DIAGNOSTIC STUDY

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I.   AGRICULTURAL LIBERALIZATION A DOUBLE-EDGED SWORD

Small island developing States (SIDSs)[1] face a number of structural problems that render them less competitive in agricultural trade than many other developing countries. The United Nations, and in particular UNCTAD, has been studying the specific problems of island developing countries since the 1970s with a view to sensitizing the international community to their distinctive needs, and, more recently, to their specific vulnerability (Encontre, 1999).[2] To a greater extent than in most other developing countries, and notably as a result of acute limitations in the resource base and domestic market opportunities available to SIDSs, the magnitude, structure and variability of trade constitutes the most important factors affecting their socioeconomic performance and development capacity. On average, the ratio of merchandise imports to gross domestic product (GDP) is 47 per cent higher in SIDSs than in other small economies, while the ratio of their agricultural trade (exports and imports combined) to GDP is the highest amongst all countries. Larger countries can count on both their domestic and international markets to foster economic growth, but SIDSs have to rely on their export markets as the only avenue for reaping the benefits of economies of scale and capital accumulation (Streeten, 1993).

The constraints faced by SIDSs, which hamper their competitiveness in international markets are well documented.[3] Factors such as small size, insularity and remoteness, and problems associated with the local environment are all obstacles to achieving efficiency in production (Briguglio, 1995). Because of their small land base and population, SIDSs have limited ability to exploit economies of scale in agricultural production. Land scarcity, in particular, is a binding constraint on agricultural production, making SIDSs highly dependent on food imports. SIDSs are net agricultural importers and depend on a small number of agricultural exports to pay for their food import bill.

Similarly, small size restricts the capacity of SIDSs to diversify exports. The need to secure certain scale economies in production, distribution and other economic activities, together with the aim of taking advantage of some export market opportunities have, to varying degrees, led SIDSs to specialize in a narrow range of agricultural products. This has exposed them to instabilities in world markets. Insularity and remoteness also give rise to problems associated with transportation of agricultural imports and exports. SIDSs tend to import and export fragmented cargoes of agricultural products, leading to high per unit shipping costs. They do not have the flexibility of road transport in handling small shipments.

Additional costs might arise, in some instances, with the need to provide indivisible and expensive public goods to support agricultural production. This is bound to be particularly expensive given the limited production involved. Higher costs mean a loss of competitiveness, which in turn frustrates diversification.

Finally, environmental degradation (as well as proneness to natural disasters) and resource depletion may have serious implications for agriculture in SIDSs. Due to their small size, the depletion of arable land for economic development has had a disproportional effect on agricultural production. Limited freshwater and poor water management, along with population pressures and an expanding tourism industry, have led to water scarcity, further jeopardizing agricultural production.

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[1] UNCTAD considers as SIDS all island developing countries and territories with a population of less than 5 million people. While both the United Nations and the Commonwealth Secretariat make use of population as the benchmark for determining smallness, there is no officially agreed international definition of smallness. The Vulnerability Report, 1985 of the Commonwealth Secretariat uses as a threshold a population of 1 million (subsequently increased to 1.5 million), but also regards as small States countries with a larger population, such as Papua New Guinea and Jamaica. Others (Briguglio, 1993, Downes, 1988) use a composite index of population, land area and GNP.

[2] In 1994, a Global Conference on the Sustainable Development of Small Island Developing States (Barbados, April/May 1994), resulted in a Programme of Action for the Sustainable Development of Small Island Developing States. In September 2002, the World Summit on Sustainable Development (Johannesburg, South Africa), in its Plan of Implementation (para.55), requested the United Nations General Assembly at its 57th session to consider convening a new international meeting on the Sustainable Development of Small Island Developing States

[3] See for example, Briguglio, 1995; UNCTAD, 1997; the Commonwealth Secretariat's Small States: Economic Review and Basic Statistics, Annual Series; Downes, 1988; Lockhart, Drakakis-Smith and Schembri, 1993; and Encontre, 1999.

Offsetting these inherent disadvantages to some extent are various preferential market access arrangement enjoyed by many SIDSs. These provide duty-free access to specific developed country markets. The European Union (EU) market for sugar is of greatest significance in this regard.

Liberalization is a double-edged sword for SIDSs. On the one hand, maintaining and obtaining market access is very important for trade-dependent economies. On the other hand, liberalization also provides additional competition, particularly if preferential access is eroded. While some SIDSs will be able to swim with the tide of liberalization, others will need help to adjust. Against this background, the objective of this study is twofold: to examine the pattern of agricultural trade of SIDSs in the world market, and to provide a quantitative assessment of the likely impacts of continued multilateral agricultural liberalization on SIDSs using UNCTAD's Agricultural Trade Policy Simulation Model (ATPSM). This is of particularly interest, given that liberalization may erode the preferential access currently provided to SIDSs.

In Section I the paper reviews the main characteristics of the agricultural sector in SIDSs, focusing on trade flows and constraints that affect their competitiveness in agriculture. An overview of the preferential trading arrangements available to SIDSs in their main markets and the importance of these schemes for their exports is also provided.

Section II provides a quantitative assessment, through the use of the ATPSM, of a number of scenarios derived from "modalities" that are being discussed in the ongoing World Trade Organization (WTO) negotiations on agriculture. The simulations show the potential impact of liberalization on prices, exports, government revenues, quota rents and overall welfare. While SIDSs as a whole may be worse off under certain assumptions, policies to improve their position are examined.

II.   EXPORT-DEPENDENT SIDSS FEAR EROSION OF PREFERENCES

II.1   Agricultural production and trade patterns of SIDSs

For many SIDSs, the agricultural sector remains the backbone of their economies. It is characterized by a combination of large-scale commercial production of cash crops and a relatively small sector that produces food crops, primarily for local consumption. The most important food crops grown are starchy staples, mostly root and tuber crops. Rapid urbanization has lead to these staples being replaced by imported cereals (FAO, 1999a).

Annex I. and annex II. provide detailed trade statistics. The agricultural trade balance of selected SIDSs is shown in table 1. The import-to-export ratio differs greatly between SIDSs (see annexes for country break-downs), but as a group SIDSs are net agricultural importers — for every $1 exported, SIDSs import $1.10. Atlantic Ocean SIDSs have the highest import-to-export ratio, while Pacific Ocean SIDSs are net agricultural exporters.

Table 2 provides the top five agricultural import/export products of SIDSs by the degree of product concentration in their agricultural trade.

SIDSs import a wide variety of agricultural products, particularly cereals, meats, dairy products, and animal and vegetable fats. These agricultural imports consume 20 per cent of their total export earnings. For some SIDSs, their agricultural import bill exceeds total export revenue, for example, for Cape Verde by 240 per cent, Comoros by 197 per cent, Haiti by 117 per cent and Tuvalu by 109 per cent.

Table 3 compares the relative importance of agricultural trade of SIDSs with that of other country groups (developed, developing and LDCs). As exporters, SIDSs' agricultural exports are concentrated

in such products as raw cane sugar, coffee, cocoa and coconut. For many SIDSs, these few agricultural products are the main source of export earnings. On average, agricultural exports and imports by SIDSs account for 24 per cent and 14 per cent respectively of their total merchandise exports and imports; this shows a considerably higher dependence of their trade on the agricultural sector than the developing country average. In fact, this trade pattern of SIDSs is remarkably similar to that of the least developed countries (LDCs). In the case of Sao Tome Principe over 90 per cent of agricultural export earnings are derived from cocoa alone.

