to conduct policy analysis. Major sugar producing, exporting, and importing countries are included in the international sugar model. The model specifies only raw sugar production, use, and trade between countries/regions and does not disaggregate refined trade from raw trade. Country coverage consists of the following countries/regions: Algeria, Argentina, Australia, Brazil, Canada, China, Colombia, Cuba, Egypt, European Union-27, Guatemala, India, Indonesia, Iran, Japan, Malaysia, Mexico, Morocco, Pakistan, Peru, Philippines, Russia, South Africa, South Korea, Thailand, Turkey, the Ukraine, the United States, Venezuela, and a Rest-of-World aggregate.[20]

The general structure of the country sub-model includes behavioural equations for area harvested as a function of crop prices, yield, production for sugarcane and sugar beet on the supply side, and per capita consumption as a function of price and demographic variables, and ending stocks

on the demand side.[21] Equilibrium prices, quantities, and net trade are determined by equating excess supply and excess demand across countries and regions. Using price transmission equations, the domestic price of each country or region is linked to a representative world price (Caribbean f.o.b. price) through exchange rates and other price policy wedges such as tariffs and transfer-service margins. The price transmission equations assume that agents in each country are price-takers in the world market. Countries are either a natural importer or exporter if their autarkic price falls above or below the free-trade world price, respectively.

Data for area, yield, sugarcane, and sugar beet production were gathered from the Food and Agricultural Organisation (FAO) of the United Nations, and data for sugar production, consumption, and ending stocks were obtained from Production, Supply and Distribution (PSD) View of the US Department of Agriculture. Cane and beet production is tied to sugar production through the extraction rate. Macroeconomic data such as real gross domestic product (GDP), GDP deflator, population, and exchange rate were gathered from various sources, including the International Monetary Fund and Global Insight.[22]

3.2 Description of the Scenarios

Using the international sugar model and starting from a baseline based on certain macroeconomic and policy assumptions for individual countries, two scenarios are run. The first is a scenario where tariffs are reduced in countries with applied tariffs at or above the final (reduced) bound rates. The tariff reductions are implemented in the first year of

the projections (2009/10) based on the tiered formula for tariff cuts. The results are presented as per cent deviations from the baseline for the years 2009/10 to 2018/19. In the second scenario, sugar is treated as a tropical product where tariffs less than or equal to 25 per cent are reduced to zero and tariffs over 25 per cent are reduced by 85 per cent.

4. RESULTS

4.1 Market Access

Tariffs

Table 3 presents the applied and WTO bound sugar tariffs for select Member countries and the final bound rates after the implementation of the modalities.[23] For many countries, the applied tariffs are significantly lower than the WTO bound rates. These countries include Australia in the developed region and 14 out of the 19 developing countries modelled. Thus, the reduction in tariffs is required in 10 of the 25 Member Countries.[24] This implies that, since the reductions are required on bound rather than applied tariffs, in countries where applied tariffs are significantly below the bound rate, the reductions will have no effect.

The EU, Japan and the US would be required to reduce their bound rates by 70 per cent. In the case of Japan, the bound tariff declines from 103.1 Yen per kilogram (kg) to 30.9 Yen per kg (or 442 per cent to 133 per cent in *ad valorem* equivalent).[25] Most of the developing countries would be required to reduce their bound rates by 38 per cent with the exception of Mexico and Turkey, which would have to reduce their bound rates by 46.67 per cent, (from 156 per cent to 83.2 per cent for Mexico, and from 135 per cent to 72 per cent for Turkey).

In this scenario, tariffs are reduced in the projection period based on the tiered formula and only in countries where the applied tariffs are at or above the final bound rates.[26] The results are presented as per cent changes between the baseline and the scenario for the years 2009/10 to 2018/19 in Table 4.[27] The results show an increase in imports in countries where the tariffs are reduced. In China, for example, where tariffs decline from 50 per cent to 31 per cent, net imports increase by an average of 5 per cent relative to the baseline. In Japan, net imports increase between 0.5 and 6.5 per cent over the 10-year projection period relative to the baseline. The higher imports result in an increase in the world sugar price by 1 per cent on average. Countries like Peru and Egypt, where tariffs do not decline, respond to the higher world price by reducing their demand for sugar. As Table 4 indicates the overall results show that the reductions do not have a significant impact on the volume of trade, which changes by 0.7 per cent on average.

Table 3. Final Tariff Reductions by Country

Country	Classification	Bound Tariff Ad valorem	Bound Specific Tariff	Description	Applied Tariff	Bound (AVE)	Tariff Reduction	Final Bound (AVE)
Argentina	Developing	35%			20%	35%	38%	21.7%
Australia	Developed		0.07 AUD/kg		0%	9%	50%	4.5%
Brazil	Developing	35%			16%	35%	38%	21.7%
Canada	Developed		27.66 CAD/ton		24.69 CAD/ton (8.8%)	9.9%	50%	5%
China	Developing	50%			50%	50%	38%	31%
Colombia	Developing	117%			20%	117%	43%	67.1%
Cuba	Developing	40%			30%	40%	38%	24.8%
Egypt	Developing	20%			2%	20%	33%	13.3%
EU	Developed		339 Euro/ton	Raw	339 Euro/ton	75.6%	70%	22.7%
EU	Developed		419 Euro/ton	Refined	419 Euro/ton	93.5%	70%	28.1%
Guatemala	Developing	160%			20%	160%	47%	85.3%
India	Developing	150%			60%	150%	47%	80%
Indonesia	Developing	95%		Raw	550 Rp/kg (44%)	95%	43%	54.5%
Indonesia	Developing	95%		Refined	790 Rp/kg (63%)	95%	43%	54.5%
Japan	Developed		103.1 Yen/kg	Raw	103.1 Yen/kg	442.3%	70%	132.7%
Japan	Developed		106.2 Yen/kg	Refined	106.2 Yen/kg	455.6%	70%	136.7%
Korea	Developing	18%		Raw	3%	18%	33%	12%
Korea	Developing		85.1% or 199.8 Won/kg*	Refined	40%	85.1%	43%	48.8%
Malaysia	Developing		15% or 112.50 RM/ton*	Raw	0%	15%	33%	10%
Malaysia	Developing		5% + 385.45 RM/ton	Refined	0%	46%	38%	28.5%
Mexico	Developing		360 USD/ton or 156%*		360 USD/ton (88%)	156%	47%	83.2%
Morocco	Developing	168%			35%	168%	47%	89.6%
Pakistan	Developing	150%			25%	150%	47%	80%
Peru	Developing	68%			9%	68%	38%	42.2%
Philippines	Developing	80%		Raw	min 50%; max 65%	65%	38%	40.3%
Philippines	Developing	50%		Refined	min 50%; max 65%	50%	38%	31%
South Africa	Developing	105%			0%	105%	43%	60.2%
Thailand	Developing	94%			65%	94%	43%	53.9%
Turkey	Developing	135%			135%	135%	47%	72%
US	Developed		0.3387 USD/kg	Raw	0.3387 USD/kg	96%	70%	28.8%
US	Developed		0.3574 USD/kg	Refined	0.3574 USD/kg	101.5%	70%	30.5%
Venezuela	Developing	105.3%			20%	105.3%	43%	60.4%

*Whichever is higher.

Note: AUD is Australian dollar; CAD is Canadian dollar, RM is Malaysian Ringgit; Rp is Indonesian Rupiah. AVE is ad valorem equivalent.
Source: WTO Documents Online

Table 4. Impact of Tariff Reduction in the World Sugar Market

	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	Average
Net Exporters												
Argentina	0.0%	0.7%	1.0%	1.3%	1.5%	1.8%	2.0%	2.0%	1.9%	1.9%	1.9%	1.6%
Australia	0.0%	0.1%	0.2%	0.2%	0.3%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.3%
Brazil	0.0%	0.3%	0.6%	0.8%	1.0%	1.3%	1.5%	1.6%	1.7%	1.8%	1.9%	1.2%
Colombia	0.0%	0.5%	0.6%	0.9%	1.2%	1.4%	1.7%	1.7%	1.7%	1.8%	1.8%	1.3%
Cuba	0.0%	0.2%	0.1%	-0.1%	-0.3%	-0.6%	-0.8%	-1.2%	-1.6%	-2.0%	-2.4%	-0.9%
Guatemala	0.0%	0.2%	0.2%	0.3%	0.4%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.4%
Mexico	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Philippines	0.0%	-0.3%	-2.4%	-5.7%	-10.0%	-15.4%	-21.9%	-30.9%	-42.7%	-56.7%	-74.7%	-26.1%
South Africa	0.0%	0.5%	0.5%	0.7%	0.8%	1.0%	1.1%	1.0%	1.0%	1.0%	1.1%	0.9%
Thailand	0.0%	0.0%	0.0%	-0.1%	-0.1%	-0.2%	-0.2%	-0.3%	-0.3%	-0.4%	-0.5%	-0.2%
Turkey	0.0%	-4.5%	-11.2%	-18.0%	-26.8%	-38.8%	-55.6%	-82.1%	-127.4%	-208.2%	-400.0%	-97.3%
Total Net Trade *	0.0%	0.2%	0.4%	0.5%	0.6%	0.7%	0.8%	0.8%	0.9%	0.9%	1.0%	0.7%
Net Importers												
Algeria	0.0%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Canada	0.0%	9.7%	7.8%	7.8%	7.8%	8.1%	8.5%	8.5%	8.3%	8.3%	8.3%	8.3%
China	0.0%	0.3%	2.5%	3.8%	4.8%	5.4%	6.0%	6.5%	6.8%	7.1%	7.4%	5.1%
Egypt	0.0%	-0.3%	-0.3%	-0.4%	-0.5%	-0.6%	-0.6%	-0.6%	-0.6%	-0.6%	-0.6%	-0.5%
European Union	0.0%	1.8%	3.5%	4.8%	6.2%	7.4%	8.6%	8.1%	7.8%	7.6%	7.4%	6.3%
India	0.0%	-1.8%	-1.2%	-1.4%	-1.6%	-1.7%	-1.8%	-1.6%	-1.6%	-1.6%	-1.6%	-1.6%
Indonesia	0.0%	0.0%	0.0%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Iran	0.0%	-0.2%	-0.2%	-0.2%	-0.2%	-0.3%	-0.3%	-0.3%	-0.3%	-0.3%	-0.3%	-0.3%
Japan	0.0%	0.5%	1.1%	1.9%	2.8%	3.7%	4.8%	5.4%	5.8%	6.2%	6.5%	3.9%
Malaysia	0.0%	-0.1%	0.0%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Morocco	0.0%	-0.2%	-0.2%	-0.3%	-0.3%	-0.4%	-0.4%	-0.3%	-0.3%	-0.3%	-0.3%	-0.3%
Pakistan	0.0%	-1.1%	-0.9%	-1.0%	-1.1%	-1.2%	-1.2%	-1.1%	-1.0%	-1.0%	-0.9%	-1.0%
Peru	0.0%	-2.4%	-2.9%	-4.0%	-4.5%	-4.7%	-4.7%	-4.1%	-3.7%	-3.4%	-3.1%	-3.8%
Russia	0.0%	-0.2%	-0.1%	-0.2%	-0.2%	-0.2%	-0.3%	-0.2%	-0.2%	-0.3%	-0.3%	-0.2%
South Korea	0.0%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Ukraine	0.0%	-0.4%	-0.5%	-0.6%	-0.7%	-0.7%	-0.8%	-0.7%	-0.7%	-0.6%	-0.6%	-0.6%
United States	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Venezuela	0.0%	-0.3%	-0.3%	-0.4%	-0.5%	-0.6%	-0.6%	-0.6%	-0.6%	-0.7%	-0.7%	-0.5%
Rest of World	0.0%	-0.5%	-0.5%	-0.6%	-0.8%	-0.9%	-1.0%	-1.0%	-1.0%	-1.1%	-1.1%	-0.9%
Prices												
FOB Caribbean Price	0.0%	0.8%	0.6%	0.8%	1.0%	1.1%	1.2%	1.1%	1.1%	1.1%	1.1%	1.0%

Note: Sugar is in raw equivalent.
* Total net trade (exports) is the sum of all positive net exports and negative net imports.