Apart from concentration of the type of exported products, SIDSs' agricultural exports also show a concentration of the destinations, further increasing their vulnerability to external shocks. As shown in table 4, the EU receives more than half of the total agricultural exports of SIDSs; it is the most important market for African SIDSs, accounting for 87 per cent of their agricultural exports. The Pacific SIDSs export around 65 per cent of their agricultural products (largely from Fiji and Papua New Guinea) to the EU, notwithstanding their geographical distance.

Similarly, the United States and Canada (though to a much lesser extent than the EU) are important markets for SIDSs, receiving 29 per cent of their agricultural exports. The Caribbean islands agricultural exports to these markets, range from 50 per cent in the case of Jamaica to 20 per cent for other, smaller, Caribbean Islands.

Japan captures only 3 per cent of total agricultural exports of SIDSs, but it has become an important market for the Pacific SIDSs, absorbing more than 6 per cent of their exports. This figure is substantially greater than the exports of SIDSs to: (i) Australia and New Zealand combined (despite the existence of the South Pacific Regional Trade and Economic Agreement (SPARTECA) between most Pacific SIDSs and these two countries); (ii) Mexico; or (iii) the whole of the South-East Asia region.

II.2   Preferential market access for SIDSs

The high geographical concentration of SIDSs' exports to the EU and the United States, coupled with a high level of product specialization, is probably due to the provision of non-reciprocal preferential market access to their products, stemming from historical trade relationships with these countries.

Preferential market access, in terms of tariff advantages and/or preferential quotas, are important for SIDSs agricultural exporters for two reasons. First, a preferential margin may provide substantial "quota rents" to SIDSs' exporters. Second, preferential margins, where substantial, can compensate for a general lack of price competitiveness of agricultural exports from SIDSs vis-à-vis low-cost exporters competing in the same markets.

This section provides an overview of preferential market access granted by the Quad (EU, Canada, Japan and the United States) to SIDSs' agricultural exports, and the values of such preferences.

European Union

Being the largest market for the agricultural exports of SIDSs, the EU has two preferential trading arrangements that are particularly important for SIDSs: (i) the EU/ACP Cotonou Partnership Agreement,[4] signed in 2000 between the EU 77 African, Caribbean and Pacific (ACP) States, 31 of which are SIDSs[5]; and (ii) the Everything-But-Arms (EBA) Initiative in favour of products originating in the 49 LDCs, 10 of which are SIDSs, under the aegis of the EU scheme of Generalized System of Preferences (GSP).

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[4]Pending the ratification process, the Agreement was put into provisional application on 2 August 2000, according to the modalities laid down in Decision No 1/2000 of the ACP-EC Council of Ministers of 27 July 2000 (2000/483/EC, Official Journal L 195 of 1.8.2000: 46).
[5] SIDSs' new ACP members include the Cook Islands, the Federated States of Micronesia, the Marshall Islands, Nauru, Niue and Palau.

The Cotonou Partnership Agreement, which provides for an eight-year rollover of the previous trade preferences granted under Lomé (with minor improvements), grants SIDSs beneficiaries with duty-free access for most of their agricultural products,[6] except for a limited number of agricultural products on which a tariff reduction is granted. For SIDSs, particularly important are the three protocols on bananas (affecting mostly the Windward Islands), sugar (Fiji, Mauritius, Barbados, Jamaica, Trinidad and Tobago) and rum (Caribbean SIDSs) — those products alone account for 69 per cent of SIDSs' total exports to the EU.

The Cotonou Agreement creates a considerable level of preferential tariff margin not only over applied rates on a most-favoured-nation (MFN) basis, but also over most GSP rates (excluding the EBA). Table 5 shows that, for those products whose average MFN rates are above 20 per cent (accounting for almost half of SIDSs' exports[7] — largely sugar and bananas), SIDSs' agricultural exports to the EU receive preferential margins of 25 percentage points against MFN rates and 15 percentage points against GSP rates.

The EBA provides LDCs with duty-free treatment for all agricultural products (except bananas, rice and sugar) until 2007, including very sensitive products such as beef, dairy products, fruit and vegetables (fresh as well as processed), cereals, starch, vegetable oils, confectionary, pasta and alcoholic beverages.[8]

For those LDC-SIDSs, the EBA has now made the EU's GSP a more favourable scheme than the Cotonou preferences in terms of tariff treatment, product coverage and preferential tariff margins. The EBA initiative has also imparted greater stability to EBA-GSP preferences for LDCs, as the EU has undertaken to maintain this special preferential treatment for an unlimited period of time, exempting such treatment from the periodical reviews of the basic GSP scheme.

The United States

The United States recently renewed its GSP programme (applicable until 2006), which provides duty-free access for 5,000 tariff line items to over 100 beneficiary countries and territories. The GSP programme covers agricultural and fishery products that are not otherwise duty free or are subject to tariff quotas/ceilings. An additional 1,783 lines have been added to the list of eligible products for LDC recipients.

The recently approved United States Trade and Development Act of 2000 has expanded the preferences granted to sub-Saharan Africa under the African Growth and Opportunity Act (AGOA),[9] and to the Caribbean Basin under the Caribbean Basin Trade Partnership Act (CBTPA). The AGOA beneficiary countries (including SIDSs such as Cape Verde, Sao Tome and Principe, Mauritius and Seychelles) now receive a "super GSP"[10] (i.e. duty-free access for a wider range of products than the "normal" GSP programme).[11] The CBTPA provides trade preferences similar to those given under the AGOA to 24 beneficiary countries of the Caribbean Basin Initiative (CBI),[12] most of which are SIDSs. It also provides NAFTA-equivalent tariff treatment for certain items previously excluded from duty-free

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[6] Duty-free treatment is also granted to fish and fish products, subject to specific rules of origin requirements.

[7] This figure is 88 per cent for African SIDSs.

[8] On most of such products, the pre-EBA GSP provided a percentage reduction of MFN rates, which would apply only to the ad valorem duties, thus leaving the specific duties still entirely applicable. This is no longer the case, as all dutiable products that were previously granted only a limited margin of preference or were subject to quantitative limitations are now entirely liberalized for LDCs.

[9] For basic and detailed information about United States legislation on the GSP programme (Title V of the Trade Act of 1974 as amended) and for detailed information about the AGOA, refer to the text and appendices of the Handbook on the GSP Scheme of the United States, UNCTAD document ITCD/TSB/Misc.58, of June 2000, also available on the UNCTAD GSP website. All AGOA-related documentation is also available on the Internet at: www.agoa.gov.

[10] All designated AGOA beneficiaries, including non-LDCs, have been granted duty-free treatment on all GSP-eligible products, including those on which only least developed beneficiary countries used to enjoy GSP treatment. This implies that former special GSP LDCs' preferences have been somewhat diluted, since other sub-Saharan non-LDC African countries can now benefit from them.

[11] In addition, the "AGOA-enhanced" GSP benefits will be in place for a period of eight years, and this longer-than-usual period of time is expected to provide additional security to investors and traders in qualifying African countries.

[12] These countries are: Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Costa Rica, Dominica, Dominican Republic, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Montserrat, Netherlands Antilles, Nicaragua, Panama, St. Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, and British Virgin Islands.

treatment under the CBI programme (e.g. canned tuna). The NAFTA-parity is provided with a view to partly offsetting the negative effects in term of trade and investment diversion experienced by these countries since the entry of Mexico into NAFTA.[13]

Under these preferential schemes, approximately 60 per cent of SIDSs' exports (which include products such as cigars, beer, alcohol and certain food preparations) enjoy preferential margins of, on average, 4.2 percentage points over corresponding MFN rates. The preferential tariff margin increases — up to an average of 35 percentage points — as the MFN tariff increases. However, these large tariff margins apply only to a small share (6 per cent) of the total agricultural exports of SIDSs. It was not possible to calculate preferential margins for some 14 per cent of SIDSs' exports to the United States, largely sugar, as MFN tariffs are given in non-ad valorem technical rates and their ad-valorem equivalents (AVEs) could not be calculated.[14].