Tariff rate quota and sugar as a sensitive product

Less than 50 per cent of the countries modelled have TRQ commitments for sugar. Most have imported more than or equal to their TRQ commitment levels with the exception of China, the Philippines and Thailand. Table 5 shows three levels of TRQ expansions for each country. If the countries designate sugar as a sensitive product, the final TRQ expansion will depend on the size of the deviation each country chooses from the tiered reduction formula in final bound tariffs. The base period used is 2003-2005 as specified in the draft text. For developed countries, if the deviation is two thirds of the reduction required by the tiered reduction formula, the TRQ expansion is no less than 4 per cent of domestic consumption. If the deviation is one third, the expansion is no less than 3 per cent and if one half, the expansion is no less than 3.5 per cent of domestic consumption. For developing countries, the TRQ expansion is two thirds the level for developed countries.

Table 5. TRQ Commitments and Expansions

Country	Average consumption (2003-2005)	TRQ level	TRQ/ Domestic Consumption	New TRQ (4% of domestic consumption)	New TRQ 3.5% of domestic consumption)	New TRQ (3% of domestic consumption)
	(Metric ton)			(Metric ton)		
China	11,316,667	1,945,000*	17%	1,975,667	1,945,000	1,945,000
Colombia	1,476,667	57,364	4%	96,742	91,820	86,897
EU	17,647,333	1,304,700	7%	2,010,593	1,922,357	1,834,120
Malaysia	1,139,000	22,458	2%	52,831	49,035	45,238
Mexico	5,464,333	183,800	3%	329,516	311,301	293,087
Morocco	1,081,667	274,340	25%	274,340	274,340	274,340
Philippines	2,000,000	64,050*	3%	117,383	110,717	104,050
South Africa	1,621,000	62,037	4%	105,264	99,860	94,457
Thailand	1,996,667	13,760 *	1%	67,004	60,349	53,693
US	9,085,000	1,117,195	12%	1,376,248	1,330,823	1,285,398
Venezuela	856,667	132,013	15%	139,409	136,553	133,698

Countries importing less than TRQ

In most countries, the final TRQ commitments expand significantly. The expansions on average are 65 per cent at 3 per cent of domestic consumption and 85 per cent at 4 per cent of consumption. At expansions of 4 per cent of domestic consumption, the largest expansions are seen in Thailand (390 per cent), Malaysia (135 per cent), Philippines (83 per cent) and Mexico (79 per cent). The lowest are in China (1.6 per cent), Venezuela (5.6 per cent) and the US (23 per cent). The final TRQ commitments also account for cases where existing TRQ levels represent 10 per cent or more of domestic consumption. These countries include China, Morocco, the US and Venezuela. In these countries, the expansions are reduced by 0.5 per cent for each deviation from 10 per cent. Consequently, Morocco sees no TRQ expansion at any deviation while China experience TRQ expansion only in the case where it expands its TRQ by 4 per cent of domestic consumption. In terms of total sugar trade, the increase in TRQ expansion represents about 3 per cent of world imports in the base period (2003-2005).

In-quota rates are also subject to reductions to be implemented on the same time frame as the TRQ expansions.[28] For developed countries, the in-quota rates are to be reduced by 50 per cent or to 10 per cent, whichever is lower. If the rate is at or below 5 per cent, it is reduced to zero. The maximum rate on the first day of implementation is 17.5 per cent. For developing countries, the in-quota rates are to be reduced by 15 per cent with

no requirement to reduce the rate to 10 per cent if lower or to reduce to zero if the in-quota rate is at or less than 5 per cent. Table 6 show the in-quota reductions for the relevant countries with TRQ commitments. Reductions are implemented in all countries except the EU and Malaysia where the existing in-quota rate is zero. In the US, the in-quota rate for raw cane sugar is 1.46 cents per kg, which is 4 per cent in *ad valorem* equivalent (AVE). This would be reduced to zero per cent. However, the in-quota rate for raw beet sugar, which is 3.66 cents per kg (or 10 per cent AVE), would be cut by 50 per cent to 5 per cent AVE.

Table 6. Initial and Final In–quota Rates

Country	Initial In-quota Rate	Final In-quota Rate
China	15%	13%
Colombia	80%	68%
EU	0%	0%
Malaysia	0%	0%
Mexico	50%	42.5%
Morocco	168%	142.8%
Philippines	50%	42.5%
South Africa	21%	18%
Thailand	65%	55.3%
US	4%	0%
Venezuela	40%	37%*

* Just as in the case of small vulnerable economies, Venezuela can apply a 7.5 per cent reduction

Special product

According to the draft text, developing countries can designate special products based on the criteria of food security, livelihood security and rural development. In this case, 12 per cent of the tariff lines may be designated as special products with up to 5 per cent of the lines having no cuts. The overall average cut is set at 11 per cent. In a large number of developing countries sugar would qualify as a special product. Countries like India and China may take advantage of the provision and bypass cuts in sugar tariffs.

Tropical product

The aim of the draft text is for the fullest liberalization of trade in tropical and diver-sification products. If sugar is treated as a tropical product, it cannot be declared a sensitive product under the first option, where the applicable tariff is reduced to zero if it is less than or equal to 25 per cent and by 85 per cent if it is greater than 25 per cent. The second option requires the tariff to be reduced to zero if it is less than 10 per cent and by 70 per cent if it is greater than or equal to 10 per cent. Using the first option, the US would reduce its tariff from 338.7 USD/ton to 50.8 USD/ton. Japan's tariffs would fall from 103.1 Yen/ton to 15.5 Yen/ton while the EU's tariffs would decline from 339 Euros/ton to 50.9 Euros/ton. Canada's tariff would drop to zero but Australia, who already has zero tariffs, would not experience any changes.

Increased market access through significant tariff reductions in the sugar market would result in increased demand for sugar and therefore, higher world sugar prices. This is because trade barriers reduce import demand and thus lower the world price while increasing the sugar price in domestic markets. When trade restrictions are removed, import demand increases since the world price is lower than domestic prices and consequently the world price increases. Elobeid and Beghin (2006) found that with market liberalization and increased demand, the world

sugar price would increase significantly (by 27 per cent). Competitive sugar producers like Brazil respond by increasing sugar production and a relocation of production occurs from highly distorted non-competitive countries to less distorted competitive countries.

A scenario is run where sugar is treated as a tropical product under the first option where tariffs less than or equal to 25 per cent are reduced to zero and tariffs over 25 per cent are reduced by 85 per cent in developed countries. The 85 per cent reduction occurs in the EU, Japan, and the US. The results, presented in Table 7, show an increase in imports in countries where the tariffs are reduced.[29] In Canada and the EU, net imports increase by an average of 9 per cent, while they increase by 5 per cent in Japan.[30] The higher imports result in an increase in the world sugar price by 1.2 per cent on average. Major exporters, like Brazil, respond by increasing their supply of sugar to the world market. Conversely, importing countries reduce their imports of sugar because of the higher world price.

Table 7. Impact of World Sugar Market if Sugar is Treated as a Tropical Product

	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	Average
Net Exporters												
Argentina	0.0%	0.9%	1.4%	1.8%	2.3%	2.2%	2.2%	2.2%	2.2%	2.1%	2.0%	1.9%
Australia	0.0%	0.1%	0.3%	0.3%	0.4%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.4%
Brazil	0.0%	0.4%	0.8%	1.2%	1.5%	1.7%	1.7%	1.8%	1.9%	1.9%	2.0%	1.5%
Colombia	0.0%	0.6%	0.9%	1.3%	1.7%	1.8%	1.9%	1.9%	1.9%	2.0%	2.0%	1.6%
Cuba	0.0%	0.3%	0.3%	0.2%	0.1%	-0.3%	-0.7%	-1.0%	-1.5%	-1.9%	-2.3%	-0.7%
Guatemala	0.0%	0.2%	0.3%	0.5%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.5%	0.5%
Mexico	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Philippines	0.0%	0.0%	-1.7%	-4.5%	-8.3%	-14.1%	-21.1%	-30.0%	-41.7%	-55.7%	-73.7%	-25.1%
South Africa	0.0%	0.6%	0.8%	1.0%	1.2%	1.1%	1.2%	1.2%	1.2%	1.2%	1.2%	1.1%
Thailand	0.0%	0.0%	0.0%	0.0%	-0.1%	-0.2%	-0.2%	-0.3%	-0.3%	-0.4%	-0.4%	-0.2%
Turkey	0.0%	-3.9%	-10.4%	-16.9%	-25.5%	-38.2%	-55.3%	-81.5%	-126.6%	-207.3%	-398.5%	-96.4%
Total Net Trade *	0.0%	0.3%	0.6%	0.8%	0.9%	1.0%	1.0%	1.0%	1.0%	1.1%	1.2%	0.9%
Net Importers												
Algeria	0.0%	-0.1%	-0.1%	-0.1%	-0.2%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Canada	0.0%	9.8%	8.1%	8.2%	8.4%	8.7%	9.0%	9.0%	8.8%	8.8%	8.8%	8.8%
China	0.0%	-0.1%	1.9%	3.2%	4.1%	5.2%	5.9%	6.4%	6.7%	7.0%	7.3%	4.8%
Egypt	0.0%	-0.4%	-0.5%	-0.6%	-0.7%	-0.7%	-0.7%	-0.7%	-0.7%	-0.7%	-0.6%	-0.6%
European Union	0.0%	3.4%	6.4%	8.9%	11.3%	10.5%	10.1%	9.8%	9.5%	9.2%	9.0%	8.8%
India	0.0%	-2.3%	-1.8%	-2.1%	-2.3%	-1.9%	-1.9%	-1.9%	-1.8%	-1.8%	-1.8%	-2.0%
Indonesia	0.0%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Iran	0.0%	-0.2%	-0.2%	-0.2%	-0.3%	-0.3%	-0.3%	-0.3%	-0.3%	-0.3%	-0.3%	-0.3%
Japan	0.0%	0.9%	2.0%	3.5%	5.1%	5.9%	6.5%	6.9%	7.2%	7.6%	7.9%	5.4%
Malaysia	0.0%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Morocco	0.0%	-0.3%	-0.3%	-0.4%	-0.5%	-0.4%	-0.4%	-0.4%	-0.4%	-0.4%	-0.3%	-0.4%
Pakistan	0.0%	-1.4%	-1.3%	-1.5%	-1.6%	-1.4%	-1.3%	-1.2%	-1.1%	-1.1%	-1.0%	-1.3%
Peru	0.0%	-3.1%	-4.2%	-5.8%	-6.6%	-5.8%	-5.2%	-4.7%	-4.1%	-3.8%	-3.4%	-4.7%
Russia	0.0%	-0.2%	-0.2%	-0.2%	-0.3%	-0.2%	-0.3%	-0.3%	-0.3%	-0.3%	-0.3%	-0.3%
South Korea	0.0%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Ukraine	0.0%	-0.6%	-0.7%	-0.9%	-1.0%	-0.9%	-0.8%	-0.8%	-0.7%	-0.7%	-0.7%	-0.8%
United States	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Venezuela	0.0%	-0.4%	-0.4%	-0.6%	-0.7%	-0.6%	-0.7%	-0.7%	-0.7%	-0.7%	-0.8%	-0.6%
Rest of World	0.0%	-0.7%	-0.7%	-0.9%	-1.1%	-1.0%	-1.1%	-1.1%	-1.2%	-1.2%	-1.2%	-1.0%
Prices												
FOB Caribbean Price	0.0%	1.0%	0.9%	1.2%	1.5%	1.2%	1.3%	1.3%	1.3%	1.2%	1.2%	1.2%