Canada

Canada provides two distinct preferential market access regimes that are of immediate relevance to SIDSs' agricultural exports: the Generalized Preferential Tariff (GPT) and the Commonwealth Caribbean Countries Tariff (CCCT) under the preferential trade agreement of the Caribbean Countries and Canada (CARIBCAN). The GPT, which is equivalent to the GSP, grants reduced tariff rates or duty-free access to 184 beneficiary countries and territories, including all SIDSs. In addition to the general GPT, LDCs receive duty-free market access to an additional 570 tariff lines. A further expansion of the preferences to LDCs came into effect on 1 January 2003, allowing for duty-free and quota-free access for all but a number of "sensitive" products.[15]

The CARIBCAN provides most Caribbean SIDSs[16] with duty-free market access for a large number of products, including all agricultural products. However, preferential tariff margins on those products are generally low, as corresponding MFN tariffs are already low — MFN duties on more than 53 per cent of SIDSs' agricultural exports are already zero. As these exports consist mainly of fresh fruits and vegetables, the Caribbean exporters seem to benefit more from their geographical proximity than from the tariff preferences they receive. In other words, for the majority of agricultural exports (some 94 per cent, including those exports already receiving duty-free MFN), SIDSs receive "empty preferences", either because of zero MFN duties or because similar preferential treatment is given to other developing countries.

Japan

Trade preferences for SIDSs (as for other developing countries) are made available under the Japanese GSP scheme, which was recently reviewed and extended for another decade, until 31 March 2011.[17] The extent of the product coverage and tariff treatment provided to beneficiary countries varies considerably among agricultural products.

Preferential GSP tariffs applicable to developing countries range from duty free to 20 per cent reduction in MFN duties. LDC beneficiaries enjoy duty-free entry for all products covered under the GSP scheme plus an additional list of products. Preferences to LDCs have been improved by increasing the number

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[13] For example, according to the Caribbean Textile and Apparel Institute, approximately 150 companies have closed their operations and relocated to Mexico since NAFTA came into force.

[14] However, the ad valorem equivalent of all rate components estimated by the United States International Trade Commission is reported to be at 3.5 per cent only. (The US2002 Tariff Web-Database at http://dataweb.usitc.gov/scripts/tariff2002.asp contains further information.)

[15] Limited exceptions are provided for products such as dairy, poultry and eggs. See " Regulations Amending the General Preferential Tariff and Least Developed Country Tariff Rules of Origin Regulations" of 23 December, 2002 at http://canadagazette.gc.ca/partII/2003/20030101/html/sor19-e.html

[16] Anguilla, Antigua and Barbuda, Bahamas, Bermuda, Barbados, Belize, British Virgin Islands, Cayman Islands, Dominica, Grenada, Guyana, Jamaica, Montserrat, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago, and the Turks and Caicos Islands.

[17] Under the scheme currently in force for fiscal year 2002/2003, Japan grants preferential treatment to 164 developing countries and territories. For detailed information on the current scheme, please refer to the Handbook on the Scheme of Japan 2002/2003 (document UNCTAD/ITCD/TSB/Misc.42), also available on the Internet.

of tariff items for duty-free and quota-free access specifically available to all 49 LDC exports as long as they request them.[18]

Despite the existence of the GSP scheme, the overwhelming majority of SIDSs' agricultural exports enter the Japanese market on a MFN basis — 66.3 per cent of SIDSs' exports, most importantly coffee and copra, enter Japan at zero MFN rates, while for another 31.5 per cent (including sugar, pumpkins and rum), preferences are simply not available. This implies that further agricultural trade liberalization, might not have a significant effect on the preferences granted to SIDSs in this market, but it might result in new trade opportunities for all those SIDSs products still affected by high MFN duties.

II.3   Liberalization and the erosion of preferences

Further liberalization in agriculture will affect the value of preferential market access currently provided to SIDSs. The impact of liberalization will depend on a number of factors. First, the impact of the erosion of preferences depends on the level of the preferential margin granted to the beneficiary exporting countries vis-à-vis other exporters. In terms of a geographical grouping, further MFN tariff cuts may result in a much faster erosion, if not elimination, of preferential tariff margins available to the Caribbean island countries than those to other SIDSs, as the preferences received by the Caribbean SIDSs on some 70 per cent of their exports are empty. However, the impact of the preference erosion on the trade flows of the Caribbean SIDSs would be on average less dramatic, as they are already exposed to a certain degree of competition with other developing country exporters, either on a MFN basis or within a GSP scheme of an importing country. Conversely, the African SIDSs enjoy the highest level of preferences in terms of preferential margins and product coverage, and are therefore subject to a relatively lower level of erosion of preferences following MFN tariff cuts. They will, however, loose quota rents by the reduction of out-of-quota (or outquota) tariffs. Further, should these preferences be considerably reduced as a result of the negotiations on agriculture, or be legally challenged by other WTO member(s),[19] adjustment costs arising from the preference erosion to these preference-dependent countries may be significant, as they have been rather sheltered against world competition.

Second, whether preferential tariffs are "linked" to or "de-linked" from MFN rates may result in different impacts upon the values of preferences after MFN tariff cut. In the case of the ACP-EU preferences, there are still a number of products whose preferences are expressed as a percentage of the MFN rate (and thus linked to MFN rates). If the initial MFN rates are sufficiently high, further MFN cuts will reduce the nominal preferential margins of the ACP preferences only marginally. Beneficiaries of such preferences are more likely to retain tariff advantages not only over MFN tariffs, but also over other preferences providing a less extensive degree of market access treatment. This might apply to such products as palm, cigars, fruits and vegetables (e.g. oranges, onions, garlic, carrots, peaches and cabbages), although SIDSs' exports of the latter items are currently limited. Where preferences to SIDSs are de-linked from the corresponding MFN rates, as in the case of the GSP scheme of the US, the only difference among various preferential schemes is the extent of the product coverage rather than the preferential margins provided. In this case, MFN tariff cuts will inevitably reduce SIDSs' preferential margins.

Third, the recent initiatives undertaken to provide better market access for LDCs and countries in the sub-Saharan African region have yet to fully materialize. As they are creating additional and substantial preferential margins for certain SIDSs and for certain products, the negative impact in terms of preferential margins coming from further trade liberalization might be somehow mitigated.

Finally, although the current preferences are wide, they could be expanded further. For example, the ACP-EU preferences are quite limited for agricultural and processed products, which are subject to the

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[18] With the recent addition of Zambia, the Democratic Republic of the Congo, Kiribati and Tuvalu to the list of GSP beneficiaries, there are currently only two LDCs (Comoros and Djibouti) that, despite being eligible for duty/quota-free treatment under the Japanese scheme, have yet to request this.

[19] The current attempt by Brazil and Australia to dispute the EU sugar regime at the WTO shows how critical the situation might become.

Common Organization of the Market (listed in the "Joint Declaration concerning agricultural products"),[20] and for products that are subject to specific rules under the Common Agricultural Policy (CAP). Many of those sensitive products (namely meat and diary products, cheese, tomatoes, mandarins and some cereals) are subject to a combined tariff which is made up of an ad-valorem component and a specific-rate component. Preferential market access for those products normally takes the form of an *elimination* of the ad-valorem component and a *reduced* level of a specific-rate component whose ad-valorem equivalent can go up as high as 80 per cent.

Similarly, for certain categories of processed agricultural products under the Harmonized System (HS) — chapters 4 (milk and milk products), 17 (sugar and sugar confectionery), 18 (cocoa and cocoa preparations), 19 (processed foodstuffs), 20 (beverages) and 21 (miscellaneous edible preparations) — the EU maintains a system of a technical tariff that includes the so-called agricultural component (i.e. a combination of ad-valorem and specific duties that may vary according to the presence in different percentages, or quantities of certain ingredients, such as sugar, starches or glucose and milk fat, or proteins contained in the final products). However, it is the specific component that constitutes the bulk of the protection and not the ad valorem part.

In addition, around 15 products, mainly fruits and vegetables, as well as some processed products such as fruit juices, are subject to the entry price system (EPS).[21] Neither ACP nor GSP beneficiary countries are granted special preferences for products subject to the EPS.[22] The Cotonou Agreement envisages the amelioration of ACP preferences[23] during the transitional period, and the European Commission has already tabled a proposal for improving the current market access conditions given to the ACP countries.[24]

III. SURVIVING AGRICULTURAL LIBERALIZATION: A QUANTITATIVE ASSESSMENT

The ongoing WTO negotiations on agriculture are expected to result in further reductions, if not an elimination, of tariffs on and trade-distorting subsidies to agricultural products in the world. A recent UNCTAD study estimates that a worldwide reduction of 50 per cent in all agricultural tariffs will bring about an aggregate welfare gain of $21.5 billion to the world.[25] However, the distribution of the welfare gains is likely to be uneven among regions. The same study suggests that the welfare gains to some groups of developing countries, particularly those in sub-Saharan Africa and Latin America, that are dependant on non-reciprocal preferential treatment, may be substantially less than the gains to such regions as Oceania, South-East Asia and North Africa.

Insignificant welfare gains, or indeed losses, to SIDSs from multilateral agricultural liberalization may be due to: (i) a rise in agricultural prices induced by liberalization, and (ii) the erosion of preferences.

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[20] See the Joint Declaration concerning agricultural products referred to in Article 1(2)(a), containing the preferential treatment applicable to agricultural products and foodstuffs originating in ACP States, Annex to Decision 1/2000 of the ACP-EC Committee of Ambassadors of 28 February 2000, on transitional measures valid from 1 March 2000 (EU OJ L 217, 26.8.2000: 189 ff.).

[21] The EPS trade regime has replaced the old reference price system as one of the results of the "tariffication" process carried out in the Uruguay Round, whereby all non-tariff measures had to be converted to bound tariffs. To explain briefly how the EPS works, it is useful to think of it as a dual system where two separate sets of tariffs apply according to a core variable that is represented by the entry price. Applicable tariffs are either ad valorem or specific duties. Under this system, as long as the c.i.f. import price of a particular product complies with the entry price (i.e. is either equal or higher) a "general" bound tariff applies. However, if the import price falls below the entry price, an additional duty is charged on top of the general one, up to a maximum tariff level (also bound). In reality, the system is slightly more complex, since there are several entry prices for the same product, and for each of them a different additional duty applies. Indeed, and although set a priori, entry prices change according to seasons, being lower during the harvest season in the EU, so as to provide maximum protection to EU producers.

[22] Under the Euro-Mediterranean agreements with Morocco and Israel, for example, the EU has granted reductions of entry prices subject to quota levels on some products for Morocco and oranges for Israel. Bearing in mind the functioning of the entry price system, this preferential margin may end up being the most effective, since these countries will be effectively able to undercut the supply price of all the other suppliers.

[23] Article 1 of Annex V of the ACP-EU Partnership Agreement

[24] Proposal for a Council regulation on "the arrangements applicable to agricultural products and goods resulting from the processing of agricultural products originating in the African, Caribbean and Pacific States (ACP States)", Brussels, 21.06.2002 COM(2002) 335 final 2002/0129 (ACC)

[25] Cernat, Laird and Turrini, Back to Basics: Market Access Issues in the Doha Agenda, UNCTAD, 2002.

It is thought that agricultural liberalization would raise world prices of temperate agricultural products more, relative to prices of tropical products, leading to an increase in food import bills for SIDSs, which import temperate products and export a narrow range of tropical products. At the same time, as MFN tariff cuts reduce the margin of preferences, importers are likely to seek supplies from low-cost countries. For example, assuming exporters of sugar to the EU are receiving EU prices, any lowering of those prices will make other exporters, such as Brazil, more competitive.

This section examines the likely impacts of agricultural trade liberalization on SIDSs under different liberalization "scenarios", with a view to identifying liberalization "modalities" that would at least "compensate" for possible negative impacts from liberalization, if not creating welfare gains.

III.1   The ATPSM modelling framework

To assess the potential impacts of agricultural liberalization on SIDSs, UNCTAD's Agricultural Trade Policy Simulation Model (ATPSM) Version 1.1 is used in this study.[26] ATPSM is a partial equilibrium model that can be used to evaluate agricultural trade policy changes in the main areas covered by the Uruguay Round Agreement on Agriculture (AoA) – market access, export subsidies and domestic support. The model distinguishes between bound and applied tariffs, as well as between inquota and outquota tariffs on products under tariff rate quotas (TRQs). It can be used to assess the impact of policy changes on quota rents, forgone and received. As quota rents are an important contributor to agriculture in SIDSs, this feature of the model is desirable in applications discussed here.

Unlike a general equilibrium model, ATPSM is confined to the agricultural sector, and does not account for interactions with other sectors of the economy. As a result, capital and labour used in agricultural production cannot be reallocated across non-agricultural sectors in response to a shock. It is assumed that this limitation will have little bearing on the empirical results, since SIDSs have few alternative sectors for resources to shift into from agriculture.

ATPSM can simulate and evaluate the various agricultural trade policy changes that may be suggested in the WTO negotiations on agriculture, such as:

·   MFN (bound or applied) and/or TRQ inquota tariff cuts;

·   Changes in TRQ quantities;

·   Reductions in trade-distorting domestic support (e.g. market price support);

·   Reductions in export subsidies; and

·   Different percentage changes in all the above policies, applied to selected countries or country groups and commodities.

The ATPSM model produces five categories of economic estimates: (i) volume changes in production, consumption, imports and exports; (ii) trade value changes (changes in export, import and net trade revenue); (iii) welfare changes (changes in producer surplus, consumer surplus and net government revenue); (iv) price changes (at world, wholesale and farm gate levels); and (v) changes in tariff quota rents – in 161 countries, including 25 of the 32 SIDSs members,[27] for the agricultural commodities shown in table 7.

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[26] The ATPSM equation structure and other details can be found in annex 1 or in UNCTAD, 2002.

[27] The definition of small island developing States is somewhat debatable. Possibly contentious in the ATPSM list are Cuba, a large sugar exporter, and Haiti. Other SIDS included in ATPSM are: Bahamas, Barbados, Cape Verde, Comoros, Cuba, Dominica, Dominican Republic, Fiji, Grenada, Haiti, Jamaica, Kiribati, Maldives, Mauritius, Papua New Guinea, Sao Tome and Principe, Solomon Islands, St. Lucia, St. Vincent and the Grenadines, the Seychelles, Trinidad and Tobago and Vanuatu.

ATPSM is both simple and complex. Its simplicity derives from linear demand and supply curves. The complexity follows from the policy detail in the model. For this reason it is necessary to explain in the next section how the model works. Next we look at the initial data, particularly the distribution of rents. We then postulate some likely liberalization scenarios, examine the results and the implications.