Note: Sugar is in raw equivalent.
* Total net trade (exports) is the sum of all positive net exports and negative net imports.

Preference erosion product

The revised draft targets slower liberalization for products with long-standing preference either by delaying the start of the tariff cuts by 10 years or increasing the implementation to 13 years for the long-standing preference granting Member. However, if there is an overlap between the tropical product and preference erosion provisions, the provisions for tropical products prevail.

The impact of preference erosion in sugar would depend on the importance of sugar in individual countries' economies as well as the volume of sugar exports relative to other exports. In the case of the EU, Chaplin and Matthews (2005) calculated the value of the sugar preferences for ACP economies and found that, using actual traded volumes, the premium obtained by ACP countries totalled 476 million Euros in 2003. The share of sugar exports as a per cent of total agricultural exports' contribution to foreign earnings ranges from less than 8 per cent in Zimbabwe to 100 per cent in Barbados. The value of preferences increases with declining world sugar prices. Thus preferences are important to countries where the bulk of their sugar exports are shipped to the EU. The export earnings provide foreign exchange necessary for purchasing essential imports such as food. Thus countries like Barbados, St. Kitts and Nevis and Mauritius will be greatly impacted by preference erosion while countries like Malawi and Zimbabwe would not. If option 1 is used, this will allow preference-receiving countries time to adjust to the eroding preferences.

4.2 Domestic Support

Reduction in OTDS

Many countries provide domestic support for sugar including price support and production quotas. Support that falls in the Amber Box, which is considered to be the most trade distorting, is targeted to be significantly reduced. *De minimis*, Blue Box and product-specific supports are subject to cuts resulting in limits. As indicated in Table 4, the countries with overall support above 60 billion USD would face 80 per cent reductions. The EU falls in this tier, therefore this reduces the EU's total support from 110.3 billion ECU to 22.1 billion ECU or 124 billion USD to 24.8 billion ECU (average of 1995-2000 period).[31] The US and Japan fall in the second tier requiring a 70 per cent reduction in their overall support. The US would have to reduce its total support from 48.3 billion USD to 9.7 billion USD while Japan's total support would decline from 5,450 billion Yen to 1,635 billion Yen (or 48.3 billion USD to 9.7 billion USD). The EU, Japan and the US also face a 33.3 per cent reduction at the start of the implementation.

Reduction in total AMS

Table 8 shows the commitment and actual levels for Total AMS.[32] Most countries are below their commitment levels after adjusting for *de minimis*. Brazil's Total AMS is below *de minimis* for all years except 1998. Table 9 presents the reductions in Final Bound Total AMS. The reductions were calculated based on 1995-2000 values for both developed and developing countries. For Argentina and Morocco, the Final Bound Total AMS was below 100 million USD, which exempted them from any reductions. At almost 84 billion USD (73 billion ECU), the EU was well above the 40 billion USD in the first tier of reductions, which would require a 70 per cent reduction to 25 billion USD with an initial reduction of 25 per cent. Japan and the US fall in the second tier with reductions of 60 per cent. For the US, this means a reduction from 21 billion USD to 8 billion USD. According to the draft text, any developed country with a Final Bound AMS of 40 per cent or more of the average total value of agricultural production in the base year is subject to additional reductions. Since Japan's AMS is 40.4 per cent of the total value of agricultural production, it will need to undertake an additional 10 per cent reduction. In this case, the reduction would be from 39.4 billion USD to 11.8 billion

USD. Like the EU, both Japan and the US are required to make an initial cut of 25 per cent. All the other developed countries fall in the third tier below 15 billion USD requiring them to cut their Final Bound Total AMS by 45 per cent in six equal reductions, i.e., no down payment is required at the initial implementation. None of the developing countries have Final Bound Total AMS levels above 15 billion USD. Thus for these countries, they would have to reduce their levels by 30 per cent over 8 years in equal instalments. As indicated in Table 9, based on the latest available notifications for Total AMS levels, the limits on Final Bound Total AMS would be binding for only 5 countries including the EU and the US. The EU and the US would have to reduce their total AMS levels by 12 billion USD and about 10 billion USD, respectively, to stay within the new reduced Final Bound Total AMS.

Table 8. Total AMS Commitments and Levels by Country (1995-2004)

Country	Unit		1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Argentina	pesos, mill.	Commitment	85.4	84.2	83.1	81.9	80.8	79.6	78.5	77.3	76.2	75.0
		Level	122.8	84.1	83.0	81.4	80.4	79.6	122.8	84.1	83.0	
Australia	$A, mill.	Commitment	570.2	550.5	530.8	511.2	491.5	471.9	471.9	471.9	471.9	471.9
		Level	151.7	144.2	131.6	119.7	61.8	213.6	308.5	212.8	207.8	206.7
Brazil	US$, mill.	Commitment	1039.1	1025.0	1010.9	996.8	982.7	968.6	954.4	940.3	926.2	912.1
		Level	0.0	0.0	0.0	82.8	0.0	0.0	0.0	0.0	0.0	0.0
Canada	C$, mill.	Commitment	5197.0	5017.0	4838.0	4659.0	4480.0	4301.0	4122.0	3943.0	3764.0	3585.0
		Level	777.4	618.7	522.1	789.5	939.1	854.6	2824.1	3449.9	1585.2	1357.8
Colombia	US$, mill.	Commitment	392.5	387.2	381.9	376.6	371.3	365.9	360.6	355.3	350.0	344.7
		Level	58.1	4.0	14.4	9.8	6.8	5.2	36.7	79.7	25.8	40.3
EU	ECU, mill.	Commitment	78670.0	76370.0	74070.0	71760.0	69460.0	67160.0	67160.0	67160.0	67160.0	67160.0
		Level	50026.2	51009.6	50194.3	46683.0	47885.7	43654.0	39281.3	28490.4	30880.2	30880.2
Japan	Yen, bill.	Commitment	4800.6	4635.0	4469.5	4304.0	4138.5	3972.9	3972.9	3972.9	3972.9	3972.9
		Level	3507.5	3329.7	3171.0	766.4	747.9	708.5	666.7	730.0	641.8	607.9
Korea	Won, bill.	Commitment	2182.6	2105.6	2028.7	1951.7	1874.8	1797.8	1720.9	1643.9	1566.9	1489.9
		Level	2075.4	1967.4	1937.0	1562.8	1551.9	1690.9	1631.4	1550.4	1471.7	1458.4
Mexico	Peso, mill.	Commitment	28622.3	28237.8	27853.2	27468.6	27084.0	26699.5	26314.9	25929.9	25544.9	25159.9
		Level	1364.7	914.9	3214.2	3798.8	211.3	351.4	1040.0	672.7	633.5	488.7
Morocco	DH, mill.	Commitment	779.0	769.0	758.0	748.0	737.0	727.0	716.0	706.0	695.0	685.0
		Level	93.0	250.0	91.0	126.0	180.0	155.0	299.0	271.6		
South Africa	Rand, mill.	Commitment	2435.3	2351.3	2267.4	2183.4	2099.4	2015.4	2015.4	2015.4	2015.4	2015.4
		Level	1640.3	1938.3	2198.3	820.1	789.9	439.2				
Thailand	Baht, mill.	Commitment	21816.4	21506.6	21196.9	20887.1	20577.0	20268.0	19957.8	19647.8	19337.8	19027.8
		Level	15773.3	12932.5	16756.6	16402.1	17279.4	19778.8	18240.0	18709.2	14150.3	14818.7
US	US$, mill.	Commitment	23083.1	22287.2	21491.2	20695.2	19899.2	19103.3	19103.3	19103.3	19103.3	19103.3
		Level	6213.9	5897.7	6238.4	10391.9	16862.3	16802.6	14413.1	9637.3	6950.0	11628.9

Table 9. Reductions in Final Bound Total AMS

	Average 1995-2000	Reduction in Final Bound	Final Bound Total AMS	Total AMS (latest Notification)	Change in Current Total AMS
	(billion USD)				
Argentina	0.08	0.00	0.08	0.03	0.06
Australia	0.36	0.16	0.20	0.17	0.03
Brazil	1.00	0.30	0.70	1.13	-0.43
Canada	3.34	1.50	1.83	2.45	-0.61
Colombia	0.38	0.11	0.27	0.03	0.23
EU	83.67	58.57	25.10	37.17	-12.07
Japan	39.44	23.67	15.78	5.62	10.16
Korea	2.02	0.61	1.42	1.74	-0.33
Mexico	3.39	1.02	2.37	0.13	2.25
Morocco	0.08	0.00	0.08	0.02	0.06
South Africa	0.46	0.14	0.32	0.06	0.26
Thailand	0.66	0.20	0.46	0.45	0.01
US	21.09	12.66	8.44	18.09	-9.65
Venezuela	1.24	0.37	0.87	0.21	0.66

Product-specific AMS

Table 10 presents the product-specific AMS levels for mostly the developed countries. The limit of the value of product-specific support is calculated as the average of support provided to sugar during the 1995-2000 period and applies from the first day of the implementation period. It is assumed that developing countries will chooses option 1, i.e., the average product-specific AMS during the base period 1999-2000. For the EU, Japan, and the US, the limits would be 5.9 billion ECU, 55 billion Yen and 1.1 billion USD, respectively. Brazil's product-specific AMS is below *de minimis* levels during the base period and its limit would be 39 million USD.

Table 10. Product–Specific AMS Limits

Country	Australia	Brazil	Canada	Colombia	EU	Japan	South Africa	US
Unit	($A million)	(US$ thousand)	(C$ million)	(US$ thousand)	(ECU million)	(Yen billion)	(Rand million)	(US$ million)
Before de minimis adjustment								
1995	0	26,226.4	0	123	5,971.2	58.9	847.1	1,090.9
1996	0	19,420.3	0	0	5,896.1	49	862.4	908
1997	0	16,089.7	0	342	5,867.1	53.8	928	1,011.5
1998	0	89,148.9	0	284.6	5,811.4	59.8	805.7	1,055.5
1999	0	35,860.5	0	62.7	5I757.8	54.6	789.9	1,207.3
2000	16.13	48,840.2	0	18	5,808.6	54	439.2	1,177.5
2001								1,061.0
2002								1,327.8
2003								1,249.8
2004								1,281.9
Average	16.1	39,264.3	0	166.1	5,852	55	778.7	1,133.7
After de minimis adjustment								
1995	0	0	0	123	5,971.2	58.9	847.1	1,090.9
1996	0	0	0	0	5,896.1	49	862.4	908
1997	0	0	0	342	5,867.1	53.8	928	1,011.5
1998	0	0	0	284.6	5,811.4	59.8	805.7	1,055.5
1999	0	0	0	62.7	5,757.8	54.6	789.9	1,207.3
2000	0	0	0	18	5,808.6	54	439.2	1,177.5
2001								1,061.0
2002								1,327.8
2003								1,249.8
2004								1,281.9
Average	0	0	0	166.1	5,852	55	778.7	1,133.7

4.3 Export Subsidies

Export subsidies are to be eliminated by 2013 for developed countries and by 2016 for developing countries. Few countries use export subsidies for sugar. The export subsidy limit for the EU is 1.374 million tons (white sugar equivalent) and its budgetary outlay commitment is 513.9 million Euros. For the marketing year 2006-2007, the EU subsidised exports below its quantity limit at 1.337 million tons of sugar. EU total sugar exports have declined significantly since the WTO ruling limiting exports and the implementation of the EU Common Market Organisation (CMO) sugar reforms. Although the elimination of the export subsidy would reduce exports in the EU, the impact is significantly smaller after the implementation of reforms. If the elimination of export subsidies causes excess supply in the EU sugar market, the EU may have to reduce the supply of sugar in the domestic market by reducing production quotas or imports.[34] However, according to Gohin and Bureau (2006), if export subsidies are banned and the EU maintains its commitment to import sugar under TRQs for developing countries, there would have to be a considerable reduction in the sugar price in order to clear the EU market. This decline in EU sugar price would result in the erosion of rents for preferential sugar imports under specific TRQs facing positive tariffs. What is likely to happen is that the EU would reduce its production quotas in order to accommodate the elimination of export subsidies.

Mexico has an export subsidy commitment of 1.4 million tons in quantity and 525.4 million USD in value. Mexican sugar exports are well below the commitment, which implies that an elimination of the export subsidy quantity would not have a significant impact. This is the case for other countries which have used export subsidies but remain below their commitment levels.

For developing countries, which provide support in terms of subsidies for transport and freight charges on export shipments or subsidies on agricultural products contingent on their incorporation in exported production, the draft text allows these countries to continue providing these subsidies. Therefore, countries like India would be able to continue to subsidise their exports during years of surplus.

5. CONCLUSIONS

The Falconer draft modalities text proposes large cuts in bound tariffs and domestic support, larger TRQ expansion and the elimination of export subsidies. In terms of market access, since many of the applied rates are much lower than the bound rates, the reductions in bound rates do not have much of an impact in many countries. This, however, is not the case for the EU, Japan and the US who experience significant reductions in their tariffs. A reduction in the tariffs of countries where the applied rate is higher than the reduced bound rate results in a higher world sugar price as the world market sees a higher demand for sugar. This benefits sugar exporters like Brazil as they respond to the higher world price by increasing production and exports. On the other hand, the increase in the world price results in a reduction in sugar consumption in countries that are net importers of sugar. Thus, trade barriers in developed countries help maintain the high domestic prices and the proposed reduction of tariffs will increase pressure to reduce domestic prices and encourage non-preferential sugar import, especially in countries like the EU and the US.

A limited number of countries have TRQ commitments that would be expanded under the modalities since many countries with TRQ commitments import more than the commitment levels. In these cases the TRQ expansion is significant if sugar is declared a sensitive product. For example, in the EU, although the standard tariff cut will be reduced by up to two thirds, the TRQ expansion would be between 500,000 and 700,000 metric tons, which would affect the balance of the EU's sugar market requiring further cuts in production. Additionally, increased market access, elimination of export subsidies and imports from LDCs after 2009, may require the EU to reduce both sugar prices and production quotas in order to balance the domestic market. The extent of the reductions would depend on the amount of imports LDCs are able to supply to the EU market. With reduced sugar prices, there would be fewer countries that export sugar under EBA imports. The

reductions would also depend on how much sugar beet can be diverted to non-food use such as ethanol production.[35] However, in aggregate, the TRQ expansion in all countries that expand their TRQ ends up representing only a small per cent of world trade and the impact would be diminished in countries that currently import well above the new TRQs.

Treating sugar as a tropical product would lead to further liberalization of the sugar markets resulting in increased imports by countries which lower their trade barriers. This benefits natural low-cost sugar exporters, which respond to the higher world sugar price by increasing sugar supply in order to satisfy the increased demand. Although consumers of sugar lose because of the higher price, welfare analysis would help determine the overall impact of this liberalization in terms of ultimate winners and losers.

Mitchell (2005) argues that preferential agreements do not encourage countries to diversify into other agricultural activities with higher value nor provide incentives for investments into other crops. This results in these countries becoming dependent on sugar and less competitive in other agricultural activities. Given the high prices these countries receive under the preferential agreements, there is also no incentive to increase productivity and competitiveness. According to Mitchell (2005), sugarcane yields in ACP sugar producers fell more than 30 per cent relative to other developing countries between 1975-79 and 2000-04.

While increased market access would benefit natural exporters like Brazil, Australia and Thailand, trade liberalization would lead to preference erosion which would come at the expense of high-cost non-competitive exporters like Barbados and Jamaica. Preferential trade agreements tend to divert trade away from low cost producers and toward less efficient producers. Liberalization of the sugar markets would reverse this diversion. How much a country is impacted by preference erosion will depend

on how important sugar is to its economy and the volume of sugar exports relative to their other exports. For countries that rely heavily on preferential access and whose economies are based on these trade agreements, the impact could be detrimental. Some have argued for the compensation of preference-receiving countries by preference-granting countries for lost earnings just as the EU compensates the EU sugar industry for income loss due to the reforms (Chaplin and Matthews 2005).

Implementation of the reductions in domestic support would reduce support in highly protected sugar markets in developed countries like the EU, Japan and the US. In the case of sugar, reducing support would translate into decreased domestic production and lower prices. This would increase sugar consumption and imports. As with the case of opening up the sugar markets, world prices would increase stimulating production and exports in low-cost producers, mostly in developing countries.

Thus, trade barriers, domestic support and export subsidies have resulted in increased production of sugar especially in high-cost producers and have dampened world prices. The measures targeting increased market access, reduction of domestic support and elimination of export subsidies reverse this situation by lowering production in high-cost countries and diverting trade to low-cost efficient producers. Although consumers face a higher price, reducing government support programs would save consumers billions of dollars per year and have a net welfare gain (Mitchell 2004).

ANNEX A

Table A1. World Sugar Price and Supply and Utilization for World and Select Countries

	98/99	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08
Prices	(U.S. Dollars per Metric Ton)									
World Price	155	166	216	167	177	173	231	348	257	301
New York Spot	487	406	465	455	480	453	462	499	460	469
World	(Million Metric Tons)									
Production	130,91	136,29	130,76	134,40	146,51	142,47	140,90	144,80	164,43	166,70
Consumption	125,43	127,63	130,19	134,99	139,92	139,77	142,64	143,20	153,06	157,04
Net Trade	27,27	31,02	29,18	29,45	33,50	32,33	33,02	35,07	36,78	38,04
Major Exporters										
Australia	(Thousand Metric Tons)									
Production	4 997	5 448	4 162	4 662	5 461	5 178	5 388	5 297	5 212	5 031
Consumption	995	995	995	1 200	1 200	1 150	1 150	1 150	1 250	1 250
Net Trade	4 072	4 118	3 051	3 589	4 106	4 147	4 438	4 199	3 851	3 783
Brazil										
Production	18 300	20 100	17 100	20 400	23 810	26 400	28 175	26 993	31 550	31 858
Consumption	9 100	9 100	9 250	9 450	9 750	10 400	10 600	10 488	10 700	11 643
Net Trade	8 750	11 300	7 700	11 600	14 000	15 240	18 020	17 090	20 850	19 750
Guatemala										
Production	1 561	1 617	1 632	1 789	1 825	1 850	2 180	2 094	2 365	2 200
Ending Stocks	70	96	70	86	76	91	46	262	412	466
Net Trade	1 086	1 140	1 190	1 298	1 335	1 335	1 569	1 241	1 500	1 402
South Africa										
Production	2 646	2 685	2 895	2 542	2 931	2 560	2 315	2 595	2 313	2 360
Consumption	1 213	1 460	1 650	1 575	1 768	1 535	1 560	1 555	1 575	1 590
Net Trade	1 293	1 255	1 320	972	1 027	741	765	1 050	1 142	989
Thailand										
Production	5 386	5 721	5 107	6 397	7 286	7 010	5 187	4 835	6 720	7 820
Consumption	1 800	1 650	1 750	1 832	1 940	1 980	2 070	2 050	2 030	2 200
Net Trade	3 352	4 147	3 394	4 157	5 280	4 860	3 115	2 242	4 705	4 900
Major Importers										
Canada										
Production	95	73	121	88	54	98	120	105	130	126
Consumption	1 227	1 265	1 242	1 250	1 398	1 431	1 375	1 430	1 450	1 490
Net Trade	-1 116	-1 194	-1 198	-1 221	-1 311	-1 311	-1 212	-1 214	-1 318	-1 371
European Union										
Production	21 466	23 114	22 024	19 224	22 311	20 500	21 707	21 471	17 757	17 740
Consumption	18 662	18 776	18 021	18 072	18 956	18 479	18 361	17 658	21 016	19 240
Net Trade	2 985	3 615	4 075	1 886	2 500	2 344	2 659	4 857	-2 176	-2 264
Indonesia										
Production	1 492	1 690	1 800	1 725	1 755	1 730	2 050	2 100	1 900	1 950
Consumption	2 800	3 200	3 300	3 350	3 400	3 400	3 550	3 850	4 300	4 300
Net Trade	-1 696	-1 932	-1 585	-1 595	-1 600	-1 500	-1 450	-1 800	-2 420	-2 450
Russia*										
Production	1 300	1 500	1 550	1 630	1 580	1 930	2 250	2 500	3 150	3 000
Ending Stocks	2 650	3 000	3 100	2 130	1 050	440	580	470	440	400
Net Trade	-5 240	-4 980	-5 390	-4 440	-3 740	-3 560	-4 190	-2 790	-2 770	-2 700
United States										
Production	7 590	8 210	7 955	7 167	7 644	7 846	7 146	6 712	7 662	7 394
Consumption	9 132	9 173	9 191	9 048	8 810	8 947	9 242	9 381	9 194	9 773
Net Trade	-1 445	-1 372	-1 315	-1 268	-1 441	-1 330	-1 670	-2 939	-1 504	-2 193

NOTE: Net Trade is total exports minus total imports. Hence positive net trade numbers is represent net exports and negative numbers represent net imports. Sugar is in raw sugar equivalent.
*Russia is not a WTO Member.