Quota rents

The Uruguay Round led to the establishment of TRQs: a two-tier tariff system based on import quotas. Imports below the quota level are levied at rates that are substantially lower than the corresponding outquota MFN tariff rates. During the Uruguay Round, the quota quantities were either set as 3 per cent, growing to 5 per cent of the level of domestic consumption observed during the 1986-1988 base period, or they were based on historical trade flows. Not all countries utilize the TRQs; only 43 WTO member countries established over 1,370 TRQs.

The introduction of a two-tier tariff system created a new category of economic effects — tariff quota rents. A quota rent is the difference between the outquota and inquota tariffs times the value of the quota, (as illustrated in figure 3). Assuming the quota, q, is full and the domestic price reflects the higher outquota tariff, $t2$, exporters with quota can supply goods over the lower tariff, $t1$, and receive the higher domestic price. Once the quota is filled, outquota imports are taxed at the higher tariff rate and no further rents are generated. Clearly, reduction in outquota tariffs reduces the quota rent.

An important question concerns the distribution of the rents between exporters, processors, distributors, taxpayers and consumers, on which the effects of liberalization largely depend. Rents may be captured by the government by auctioning rights to import or export, but often they accrue to other groups, depending on how quotas are allocated. There is, however, no one uniform method for the administration of TRQs; thus there is no general rule on how quota rents and tariff revenues will change with trade liberalization. In this study, it is assumed that all the quota rents in the sugar market accrue to the producers in exporting countries. For the remaining products, the rents are assumed to be shared equally between exporters and importers. The rents not captured by exporters are assumed to accrue eventually to government revenue in the importing country, instead of being transferred to consumers in the importing countries.

To estimate the actual size of a quota rent, it is necessary to have observations of global quotas, bilateral quotas, inquota and outquota tariff rates, world market prices and imports. To determine how the rents are allocated between countries requires some judgment.

The size of the global quotas (i.e. the total level of imports at the lower tariff level) are obtained from annual notifications made to the WTO by TRQ-using countries, but these notifications do not always provide a breakdown of quotas among different exporting countries. The model uses bilateral trade flows to estimate the distribution of global quotas among countries.[28]

The final key assumption relates to the quota fill rate (i.e. the ratio of actual imports to the total TRQ quantity of the product concerned). Ideally, the quota fill rate should determine the domestic price, so that if the quota is unfilled, domestic prices should be determined by the inquota tariffs, and prices should be high only if the quota is filled or overfilled. However, it is often observed that quotas are unfilled but domestic prices are nonetheless high. This may be because administrative constraints prevent the quotas being filled. More to the point, countries with high domestic prices are unlikely to accept their erosion by a shift in the supply of imports. As a result, the assumption here is that the outquota tariffs (or possibly the applied tariffs) determine the domestic market price. This implies that global quotas should not exceed imports, and quotas are reduced to the level of imports where the data suggests this is necessary. The calculation of tariff revenues and rents in the model is based on these assumptions.

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[28] For this reason, estimated rents may differ from reality in cases where a country exports at the over-quota level in addition to its quota share.

The assumptions made above imply that changes in inquota tariffs and TRQ quantities will not have price and production quantity effects, as these instruments are not binding. They do, however, change the distribution of rents.

Data

Data on production quantity for the year 2000 are compiled from FAO supply utilization accounts (see FAOSTAT). Price data are from the FAO Yearbooks, using an average for the period 1996–1998. Parameters on elasticities and feedshares are also provided by FAO. These are based on a trawling of the literature and are not econometrically estimated specifically for the model. Inquota tariffs, outquota tariffs and the size of the global quotas as notified to the WTO are obtained from the Agricultural Market Access Database (AMAD)[29] and aggregated to the ATPSM commodity level using a simple average wherever trade exists. Specific tariffs are converted to ad valorem equivalents based on unit values calculated for each country at the Harmonized System (HS) six-digit level. Data on trade-distorting domestic support and export subsidies are derived from the notifications submitted to the WTO. Bilateral trade flow data for 1995, which were used to allocate global quotas to individual exporting countries, are provided by UNCTAD. The UNCTAD Trade Analysis and Information System (TRAINS) database is a source of applied tariff information which determines whether cuts in bound rates are effective.

The main drawback to using ATPSM for this study is that it does not include information on bilateral tariffs (e.g. preferential tariff rates), and thus cannot capture trade diversion and trade creation effects from changes in preferential arrangements. However, this is consistent with the assumptions that the quotas are filled and that changes in rents do not change production.

III. 2   Current protection levels and rents

Good indicators of the ongoing level of border protections are global tariff revenues and rents, as these are the product of the level of protection (i.e. the higher the MFN tariffs, the greater the tariff revenues and rents for a given import flow) and trade flows. The base period data of these global indicators are shown in the first two columns in table 8. Across commodities, temperate goods are subject to relatively higher levels of border protection in developed countries than tropical products (with the notable exception of sugar and bananas). Developing countries, however, may levy substantial tariffs on tropical products.

Also shown in the table are the initial values of three variables important to SIDSs: tariff revenues; export revenues and rent received. It is immediately apparent that sugar is the key commodity of interest to SIDSs, capturing more than 50 per cent of the total export revenues and 90 per cent of rents received. Next in importance are vegetable oils (copra), coffee, cocoa and bananas. The bulk of the SIDSs' export revenues and virtually all the quota rents received emanate from EU and United States sugar policies. The major supplier of EU sugar imports (1.3 million tonnes) is Mauritius with a quota of 487,000 tonnes. The United States imports 1.1 million tonnes of sugar under a quota from developing countries plus Australia, the only developed country exporter of cane sugar. China has imports of 0.6 million tonnes, the bulk of which come from Cuba, Thailand, India and Australia.

Multilateral trade liberalization will influence the level of these three variables: tariff revenues and rents received are most likely to decrease, while export revenues may improve. The next section examines the extent of such impacts and how they vary according to different trade liberalization scenarios.

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[29] AMAD is available to all users at: http// www.amad.org.

III.3 Five alternative scenarios

Taking into account the proposals and discussions made so far during the ongoing WTO negotiations on agriculture, the following five scenarios were selected for examination:

(1) Ambitious

Across-the-board reductions in outquota (MFN) bound tariffs using the Swiss formula with a coefficient of 25, and total elimination of export subsidies and production-distorting domestic support.

(2) Conservative – the Uruguay Round approach

A 36 per cent cut in outquota bound tariffs, 36 per cent reductions in export subsidy spending and 20 per cent cut in trade-distorting domestic support in developed countries; two thirds of these reductions in developing countries and no reductions in LDCs.

(3) Tariff-50

A 50 per cent cut in outquota bound tariffs in all countries.

(4) Preferential

Scenario 3 plus removal of inquota tariffs on SIDSs' exports under quota.

(5) Compensatory

Scenario 3 plus removal of all tariffs on all SIDSs' exports.

Scenario 1, consisting of elements that have been proposed to the WTO negotiations on agriculture by major agricultural exporters such as the United States and the Cairns Group members, will lead to substantial agricultural liberalization. The "Swiss formula" is designed in such a way that it eliminates tariff peaks and substantially reduces tariff escalation.[30] A coefficient of 25 (as proposed by the United States and the Cairns Group) sets an effective tariff ceiling at 25 per cent, and achieves very deep cuts indeed — tariff rates of 100 per cent, 200 per cent and 300 per cent are reduced to 20 per cent, 22 per cent and 23 per cent respectively.

Scenario 2 is almost a replica of the liberalization approach employed during the Uruguay Round. The only difference is that in this scenario, a linear cut of 36 per cent applies to the tariffs across all products, unlike the actual Uruguay Round approach where tariffs on sensitive commodities were reduced by the minimum reduction rate of 15 per cent so long as an average cut of 36 per cent across products was achieved.