Source: FAPRI (2009).

Table A1. *Continued*

	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19
Prices						(U.S. Dollars per Metric Ton)					
World Price	287	287	279	287	292	298	305	310	315	323	329
New York Spot	466	500	483	480	484	488	492	491	487	485	484
World						(Million Metric Tons)					
Production	158,55	164,68	168,94	171,89	174,94	178,11	181,25	184,57	187,92	191,05	194,31
Consumption	162,05	165,04	168,80	171,87	174,95	178,12	181,27	184,58	187,91	191,09	194,35
Net Trade	33,96	39,80	41,66	42,60	43,37	44,10	44,72	45,38	46,05	46,47	46,88
Major Exporters											
Australia						(Thousand Metric Tons)					
Production	4 900	5 066	5 169	5 229	5 299	5 370	5 444	5 521	5 596	5 669	5 748
Consumption	1 100	1 235	1 267	1 291	1 316	1 341	1 366	1 392	1 418	1 444	1 469
Net Trade	3 891	3 804	3 887	3 935	3 983	4 028	4 078	4 129	4 177	4 226	4 278
Brazil											
Production	32 450	37 906	39 758	40 726	41 560	42 362	43 040	43 799	44 560	45 036	45 488
Consumption	11 900	12 144	12 394	12 639	12 889	13 137	13 386	13 643	13 902	14 154	14 414
Net Trade	20 250	25 702	27 353	28 086	28 673	29 226	29 656	30 157	30 660	30 883	31 076
Guatemala											
Production	2 340	2 391	2 443	2 501	2 569	2 643	2 723	2 806	2 890	2 977	3 068
Ending Stocks	471	464	457	450	443	436	428	421	413	406	398
Net Trade	1 590	1 633	1 659	1 698	1 746	1 800	1 860	1 922	1 985	2 052	2 122
South Africa											
Production	2 315	2 328	2 336	2 353	2 378	2 407	2 437	2 466	2 495	2 527	2 559
Consumption	1 605	1 632	1 655	1 670	1 688	1 707	1 734	1 766	1 800	1 833	1 869
Net Trade	800	696	661	659	665	674	676	672	668	667	664
Thailand											
Production	7 900	8 227	8 447	8 607	8 735	8 844	8 943	9 038	9 134	9 238	9 350
Consumption	2 300	2 334	2 388	2 423	2 470	2 514	2 562	2 610	2 657	2 701	2 748
Net Trade	5 100	5 720	5 994	6 164	6 258	6 326	6 378	6 425	6 476	6 537	6 601
Major Importers											
Canada											
Production	85	86	87	88	89	90	91	92	93	94	95
Consumption	1 510	1 540	1 576	1 596	1 613	1 625	1 636	1 651	1 670	1 685	1 700
Net Trade	-1 400	-1 462	-1 503	-1 520	-1 536	-1 547	-1 556	-1 571	-1 590	-1 604	-1 617
European Union											
Production	16 900	15 744	15 843	15 835	15 826	15 814	15 804	15 799	15 796	15 787	15 785
Consumption	20 300	20 175	20 235	20 299	20 348	20 391	20 432	20 469	20 505	20 538	20 570
Net Trade	-2 299	-4 409	-4 324	-4 389	-4 442	-4 497	-4 547	-4 589	-4 628	-4 669	-4 703
Indonesia											
Production	2 060	2 085	2 108	2 130	2 153	2 175	2 198	2 221	2 245	2 272	2 300
Consumption	4 500	4 575	4 661	4 744	4 826	4 906	4 992	5 077	5 161	5 242	5 325
Net Trade	-2 200	-2 428	-2 545	-2 621	-2 685	-2 744	-2 808	-2 869	-2 928	-2 982	-3 037
Russia*											
Production	2 950	2 987	3 050	3 119	3 198	3 281	3 368	3 457	3 548	3 640	3 734
Ending Stocks	400	406	422	429	431	433	433	434	435	435	435
Net Trade	-2 900	-2 902	-2 937	-2 878	-2 813	-2 738	-2 659	-2 584	-2 508	-2 416	-2 327
United States											
Production	7 076	7 374	7 752	7 777	7 790	7 870	7 965	8 088	8 190	8 288	8 402
Consumption	9 635	9 459	9 522	9 639	9 698	9 808	9 930	10 059	10 166	10 291	10 423
Net Trade	-2 143	-2 034	-1 879	-1 896	-1 925	-1 955	-1 984	-2 000	-2 013	-2 029	-2 048

NOTE: Net Trade is total exports minus total imports. Hence positive net trade numbers is represent net exports and negative numbers represent net imports. Sugar is in raw sugar equivalent.
*Russia is not a WTO Member.
Source: FAPRI (2009).

Table A2. Annual Per Cent Change for Sugar in World and Select Countries

	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09
Prices						(U.S. Dollars per Metric Ton)				
FOB Caribbean Price	6,8%	30,2%	-22,7%	5,6%	-2,0%	33,3%	50,9%	-26,1%	17,2%	-4,9%
New York Spot	-16,6%	14,5%	-2,0%	5,4%	-5,6%	1,9%	8,0%	-7,7%	1,9%	-0,6%
World						(Million Metric Tons)				
Production	4,1%	-4,1%	2,8%	9,0%	-2,8%	-1,1%	2,8%	13,6%	1,4%	-4,9%
Consumption	1,8%	2,0%	3,7%	3,7%	-0,1%	2,0%	0,4%	6,9%	2,6%	3,2%
Net Trade	13,7%	-5,9%	0,9%	13,8%	-3,5%	2,1%	6,2%	4,9%	3,4%	-10,7%
Major Exporters										
Australia						(Thousand Metric Tons)				
Production	9,0%	-23,6%	12,0%	17,1%	-5,2%	4,1%	-1,7%	-1,6%	-3,5%	-2,6%
Consumption	0,0%	0,0%	20,6%	0,0%	-4,2%	0,0%	0,0%	8,7%	0,0%	-12,0%
Net Trade	1,1%	-25,9%	17,6%	14,4%	1,0%	7,0%	-5,4%	-8,3%	-1,8%	2,9%
Brazil										
Production	9,8%	-14,9%	19,3%	16,7%	10,9%	6,7%	-4,2%	16,9%	1,0%	1,9%
Consumption	0,0%	1,6%	2,2%	3,2%	6,7%	1,9%	-1,1%	2,0%	8,8%	2,2%
Net Trade	29,1%	-31,9%	50,6%	20,7%	8,9%	18,2%	-5,2%	22,0%	-5,3%	2,5%
Guatemala										
Production	3,6%	0,9%	9,6%	2,0%	1,4%	17,8%	-3,9%	12,9%	-7,0%	6,4%
Consumption	0,0%	3,8%	1,5%	5,3%	0,0%	31,2%	-2,9%	12,2%	4,1%	0,1%
Net Trade	5,0%	4,4%	9,1%	2,9%	0,0%	17,5%	-20,9%	20,9%	-6,5%	13,4%
South Africa										
Production	1,5%	7,8%	-12,2%	15,3%	-12,7%	-9,6%	12,1%	-10,9%	2,0%	-1,9%
Consumption	20,4%	13,0%	-4,5%	12,3%	-13,2%	1,6%	-0,3%	1,3%	1,0%	0,9%
Net Trade	-2,9%	5,2%	-26,4%	5,7%	-27,8%	3,2%	37,3%	8,8%	-13,4%	-19,1%
Thailand										
Production	6,2%	-10,7%	25,3%	13,9%	-3,8%	-26,0%	-6,8%	39,0%	16,4%	1,0%
Consumption	-8,3%	6,1%	4,7%	5,9%	2,1%	4,5%	-1,0%	-1,0%	8,4%	4,5%
Net Trade	23,7%	-18,2%	22,5%	27,0%	-8,0%	-35,9%	-28,0%	109,9%	4,1%	4,1%
Major Importers										
Canada										
Production	-23,2%	65,8%	-27,3%	-38,6%	81,5%	22,4%	-12,5%	23,8%	-3,1%	-32,5%
Consumption	3,1%	-1,8%	0,6%	11,8%	2,4%	-3,9%	4,0%	1,4%	2,8%	1,3%
Net Trade	7,0%	0,3%	1,9%	7,4%	0,0%	-7,6%	0,2%	8,6%	4,0%	2,1%
European Union										
Production	7,7%	-4,7%	-12,7%	16,1%	-8,1%	5,9%	-1,1%	-17,3%	-0,1%	-4,7%
Consumption	0,6%	-4,0%	0,3%	4,9%	-2,5%	-0,6%	-3,8%	19,0%	-8,5%	5,5%
Net Trade	21,1%	12,7%	-53,7%	32,6%	-6,2%	13,4%	82,7%	-144,8%	4,0%	1,5%
Indonesia										
Production	13,3%	6,5%	-4,2%	1,7%	-1,4%	18,5%	2,4%	-9,5%	2,6%	5,6%
Consumption	14,3%	3,1%	1,5%	1,5%	0,0%	4,4%	8,5%	11,7%	0,0%	4,7%
Net Trade	13,9%	-18,0%	0,6%	0,3%	-6,3%	-3,3%	24,1%	34,4%	1,2%	-10,2%
Russia*										
Production	15,4%	3,3%	5,2%	-3,1%	22,2%	16,6%	11,1%	26,0%	-4,8%	-1,7%
Consumption	22,7%	11,6%	2,9%	-9,1%	-4,7%	3,3%	-14,3%	10,2%	-3,5%	1,9%
Net Trade	-5,0%	8,2%	-17,6%	-15,8%	-4,8%	17,7%	-33,4%	-0,7%	-2,5%	7,4%
United States										
Production	8,2%	-3,1%	-9,9%	6,7%	2,6%	-8,9%	-6,1%	14,2%	-3,5%	-4,3%
Consumption	0,4%	0,2%	-1,6%	-2,6%	1,6%	3,3%	1,5%	-2,0%	6,3%	-1,4%
Ending Stocks	35,2%	-1,6%	-29,9%	9,3%	13,6%	-29,8%	27,5%	5,9%	-7,9%	-27,7%
Net Trade	-5,1%	-4,1%	-3,6%	13,6%	-7,7%	25,6%	76,0%	-48,8%	45,8%	-2,3%

* Russia is not a WTO Member.

Table A2. *Continued*

	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	Average
Prices					(U.S. Dollars per Metric Ton)						(99/00-08/09)
FOB Caribbean Price	0,1%	-2,6%	2,5%	2,0%	2,0%	2,3%	1,6%	1,5%	2,5%	2,1%	8,8%
New York Spot	7,3%	-3,5%	-0,6%	0,9%	0,9%	0,7%	-0,1%	-1,0%	-0,3%	-0,2%	-0,1%
World					(Million Metric Tons)						
Production	3,9%	2,6%	1,7%	1,8%	1,8%	1,8%	1,8%	1,8%	1,7%	1,7%	2,1%
Consumption	1,8%	2,3%	1,8%	1,8%	1,8%	1,8%	1,8%	1,8%	1,7%	1,7%	2,6%
Net Trade	17,2%	4,7%	2,3%	1,8%	1,7%	1,4%	1,5%	1,5%	0,9%	0,9%	2,5%
Major Exporters											
Australia					(Thousand Metric Tons)						
Production	3,4%	2,0%	1,2%	1,3%	1,3%	1,4%	1,4%	1,4%	1,3%	1,4%	0,4%
Consumption	12,2%	2,6%	1,9%	1,9%	1,9%	1,8%	1,9%	1,9%	1,8%	1,8%	1,3%
Net Trade	-2,2%	2,2%	1,2%	1,2%	1,1%	1,2%	1,3%	1,2%	1,2%	1,2%	0,3%
Brazil											
Production	16,8%	4,9%	2,4%	2,0%	1,9%	1,6%	1,8%	1,7%	1,1%	1,0%	6,4%
Consumption	2,1%	2,1%	2,0%	2,0%	1,9%	1,9%	1,9%	1,9%	1,8%	1,8%	2,8%
Net Trade	26,9%	6,4%	2,7%	2,1%	1,9%	1,5%	1,7%	1,7%	0,7%	0,6%	11,0%
Guatemala											
Production	2,2%	2,2%	2,3%	2,7%	2,9%	3,0%	3,0%	3,0%	3,0%	3,0%	4,4%
Consumption	2,8%	3,3%	2,5%	2,5%	2,4%	2,3%	2,4%	2,4%	2,2%	2,2%	5,5%
Net Trade	2,7%	1,6%	2,3%	2,8%	3,1%	3,3%	3,3%	3,3%	3,4%	3,4%	4,6%
South Africa											
Production	0,6%	0,3%	0,7%	1,1%	1,2%	1,3%	1,2%	1,2%	1,2%	1,3%	-0,8%
Consumption	1,7%	1,4%	0,9%	1,1%	1,1%	1,6%	1,9%	1,9%	1,8%	2,0%	3,2%
Net Trade	-13,0%	-5,0%	-0,2%	0,8%	1,4%	0,4%	-0,6%	-0,7%	-0,1%	-0,5%	-3,0%
Thailand											
Production	4,1%	2,7%	1,9%	1,5%	1,2%	1,1%	1,1%	1,1%	1,1%	1,2%	5,4%
Consumption	1,5%	2,3%	1,5%	1,9%	1,8%	1,9%	1,9%	1,8%	1,6%	1,7%	2,6%
Net Trade	12,1%	4,8%	2,8%	1,5%	1,1%	0,8%	0,7%	0,8%	1,0%	1,0%	10,1%
Major Importers											
Canada											
Production	1,2%	1,7%	0,9%	1,0%	0,9%	0,9%	1,0%	1,1%	1,1%	1,3%	5,6%
Consumption	2,0%	2,3%	1,2%	1,1%	0,8%	0,6%	0,9%	1,2%	0,9%	0,9%	2,2%
Net Trade	4,4%	2,8%	1,2%	1,0%	0,7%	0,6%	0,9%	1,2%	0,9%	0,9%	2,4%
European Union											
Production	-6,8%	0,6%	0,0%	-0,1%	-0,1%	-0,1%	0,0%	0,0%	-0,1%	0,0%	-1,9%
Consumption	-0,6%	0,3%	0,3%	0,2%	0,2%	0,2%	0,2%	0,2%	0,2%	0,2%	1,1%
Net Trade	91,8%	-1,9%	1,5%	1,2%	1,2%	1,1%	0,9%	0,8%	0,9%	0,7%	-3,7%
Indonesia											
Production	1,2%	1,1%	1,1%	1,1%	1,0%	1,0%	1,1%	1,1%	1,2%	1,2%	3,6%
Consumption	1,7%	1,9%	1,8%	1,7%	1,7%	1,8%	1,7%	1,7%	1,6%	1,6%	5,0%
Net Trade	10,4%	4,8%	3,0%	2,4%	2,2%	2,3%	2,2%	2,1%	1,8%	1,8%	3,7%
Russia*											
Production	1,2%	2,1%	2,2%	2,5%	2,6%	2,6%	2,6%	2,6%	2,6%	2,6%	9,0%
Consumption	0,6%	1,5%	0,3%	0,3%	0,2%	0,1%	0,2%	0,2%	0,0%	0,1%	2,1%
Net Trade	0,1%	1,2%	-2,0%	-2,3%	-2,7%	-2,9%	-2,8%	-2,9%	-3,6%	-3,7%	-4,6%
United States											
Production	4,2%	5,1%	0,3%	0,2%	1,0%	1,2%	1,5%	1,3%	1,2%	1,4%	-0,4%
Consumption	-1,8%	0,7%	1,2%	0,6%	1,1%	1,2%	1,3%	1,1%	1,2%	1,3%	0,6%
Ending Stocks	-4,7%	10,5%	3,0%	1,4%	1,4%	1,5%	2,3%	2,9%	2,0%	2,0%	-0,5%
Net Trade	-5,1%	-7,6%	0,9%	1,5%	1,6%	1,5%	0,8%	0,6%	0,8%	0,9%	8,9%

* Russia is not a WTO Member.

ANNEX B

Outline of Schedule of Commitments Based on the Most Recent Draft Modalities

The modalities used in this analysis are derived from the December 2008 *Revised Draft Modalities for Agriculture* put forth by Ambassador Crawford Falconer, chairperson of the agriculture negotiations (WTO 2008a). The current draft is a revision of a July 2008 draft, which was based on 10 months of negotiations.

Market access

Tariffs

All final bound out-of-quota tariffs are subject to the reductions presented in Table B1. In order to determine appropriate tariff reductions, non-*ad valorem* tariffs are to be converted to *ad valorem* equivalents using the required WTO methodology.[36] Developed countries are to re-duce their final bound tariffs in 6 equal annual instalments over 5 years while developing coun-tries are to reduce their tariffs in 11 equal annual instalments over 10 years. The reductions for developing countries are two-thirds of the cuts for developed countries. The minimum average reduction on final bound tariffs that a developed country is required to undertake is 54 per cent. The maximum average reduction on final bound tariffs that a developing country is required to implement is 36 per cent. Recently-acceded members can moderate the reductions in column 4 of Table B1 by up to 8 *ad valorem* percentage points and can exempt their final bound tariffs at or below 10 per cent from reductions in bound tariffs. Furthermore, their implementation period may be extended by up to 2 years beyond the initial end.

Table B1. Tariff Reductions

Developed country Reductions		Developing country Reductions	
Thresholds of *ad valorem* equivalents of tariffs	Reduction	Thresholds of *ad valorem* equivalents of tariffs	Reduction
0 < d ≤ 20	50%	0 < d ≤ 30	33.33%
20 < d ≤ 50	57%	30 < d ≤ 80	38.00%
50 < d ≤ 75	64%	80 < d ≤ 130	42.67%
75 < d	70%	130 < d	46.67%

Sensitive products

Developed countries can designate up to 4 per cent of tariff lines as "Sensitive Products" while developing countries can designate up to one-third more of tariff lines as "Sensitive Products".[37] Countries can deviate from the tariff reductions indicated in Table B1 by one-third, one-half or two-thirds of the reductions with uniform deviations for all tariff lines for a specific product.

Tariff rate quota (TRQ) increases for deve-loped countries are proposed to result in new market access equivalent to no less than 4 per cent of the volume of domestic consumption where two-thirds deviation is applied, no less than 1 per cent less than that percentage of domestic consumption where one-third deviation is used, and no less that 0.5 per cent less than that percentage of domestic consumption where one-half deviation is used. If the existing TRQ already adds up to 10 per cent or more of dome-stic consumption, developed countries can adjust their obligations to expand the TRQ volumes according to a specified formula. For developing countries, the TRQ expansion is two thirds of the volume for developed countries. There are addition provisions for developing countries allowing for smaller deviations and longer implementation periods.

In-quota tariff rates for developed country Members are to be reduced by 50 per cent or to a threshold of 10 per cent, whichever yields a lower tariff with the maximum rate of 17.5 per cent at the start of the implementation. Rates at or below 5 per cent are to be reduced to zero at the end of the first year. The reductions are to be implemented on the same time-frame as the TRQ expansions. Developing countries' in-quota tariff rates are to be reduced by 15 per cent while recently-acceded countries are to be reduced by one-third of the reduction for developing countries with no reductions for rates at or below 15 per cent.

Special agricultural safeguard (SSG)

On the first day of implementation, the tariff lines eligible for SSG are to be reduced to 1 percent of the scheduled tariff lines of developed countries and to be eliminated no later than the end of year 7 of the implementation period. If the SSG entitlement includes a sensitive product, the TRQ expansion applicable to the two-thirds deviation is to be used and the standard implementation period for in-quota rate reductions also apply. In the case of developing countries, the lines eligible for SSG are to be reduced to no more than 2.5 per cent of tariff lines.

Special Products

Developing countries may declare some pro-ducts "Special Products" for food/economic security and rural development purposes. For these countries, 12 per cent of the tariff lines are eligible for "Special Product" designation. Five per cent of the lines qualify for no reductions and the overall average reduction is 11 per cent. Thirteen per cent of tariff lines can be designated as "Special Products" for recently-acceded Members with the overall average cut for these lines to be further reduced to 10 per cent.