Scenario 3 focuses purely on the impact of tariff cuts. Reductions in MFN bound tariffs (putting aside proposals to make reductions from the applied tariffs) are likely to have the greatest impact on SIDSs through the erosion of preferences, causing reductions in quota rents. Scenario 3 is also a reasonable middle ground between scenarios 1 and 2, and will serve as a benchmark for assessment of the impact from the following scenarios 4 and 5.

Scenarios 4 and 5 are aimed at assessing whether SIDSs could be compensated for the losses stemming from preference erosion by changes in other policy variables, such as the size of the inquota tariffs or the TRQ quantities. Scenario 4 looks at the likely impact of elimination of inquota rates for SIDSs' exports under TRQs. Scenario 5 looks at a situation of elimination of all outquota (MFN) rates applicable to SIDSs, which is equivalent to an expansion of TRQs only to SIDSs. As the quota rents are determined by (i) the difference between the inquota and outquota tariff rates, and (ii) the quota quantities, changes in one of the variables (e.g. global reductions of MFN tariffs) may possibly be offset by changes in the others (e.g. SIDS-specific expansion of TRQs).

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[30] The "Swiss formula" takes the following structure: $T1 = (T0/c)/(T0+c)$, where $T1$ is the new tariff rate, $T0$ is the initial tariff rate and c is the reduction coefficient.

III.4   Results

In order to interpret the outcome of the simulations, we need to take into account the following elements. First, reductions in outquota tariff rates do not necessarily mean that the gap between domestic and world prices is reduced by 50 per cent. In cases where applied tariffs are below the bound outquota rates, a 50 per cent cut in the outquota tariffs may result in a less than 50 per cent cut, or even no change at all, in the applied rates. Second, EU sugar and dairy production is assumed not to be responsive to changes in prices, due to the existence of production quotas for those products.

Prices

The impact on world prices for the first three scenarios is shown in table 9. The price changes are correlated with the level of distortions removed. That is why the "ambitious" scenario shows relatively greater price rises on products that are subject to high levels of tariffs, trade-distorting domestic support and/or export subsidies (e.g. dairy products, wheat) than the other two approaches. The model estimates similar levels of price changes for the "conservative" scenario and the "tariff-50" scenario. As expected, the results shows that prices of tropical products (e.g. sugar, copra oils and bananas) increase less than those of temperate products, which implies a decline in the terms of trade facing the majority of SIDSs.

While price rises are indicative of the level of distortions, of greater interest to policy makers in SIDSs are the impacts of liberalization on export revenues, tariff revenues, changes in quota rents and overall welfare. The welfare impact is calculated based on the changes in (i) consumer surplus, (ii) producer surplus, and (iii) government revenues. The estimation of these data are shown for SIDSs and for the world in table 10.

Export revenues

A comparison of estimated export revenues across different scenarios suggests that export revenues increase in proportion to the level of market access improvement. The increase in export revenues under the "ambitious" scenario ($40.4 billion) is almost three times greater than the estimated increase under the "conservative" scenario.

Under the "tariff-50" – or the benchmark – scenario, export revenues to SIDSs rise from $2.1 billion to $2.4 billion, an increase of $166 million (or 8 per cent). Sugar ($69 m), other tropical fruits ($ 19 million), citrus ($16 million) and bananas ($17 million) are the major beneficiaries. Scenarios 4 and 5 do not show changes in export revenues from the benchmark, due to the assumption that changes in quota rents alone do not affect the supply decisions of the producers of the exported products concerned (hence the level of export quantity remains the same). This assumption is reasonable for small changes in quota rents.[31]

Tariff revenues

Tariff revenues are determined by the combination of tariff rates, import quantities and import prices. The simulation results in table 10 show a wide variation in the degree of changes in tariff revenue across different scenarios. Concerning tariff revenues at the global level, the "ambitious" scenario will lead to the smallest losses, largely because tariff revenues forgone are offset by reductions in domestic support and export subsidies. The continuation of spending on these government subsidies results in substantial losses in government revenues in the "conservative" and benchmark scenarios.

Looking at scenarios 4 ("preferential") and 5 ("compensatory"), reducing inquota or outquota tariffs on SIDSs' exports involves losses in tariff revenues for importing countries equal to the gains in quota

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[31] This assumption may no longer hold if suppliers depend on the receipt of rents to cover their costs. At some point, declining rents will lead to a fall in production below the quota level.

rents received by SIDSs' exporters. In the "compensatory" scenario, importing governments' revenue losses are $187 million over and above the $4.18 billion in the benchmark scenario. The magnitude of a global loss in tariff revenues (or an increase in quota rents for SIDSs) is determined by the degree of rent capture. It is assumed in this study that half the loss in tariff revenues (i.e. quota rents) for all products except sugar is clawed back by the importing government. These revenue losses effectively arise from transfers between taxpayers and producers, and do not involve any efficiency gains or losses. Concerning SIDSs, the benchmark scenario leads to a 13 per cent reduction of tariff revenues from the estimated initial level of $425 million, to $369 million.

Quota rents

Global quota rents in the agricultural sector represented in the database are initially estimated to be around $9.7 billion prior to any policy change. In total, SIDSs receives $285 million in the initial database, of which $272 million is from sugar (table 8). The rents are reduced by $166 million under the benchmark scenario, of which $160 million can be attributed to sugar. About $16 million of this loss is offset by allocative efficiency gains (due to tariff reductions in the SIDSs themselves) and increased export prices (due to tariff reductions in other countries).

A comparison of the changes in SIDSs' quota rents under the "preferential" scenario with the benchmark scenario suggests that eliminating inquota rates for all SIDSs' inquota exports does not fully offset the effect of outquota tariff reductions. The additional quota rent of $88 million over the benchmark level can be attributed to sugar ($82 million). Much of this accrues to Cuba, which is the major supplier to China. The quota gains may be overestimated, as the model does not take into account preferential tariffs provided by major markets (e.g. the EU. The initial EU inquota tariffs are 13 per cent on bananas and 2.3 per cent on sugar (on which the inquota tariff revenues of the EU is calculated), but almost all SIDSs' inquota exports of sugar and bananas already receive duty-free access under the EU-ACP Cotonou Partnership Agreement. However, China imports 0.6 billion tonnes over an inquota tariff of 15 per cent. This accounts for much of the increase in quota rents under the preferential scenario.

The "compensatory" scenario, on the contrary, results in a $83 million increase in the quota rents transferred from the initial level, and a $249 million increase from the benchmark result. That is to say, removing tariffs on all SIDSs' exports within and out of quota (which is equivalent to increasing the size of global quotas to accommodate all of SIDSs' exports) is more than sufficient to offset the $166 million losses in quota rents resulting from a 50 per cent cut in MFN tariffs by importing countries.

Welfare

Putting together the various changes in prices, exports, tariff revenues and quota rents, the greater the degree of liberalization, the greater are the welfare gains to the world as a whole (scenarios 4 and 5 do not change global welfare from the benchmark). A greater global welfare increase under the "tariff-50" (benchmark) scenario than under the "conservative" scenario arises from gains by developing countries as a whole, as more substantial tariff cuts by developing countries under the benchmark case increases largely due to consumer surplus increases in those countries. However, the impact of liberalization on SIDSs appears to be negative — welfare gains for SIDSs are expected only under the compensatory scenario.

Table 11 provides a breakdown of the welfare impacts of each of the five scenarios across different groups of countries. It is apparent that gains from agricultural liberalization to SIDSs are more limited compared to other groups of countries listed. Under the "ambitious" scenario, for instance, only SIDSs are expected to incur welfare losses while all other groups gain. Under the "conservative" scenario, in which export subsidy reductions are relatively important, LDCs will also experience a welfare loss due to a combination of higher import prices and the absence of efficiency gains from liberalization (LDCs are exempted from making reduction commitments), though they will make welfare gains of $800

million in other scenarios. Welfare gains to a group of developing country agricultural importers appear to be modest — they experience gains only under the "ambitious" scenario, whereas in other scenarios import price rises and losses in tariff revenues lead to welfare losses. Extending compensation to the SIDSs, (scenario 5) tends to make non-SIDSs slightly worse off. The major costs are borne by the developed countries, predominantly those of the European Union and the United States, which provide compensation through extended preferential access.

A breakdown of the welfare impact under the benchmark scenario — for individual SIDSs by commodity — is presented in table 12. The largest welfare losses anticipated are incurred by Mauritius, Jamaica and Fiji. The major losses by commodity occur in sugar (due to loss of quota rents) and wheat, dairy products and meat (due to increases in food import prices).

The importance of quota rents to the welfare figures highlights the assumption about their distribution. In an alternative simulation, where all rents are assumed to accrue to importers, SIDSs' welfare under the benchmark scenario rises by $16 million, rather than falling by $166 million.

III.5   Some limitations

The major limitation of this analysis is the lack of knowledge of the distribution of quota rents. This is unfortunate, as these have a considerable bearing on the overall results for SIDSs. Another limitation is that this model is likely to overestimate the amount of quota rents accruing to the world in general, due to the assumption that quotas are effectively filled and that outquota or applied tariffs, rather than inquota tariffs, drive domestic prices. Rents accruing to SIDSs in particular may be further overestimated as the model does not take into account various reciprocal or non-reciprocal preferential tariffs most SIDSs receive in major markets for their agricultural exports. A final consideration is the assumption that producers don't respond to changes in rents, which further implies no trade diversion. These are reasonable for small policy changes but less so for elimination of tariffs. Preference erosion is expected to benefit low-cost producers from liberalization of markets in which they were excluded from preferential market access (e.g. Brazilian sugar in the EU market).

IV. CONCLUSIONS

In spite of these limitations, several implications can be drawn from the results.

First, preferences provide significant benefits to some SIDS members, and trade liberalization will lead to some erosion of these preferences. This will have a significant impact in some cases, particularly for those SIDSs currently enjoying quota rents. Sugar and banana producers are likely to be the sectors most affected. Yet the magnitude of the overall impact depends on the chosen scenarios, being the highest in the "ambitious" scenario and the lowest in the "conservative " scenario.

Second, the results of the simulations suggest that there is scope for these countries to be compensated. This was considered to be desirable in two distinctive ways. One possibility would be to provide inquota duty-free treatment for all those SIDSs' exports already benefiting from quotas. Although the gains are insufficient to compensate entirely for the rent losses stemming from the benchmark simulation ("tariff-50" scenario), they are nonetheless positive for SIDSs. However, there might be individual SIDSs currently not capturing quota rents that may be inclined to favour liberalization, as estimates indicate that if quota rents are ignored there are positive net benefits from improved market access and efficiency gains from domestic reform. Similarly, low-cost SIDS producers may find themselves shut out of markets by the import quota system and may be favoured by the erosion of preferences.

Another avenue bringing significant benefits to (certain) SIDSs would be to expand import- duty-free quotas to cover all SIDS exports. According to the model's estimates, this would entirely compensate

for losses in the rents. Given the high degree of specialization by SIDSs on a limited number of products, additional preferential quotas appear, therefore, to guard beneficiaries against the erosion of preferential tariff margins and quota rents. However, this assumes that beneficiary countries are capable of filling the additional quotas. Tellingly, this particular scenario, that has been selected as a possible modality to compensate SIDSs, would have no, or very limited, effects on the welfare gains of developing countries.

Finally, compensation, if any, might be sought both within the WTO framework and bilaterally. In fact, given the high geographical concentration of SIDS exports in a few markets, there may yet be scope for improving the effectiveness of non-reciprocal preferential market access via expansion of product coverage, expansion of quantitative limits on preferential market access, or lowering of preferential tariff rates, with a view to offsetting the impacts of MFN tariff cuts.

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ANNEX

Annex 1. Some technical details concerning ATPSM

The Agricultural Trade Policy Simulation Model (ATPSM) is a comparative static, deterministic, linear, partial equilibrium, global model with 36 commodities and 162 countries or regions. Technical specifications of the model are provided in this section.

Price determination

One principal characteristic of the model is that domestic prices are all functions of world market prices and border protection or special domestic support measures. Thus no data is provided about the domestic prices and no transaction costs (such as wholesale and retail margins) are taken into account. All protection measures are expressed in tariff equivalents.

A second characteristic is two-way trade. In the ATPSM database, a country is often an importer and exporter of the one (aggregated) good. To accommodate this feature of trade data, composite tariffs for determining the domestic consumption and production price are estimated. The composed tariffs are derived by dividing the volumes into three groups, imports, exports and production, supplied to the domestic market (S_d).

First, a domestic market tariff (t_d) is computed as the weighted average of two trade taxes, the export subsidy rate (t_x) and the import tariff (t_m), where the weights are exports (X) and imports (M):

$t_d = (X \, t_x + M \, t_m)/(M + X);$

Then a consumption (domestic market) tariff is computed as the weighted average of the import tariff (t_m) and the domestic market tariff (t_d), where the weights are imports (M) and domestic supply (S_d):

$t_c = (M \, t_m + S_d \, t_d) / D;$

Similarly, a supply (domestic market) tariff is computed as the weighted average of the import tariff (t_m) and the domestic market tariff (t_d), where the weights are exports (X) and domestic supply (S_d) plus the domestic support tariff (t_p):

$t_s = (X \, t_x + S_d \, t_d) / S + t_p;$

These calculations are applied to both the baseline and final tariffs.

Model equations

The equation system for all countries essentially has the following four equations, specifying domestic consumption, production, exports and imports:

$$1) \quad \hat{D}_{i,r} = \eta_{i,i,r} \left[\hat{P}_{wi} + t_{c\,i,r} \,/(1 + t_{c\,i,r}) \right] + \sum_{\substack{j=1 \\ i \neq j}}^{J} \eta_{i,j,r} \left[\hat{P}_{wi} + t_{c\,i,r} \,/(1 + t_{c\,i,r}) \right]$$

$$2) \quad \hat{S}_{i,r} = \varepsilon_{i,i,r} \left[\left[\hat{P}_{wi} + t_{s\,i,r} \,/(1 + t_{s\,i,r}) \right]\right] + \sum_{\substack{j=1 \\ i \neq j}}^{J} \varepsilon_{i,j,r} \left[\hat{P}_{wj} + \left[t_{s,i,r} \,/(1 + t_{s,i,r}) \right] \right]$$

3) $\Delta X_{i,r} = X_{i,r} \hat{S}_{i,r}$;

4) $\Delta M_{i,r} = D_{i,r} \hat{D}_{i,r} - S_{i,r} \hat{S}_{i,r} + \Delta X_{i,r}$;

where *D, S, X,* and *M* denote demand, supply, exports and imports respectively,
^ denotes relative changes and Δ absolute changes,
P_w denotes world price, t_c denotes the domestic consumption tariff and t_s denotes the domestic production tariff,   denotes supply elasticity and $\eta_{i,i,r}$ denotes demand elasticity, i and j are commodity indices and r is a country index.