Special Safeguard Mechanism (SSM)

A price-based or a volume-based Special Safeguard Mechanism can be invoked on any tariff line. In terms of the volume-based SSM, additional duties can be imposed on applied tariffs if import volumes exceed a specified per cent of base imports (rolling average of imports in the preceding 3-year period). The price-based SSM applies where the c.i.f. import price falls below the trigger price.

Tropical and diversification products

For developed countries two options are proposed for the modality to be applied over and above the tiered formula. The first is to reduce the scheduled tariff to zero where it is less than or equal to 25 per cent ad valorem and to cut the tariff by 85 per cent if it exceeds 25 per cent. This is to be implemented in 4 equal annual steps. Under this option, tropical and diversification products cannot be treated as sensitive products. The second option is to reduce the tariff by 70 per cent where the tariff is greater than or equal to 10 per cent (except for tariffs in the top band, which have a different reduction) and reduce it to zero where the tariff is less than 10 per cent. These reductions are to be implemented with the general tariff reduction implemen-tation period.

Long–standing preferences and preference erosion

Two options are available: no tariff reductions on these products for 10 years with reductions to be implemented after that period in equal annual instalments over 5 years; or under certain conditions, tariff reductions provided by long-standing preference granting country Members be implemented in equal annual instalments over a period that is two years longer than the implementation period for developing country Members for tariff cuts under the tiered formula.

Least–Developed Countries

Least-developed country Members are not required to undertake reductions in bound duties.

Domestic Support

For domestic support, the reductions apply mainly to developed countries with a few exceptions in the developing region. The base level for the reductions in the Overall Trade Distorting Domestic Support (OTDS) is made up of three components. It is the sum of the Final Bound Total AMS plus 10 percent of the average total value of agricultural production in the 1995-2000 base period (20 percent for developing countries) plus the average Blue Box payment or 5 percent of the average total value of agricultural production in the base period, whichever is higher.[38] Overall, the proposal calls for significant reductions in total support and amber box support, tighter caps on blue box support, and caps on product-specific Aggregate Measures of Support (AMS). Table B2 shows the tiered reduction formula for Base OTDS and the Final Bound Total Aggregate Measure of Support.

Developed countries with OTDS base levels of 40 per cent or more of the average total value of agricultural production in the base period will undertake an additional 5 per cent reduction, i.e., equal to one half of the difference between the reductions rates in the first and second tiers presented in Table B2.

Table B2. Proposed Reduction in Domestic Support for Developed Countries

	Base level in Overall Trade Distorting Support (OTDS)		Final Bound Total Aggregate Measure of Support (FBAMS)	
	Thresholds (billion USD)	Reduction	Thresholds (billion USD)	Reduction
Tier 1	> 60	80%	> 40	70%
Tier 2	10 < OTDS ≤ 60	70%	15 < FBAMS ≤ 40	60%
Tier 3	0 < OTDS ≤ 10	55%	0 < FBAMS ≤ 15	45%

The implementation period for developed nations is five years to be implemented in 6 steps. Countries in Tiers 1 and 2 are to reduce their Base OTDS by one-third at the beginning of the implementation period followed by 5 equal annual reductions. For countries falling in the third tier, the proposal is to reduce their base OTDS by 25 per cent at the start of the implementation period followed by 5 equal annual reductions. For the developing countries required to undertake reduction commitments in their Base OTDS, their Final Bound Total AMS reduction commitment is two-thirds of the relevant rate in Tier 3. The implementation period for these countries is 8 years to be implemented in 9 steps with an initial reduction of 20 per cent and 8 equal annual reductions after that. The reduction, implementation period and staging requirements also apply to recently-acceded members with reduction commitments.

Developed countries with Final Bound Total AMS of 40 per cent or more of the average total value of agricultural production in the base period, and who are in Tier 2, will undertake an additional reduction equal to the difference between the reductions rates in the first and second tiers presented in column 4 in Table B2. For countries in Tier 3, the additional reduction is one half of the difference between the reduction rates in Tiers 2 and 3.

The implementation period for developed countries reducing their Final Bound Total AMS is five years. The reductions are to be implemented in 6 instalments. Countries in Tiers 1 and 2 have an initial reduction of 25 per cent on the first day and then 5 equal annual reductions. For the other countries, the reductions are in 6 equal annual stages starting on the first day of implementation. Qualified developing countries (with Final Bound Total AMS above USD100 million) are to reduce their Final Bound Total AMS by two-thirds of the Tier 3 reductions required of developed nations to be implemented in 9

equal annual reductions over 8 years. Recently-acceded member countries with reduction commitments are also required to follow the same implementation period, staging and reduction rates as the developing nations.

Product-specific AMS: Except for the United States, the product-specific AMS limits for developed countries are set at the average of the product-specific AMS 1995-2000 levels. In the case of the US, the product-specific AMS limits are determined by applying pro-portionately the 1995-2004 average product-specific AMS to the 1995-2000 average product-specific total AMS support. There are provisions in place for cases when the product-specific AMS support is above or below the *de minimis* level provided under the Uruguay Round. Special and differential treatment applies to developing country members.

De minimis: For developed countries, *de minimis* levels (5 per cent of the value of production in both product-specific and non-product-specific cases) is proposed to be reduced by no less than 50 per cent starting on the implementation date. This applies to both product-specific and non-product-specific *de minimis*. In cases where, with the reduction, the Annual or Final Bound OTDS commitment is still not met, countries have to undertake additional reductions in *de minimis*

Export Competition

Export subsidies

Developed country budgetary outlay com-mitments are to be cut by 50 per cent by the end of 2010 in equal annual instalments and the rest reduced to zero in equal annual instalments so that all exports subsidies are eliminated by the end of 2013. Quantity commitment levels are to be set at the actual average of 2003-2005 base period levels throughout the implementation period.

support. For developing countries, where *de minimis* levels are 10 per cent of the value of production for product-specific and non-product-specific support, the reductions are at least two-thirds of the reductions required of developed countries with implementation three years from the first day. To ensure that Annual Bound or Final OTDS commitments are not exceeded, developing countries may need to implement additional reductions in support. Recently-acceded members with 5 per cent *de minimis* levels will be expected to reduce these levels by at least one-third of the developed countries' reduction rates with the implementation period being 5 years longer.

Blue box: The maximum value of support is capped at 2.5 per cent of the average total value of agricultural production based on 1995-2000 levels and applies from the first day of the implementation period. The maximum value of support is limited to 5 per cent of the average total value of agricultural production based on 1995-2000 or 1995-2004, whichever is selected, for developing and recently-acceded members.

Green box: Domestic support measures which are considered to have no or minimal trade- and production-distorting effects are exempt from reduction commitments.

Developing countries are to reduce to zero their budgetary outlays and quantity commit-ments in equal annual instalments by the end of 2016.

Additional provisions are also proposed for export credit and insurance programmes, agricultural exporting state trading enter-prises, and international food aid programs.

ANNEX C

Structure of the International Sugar Model[39]

The international sugar model is a non-spatial, partial-equilibrium world model consisting of 30 countries/regions, including a Rest-of-the-World aggregate to close the model.[40] The model is used to establish a baseline of 10-year projections for sugar supply, utilisation and prices and for policy analysis. It includes major sugar producing, exporting, and importing countries. The model specifies only raw sugar production, use, and trade between countries/regions and does not disaggregate refined trade from raw trade. Country coverage consists of the following countries/regions: Algeria, Argentina, Australia, Brazil, Canada, China, Colombia, Cuba, Egypt, European Union-27, Guatemala, India, Indonesia, Iran, Japan, Malaysia, Mexico, Morocco, Pakistan, Peru, Philippines, Russia, South Africa, South Korea, Thailand, Turkey, the Ukraine, the United States, Venezuela, and a Rest-of-World aggregate.[41]

The general structure of the country sub-model includes behavioural equations for area harvested, yield, production for sugarcane and sugar beet on the supply side, and per capita consumption and ending stocks on the demand side. Equilibrium prices, quantities, and net trade are determined by equating excess supply and excess demand across countries and regions. Using price transmission equations, the domestic price of each country or region is linked with a representative world price (Caribbean f.o.b. price) through exchange rates and other price policy wedges such as tariffs and transfer-service margins.. The general framework for each country sub-model consists of the following:

Harvested area at time t:

$$AH_t = f(AH_{t-1}, RSPP_{t-1}, RGP_{t-1}, Trend) \quad (1)$$

Yield at time t:

$$Yield_t = f(Yeld_{t-1}, Trend) \quad (2)$$

Cane and beet crop production at time t:

$$Production_t = AH_t \, x \, Yield_t \quad (3)$$

with AH denoting acreage, RSPP being the cane or beet price, and RGP denoting the price of alternative crops; subscripts indicate the time period.

Total sugar production is obtained by converting raw cane production and beet production into raw sugar equivalent. Sugar consumption per capita is determined by the real price of sugar and income per capita:

Per capita sugar consumption at time t:

$$= f(RSP_t, PCRGDP_t) \quad (4)$$

with RSP being the real consumer price of raw sugar, and $PCRGDP$ representing real income per capita; total demand is the product (population * per capita consumption). The GDP deflator is used to change nominal variables into real variables. Inventory demand at time t is

$$ES_t = f(ES_{t-1}, SC_t, RSP_t) \quad (5)$$

with ES representing ending stock, and SC denoting sugar consumption.

In many countries, the beet or cane prices are set by policy and can be treated as being predetermined. In countries where there is limited information on agricultural price, the raw sugar price, RSP, is used instead of the agricultural prices in the specification of the acreage response. In some countries, yield improvements are captured by a time trend. The excess demand (supply) of each country goes to the world market for raw sugar, and the sum of all excess demands and supplies is equal to zero by market clearing to determine the world market price.

The Caribbean raw sugar price is generally considered to be the representative world market price. The model uses price transmission elasticities to link the world and domestic markets for each country. The price

transmission equations assume that agents in each country are price-takers in the world market. Countries are either a natural importer or exporter if their autarkic price falls above or below the free-trade world price, respectively. Abstracting from any spatial considerations and assuming an "ad valorem tariff only" regime, the domestic price can be expressed as

$$P^d = a + \beta \times P^w \times r \times (1+d) \quad (6)$$

where P^d is the domestic sugar price, P^w is the world price of sugar including international transportation cost if the country is an importer (f.o.b. price for exporters), r is the exchange rate, and d summarises policy interventions between the world and domestic markets and is expressed in *ad valorem* form. Parameter a captures the divergence of the domestic and border price that does not depend on the price level but rather reflects transaction costs arising between the farmgate and the market place and/or marketing mark-ups. Parameter β allows imperfect transmission between world and domestic prices. Depending on data availability, domestic prices in the sugar model can be farm, wholesale, or retail prices. Because of the homogeneous nature of sugar, quality adjustments are not incorporated in the price transmission equations. In general, only one domestic price is used in the model.[42] Consumer and producer prices are differentially specified only in countries that have a deficiency type of producer support or an explicit tax on consumption.

This general structure is slightly modified to accommodate policy interventions other than price distortions, such as quantitative restrictions on area, supply, or trade flows. For example, imports constrained by binding TRQs are treated as exogenous, and domestic prices are solved endogenously. Policy interventions providing a price floor are treated as such and are effective whenever the domestic producer price falls to the price floor level (e.g., the US loan rate).

Data for area, yield, sugarcane, and sugar beet production were gathered from the Food and Agricultural Organisation (FAO) of the United Nations, and data for sugar pro-duction, consumption, and ending stocks were obtained from Production, Supply and Distribution (PSD) View of the US Department of Agriculture. Cane and beet production is tied to sugar production through the extraction rate. Macroeconomic data such as real gross domestic product (GDP), GDP deflator, population, and exchange rate were gathered from various sources, including the International Monetary Fund and Global Insight. Table C1 presents the exchange rate by country used to make the conversions from local currency to USD and vice versa.

Table C1. Exchange Rate (Local Currency per USD)

Country	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Argentina	1.0	1.0	1.0	1.0	1.0	1.0	1.0	3.1	2.9	2.9
Australia	1.3	1.3	1.3	1.6	1.5	1.7	1.9	1.8	1.5	1.4
Canada	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.6	1.4	1.3
EU	0.8	0.8	0.9	0.9	0.9	1.1	1.1	1.1	0.9	0.8
Japan	94.1	108.8	121.0	130.9	113.9	107.8	121.5	125.4	115.9	108.2
Korea	771.3	804.5	951.3	1401.4	1188.8	1131.0	1291.0	1251.1	1191.6	1145.3
Mexico	6.4	7.6	7.9	9.1	9.6	9.5	9.3	9.7	10.8	11.3
Morocco	8.5	8.7	9.5	9.6	9.8	10.6	11.3	11.0	9.6	8.9
South Africa	3.6	4.3	4.6	5.5	6.1	6.9	8.6	10.5	7.6	6.5
Thailand	24.9	25.3	31.4	41.4	37.8	40.1	44.4	43.0	41.5	40.2

Demand and supply price responses and income response for demand are econometric estimates or, when not available, consensus estimates. Simple linear specifications and ordinary least squares are used in the estimation of these equations to save degrees of freedom, given the short time series used. This estimation approach treats sugar prices as exogenous for estimation purposes. Elasticities in the model are comparable to most existing estimates and do not depart from the conventional wisdom on price-inelastic sugar markets. The own-price elasticities of sugarcane supply are highly inelastic in the short run. This feature is consistent with the fact that several annual crops can be harvested from one planting of sugarcane. Therefore, there is limited acreage adjustment to price fluctuations in the short run. The own-price supply elasticities for sugar beet production are generally not as inelastic as they are for sugarcane since beet is an annual crop. On the demand side, the own-price and income elasticities reflect the fact that in many developing countries sugar is considered a staple in the diet.

ANNEX D

Table D1: Impact of Tariff Reductions on World and Select Countries (Per Cent Change from Baseline and Table D2: Impact on World and Select Countries If Sugar is Treated as a Tropical Product (Per Cent Change from Baseline) are provided in Excel format because of size. The tables are available on ICTSD's website at: http://ictsd.net/i/publications/57666/

ENDNOTES

1   This, of course, is dependent on how sugar is treated, i.e., as a sensitive product, special product, etc.

2   The historical period ends in 2008/09 and the projections begin in 2009/10. However, since the marketing year 2008/09 is currently not over, the forecasts provided by US Department of Agriculture for this year are taken as history.

3   All sugar is in raw sugar equivalent unless specified otherwise.

4   For more details on the historical and projected supply and utilization of sugar for the world and for select countries, see Table A1 in Annex A. Table A2 in Annex A shows the annual percentage changes for supply and utilization and the average percentage change for 1998/99 through 2008/09 globally and for the major countries.

5   Although Surinam and Uganda are part of the Protocol, they have no quotas assigned to them.

6   The EU sugar policy is also described in the next section in the context of the Common Market Organisation Sugar reforms.

7   Total imports through preferential trade agreements add up to 3.3 million metric MT (white sugar equivalent).

8   In 2007/08, the European Commission imposed a mandatory cut in the production quota of 2 million MT as sugar companies failed to renounce the necessary amount of quota to balance the market. This was the second time the Commission imposed a mandatory cut. In 2006/07, the quota was cut by 2.5 million MT.

9   The United Nations defines Least Developed Nations based on the following three criteria: gross national income per capita, Human Asset Index and Economic Vulnerability Index.

10   EBA includes 5 ACP Sugar Protocol signatories and 4 ACP non-protocol members (CEC 2005b).

11   Until full liberalisation in 2009, EBA imports are counted against Special Preferential Sugar volumes.

12   The EPAs are regional trade agreements aimed at integrating ACP countries into the global economy through trade, agriculture, services and development (USDA FAS, 2009).

13   This safeguard clause expires in 2014/15.

14   According to European Commission (CEC 2005a) 41 per cent of all Sugar Protocol countries' sugar production is exported to the EU. Because of the higher EU price, this translates to 71 per cent of sectoral revenue obtained from the EU market. More dependence on the EU sugar market is seen in ACP countries like Fiji and Mauritius and less in countries like Mozambique and Swaziland.

15   Chaplin and Matthews (2005) indicate that, unlike in ACP countries where the long-term effects of preferential access have become institutionalized, in LDCs there is less dependence on CMO sugar.

16   Under the reforms, the sugar price received by LDCs is set at no lower than the guaranteed price for ACP countries and India.

17   These numbers are much higher if van Berkum, Roza and van Tongeren (2005) remove the assumption that EU and LDC sugar are imperfect substitute, i.e., that sugar is a homogeneous product. In this case EPA exports would increase to 2.7 million tons pre-reform and by 915,000 tons post reform.

18   The higher figure assumes countries taking advantage of the swaps provision.

19   This model is part of the agricultural modelling system that includes crop and livestock models developed and maintained at the Center for Agricultural and Rural Development, located at Iowa State University.

20   Although exports from the African, Caribbean and Pacific (ACP) countries make up the majority of the EU's raw sugar imports, the ACP as a region is not modelled explicitly. Imports under TRQ are represented exogenously in the baseline.

21   Supply and utilisation data as well as macroeconomic data for individual countries is available at Iowa State University's Food and Agricultural Policy Research Institute (FAPRI) (www.fapri.iastate.edu/outlook/). Elasticity values for demand and supply price responses and income response of demand are also available from FAPRI (www.fapri.iastate.edu/tools/elasticity.aspx).

22   The exchange rates used in the currency conversion in this study are listed in Table C1 in Annex C.

23   The applied tariffs for each country are the most recently reported tariffs available from the United States Department of Agriculture, Foreign Agricultural Service GAIN Reports and from the WTO country schedules.

24   Although there are a total of 29 countries, Algeria, Iran and Russia are not WTO members and as a newly acceded member, Ukraine is not required to reduce its bound tariffs. No changes in tariffs were implemented in these countries. However, the countries are impacted through the changes in the world price of sugar resulting from reductions in the tariffs of WTO Members as listed in Table 3. See Annex D for the impact on these countries.

25   Certain Members like Japan may have tariffs in excess of 100 per cent outside the sensitive product designation provided they apply a further TRQ expansion of 0.5 per cent of domestic consumption for all sensitive products, or the tariff cut is applied 2 years faster than otherwise required or is increased by an additional 10 per cent.

26   This reduction was not applied in the US and Mexico sub-models where the domestic prices are solved endogenously. If the US tariff was reduced, the results would show higher world prices and consequently, a larger response from the rest of the world. In the case of Mexico, the tariff reduction would be from 88 per cent to 83.2 per cent, i.e., the impact would be small.

27   More detailed results are provided in Table D1, Annex D.

28   Countries are allowed to have tariffs above 100 per cent if sugar is declared a sensitive product but that would require an additional expansion in the TRQ of 0.5 per cent of domestic consumption. Additionally, for developing countries, no in-quota rate reductions are required if sugar is declared a special product for food security, livelihood security and rural development purposes.

29   More detailed results are provided in Table D2, Annex D.

30   Because of the set up of the US and Mexico sugar models, which solve for a domestic sugar price, the tariff reductions in the US and Mexico were not implemented. As in the EU and Japan, the implementation of the US tariff reductions would increase US imports and result in a larger increase in the world price. The impact of the reduction in the tariff in Mexico, which declines from 50 per cent to 42.5 per cent, would be small.

31   The Overall Trade Distorting Support levels were obtained from Jean, Josling and Laborde (2008) for the EU, Yamashita (2008) for Japan and Blanford, Laborde and Martin (2008) for the US.

32   All notifications are in marketing year except for Argentina, Australia, Brazil and EU. For these countries, 1995 corresponds to 1995/96 and so on.

33   The period 1995-2000 provides higher limits for developing countries.

34   The CMO sugar reforms mandate the EU Commission to "withdraw" a percentage of quota sugar if the market situation demands such a measure.

35   Sugar for ethanol does not count against the sugar production quota.

36   Another proposed option is to require that no less than 90 per cent of bound tariffs in a developed country be expressed as *ad valorem* with a decision on how to achieve 100 per cent coverage no later than 1 year after the end of the implementation period. This study uses WTO methodology to convert non-*ad valorem* tariffs to *ad valorem* equivalents as follows: AVE= (Specific tariff *100)/(Value of imports/quantity of imports) using a weighted average for 1999-2001. Exchange rates and conversion factors for quantity units are used where appropriate.

37   The selection of sensitive products is still unclear. The draft offers two options: either limited to products that have an existing TRQ or no restrictions on declaring a product sensitive. However, the chairperson, in a separate document, contends that neither option will prevail and offers a proposal for tariff quota creation for sensitive products (WTO 2008b).

38   The base period for developing countries can be either 1995-2000 or 1995-2004 as selected by the Member country.

39   This description of the international sugar model is obtained from Elobeid and Beghin (2006) "Multilateral Trade and Agricultural Policy Reforms in Sugar Markets," *Journal of Agricultural Economics*, Volume 57, Number 1: 23-48.

40   This model is part of the agricultural modelling system that includes crop and livestock models developed and maintained at the Center for Agricultural and Rural Development, located at Iowa State University.

41   Although exports from the African, Caribbean and Pacific (ACP) countries make up the majority of the EU's raw sugar imports, the ACP as a region is not modelled explicitly. Imports under TRQ are represented exogenously in the baseline.

42   Sugar is a true homogeneous commodity resulting in a single world price in a global sugar market. This implies that in trade its origin is undistinguishable, as opposed to cereals or oilseeds, which are highly differentiated products and for which trade is more specialised and spatial.

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