By transforming $\hat{D}$, $\hat{S}$,   and   and   to vectors with dimensions of 5832 (162 * 36) by 1, the equation system above can be simplified and solved by matrix inversion. Further details are available from UNCTAD (2002).[32]

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[32] The ATPSM model, plus the documentation and data, are available free of charge from UNCTAD on request, at e-mail: atpsm@unctad.org

TABLES AND FIGURES

Table 1. Agricultural trade balance (average for the period 1996-2000)

SIDS regions	Ratio of agricultural imports to agricultural exports	Share of agricultural imports in total imports (%)	Share of agricultural exports in total exports (%)	Share of agricultural imports in total exports (%)
Africa	1.4	21	21	29
Caribbean	1.3	16	18	24
Pacific	0.6	18	23	14
All SIDSs	1.2	16	19	23

Source: FAOStat; UNSD Comtrade

Africa - Cape Verde, Comoros, Maldives, Mauritius, the Seychelles, and Sao Tome and Principe;

Caribbean - Antigua and Barbuda, Bahamas, Barbados, Cuba, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, and Trinidad and Tobago;

Pacific - Cook Islands, Fiji, Kiribati, Papua New Guinea, Western Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu;

Table 2. Top 5 agricultural imports and exports (average for the period 1996–2000)

SIDS Region	Import rank	Product code	Product Description	% of total agricultural imports	Export rank	Product code	Product Description	% of total agricultural exports
Africa	1.	04	Dairy produce and birds' eggs	15	1.	170111	Cane sugar	83
	2.	10	Cereals	11	2.	010600	Other live animals.	2
	3.	02	Meat and edible meat, meat offal	8	3.	170310	Cane molasses	1
	4.	15	Animal or vegetable fats	10	4.	180100	Cocoa beans, whole or broken	1
	5.	22	Beverages, spirits and vinegar	9	5.	090500	Vanilla	1
			Total	53			**Total**	89
Caribbean	1.	10	Cereals	20	1.	170111	Cane sugar	35
	2.	04	Dairy produce and birds' eggs	11	2.	240210	Cigars, cheroots and cigarillos	12
	3.	15	Animal or vegetable fats	8	3.	220840	Rum and tafia	11
	4.	22	Beverages, spirits and vinegar	7	4.	080300	Bananas, including plantains	8
	5.	02	Meat and edible meat, meat offal	7	5.	090111	Coffee, not roasted	4
			Total	53			**Total**	70
Pacific	1.	02	Meat and edible meat, meat offal	24	1.	090111	Coffee, not roasted	24
	2.	04	Dairy produce and birds' eggs	11	2.	170111	Cane sugar	20
	3.	21	Miscs. edible preparations	8	3.	151110	Palm oil	18
	4.	15	Animal or vegetable fats	8	4.	120300	Copra	10
	5.	10	Cereals	7	5.	180100	Cocoa beans, whole or broken	8
			Total	57			**Total**	80
All SIDSs	1.	10	Cereals	18	1.	170111	Cane sugar	37
	2.	04	Dairy produce and birds' eggs	12	2.	240210	Cigars, cheroots and cigarillos	9
	3.	02	Meat and edible meat, meat offal	9	3.	220840	Rum and tafia	8
	4.	15	Animal or vegetable fats	8	4.	090111	Coffee, not roasted	8
	5.	22	Beverages, spirits and vinegar	7	5.	080300	Bananas, including plantains	6
			Total	54			**Total**	68

Source: UNSD COMTRADE.

Africa - Cape Verde, Comoros, Maldives, Mauritius, the Seychelles, and Sao Tome and Principe.

Caribbean - Antigua and Barbuda, Barbados, Bahamas, Cuba, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, and Trinidad and Tobago.

Pacific - Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Papua New Guinea, Western Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu.

Table 3. Importance of agricultural trade, 2000

Country groups	Agricultural exports in total exports (%)	Agricultural imports in total imports (%)	Imports/ exports ratio in agriculture	Ratio of agricultural exports to GDP (1999)* (%)	Ratio of agricultural imports to GDP (1999)* (%)
Developed	6.8	6.5	1.1	1.1	2.9
Developing (excl. LDCs)	7.2	6.7	0.98	2.7	7.0
LDCs	31.4	16.4	1.1	3.7	7.4
SIDSs**	24.0	14.0	2.5	7.4	14.7

Sources: Trade information is from UN COMTRADE; GDP data are taken from World Bank, *World Development Indicators*.

 *Data on GDP available only for selected countries.

** For this table, trade data was available for the following SIDSs: Bahamas, Barbados, Comoros, Dominica, Fiji, Papua New Guinea, Mauritius, Grenada, Jamaica, Maldives, Saint Vincent and the Grenadines, Saint Lucia, Saint Kitts and Nevis and Trinidad and Tobago.

Table 4. Concentration of SIDSs' agricultural trade (%), 2000

	All SIDSs	**African SIDSs**	**Caribbean SIDSs**	**Pacific SIDSs**
European Union	**52.1**	87.1	41.6	65.0
United States	**27.1**	5.2	37.6	8.2
Canada	**1.6**	0.8	2.3	0.1
Japan	**3.1**	1.8	2.4	5.8
Australia/New Zealand	**0.7**	0.1	0.3	2.1
Mexico	**0.5**	0.1	0.8	0.0
South-East Asia	**2.6**	2.0	0.3	9.4
Others	**12.0**	2.8	14.4	9.4
Regions in total SIDSs' exports (%)	**100**	**10.90**	**65.37**	**23.73**

Sources: Trade information is from UN COMTRADE

Table 5. SIDSs' agricultural exports to the Quad:* Average tariffs and preferential margins*

European Union

Year: 2000	% in total SIDSs' exports	MFN rate	GSP rate	LDC rate	ACP rate	Pref. margin 1 (MFN - GSP)	Pref. margin 2 (MFN -ACP)	Pref. margin 3 (=GSP-ACP)
MFN = 0%	14	0	0	0	0	0	0	0
0% < MFN =< 10%	35	6.0	3.8	0	0.2	2.6	6.1	3.5
10% < MFN =< 20%	2	14.8	10	0	1.1	4.7	13.7	9.0
MFN > 20%	48	39.9	19.2	0	10.3	10.4	25.1	14.7

United States

Year: 2000	% in total SIDSs' exports	MFN rate	GSP rate	LDC rate	CBI rate	Pref. margin 1 (= MFN - GSP)	Pref. margin 2 (=MFN -CBI)
MFN = 0%	20	0.0	0.0	0.0	0.0	0.0	0.0
0% < MFN =< 10%	60	4.2	0.0	0.0	0.0	4.2	4.2
10% < MFN =< 20%	5	14.2	0.0	0.0	0.0	14.3	14.1
MFN > 20%	1	49.1	0.0	0.0	0.0	34.7	33.3
MFN AVE n/a (sugar)	14	n.a	n.a	n.a	n.a	n.a	n.a

Canada

Year: 1998	% in total SIDSs' exports	MFN rate	GSP rate	LDC rate	CBCAN rate	Pref. Margin 1 (=MFN-GSP)	Pref. Margin 2 (=MFN-CBI)
MFN = 0%	55	0.0	0.0	0.0	0.0	0.0	0.0
0% < MFN =< 10%	39	5.4	2.0	0.0	0.0	3.1	5.4
10% < MFN =< 20%	6	11.4	5.3	0.0	0.0	5.7	11.4

Japan

	% in total SIDSs' exports	MFN rate	GSP rate	LDC rate	Pref. margin 1 (= MFN - GSP)
MFN = 0%	66	0.0	0.0	0.0	0.0
0% < MFN =< 10%	17	5.0	1.2	0.0	2.3
10% < MFN =< 20%	2	13.8	8.2	0.0	3.8
MFN > 20%	15	89.2	excl.***	excl.	excl.

*Quad comprises the EU, the United States, Canada and Japan.

**This table reports the average GSP rates and other rates for those products covered by preferences only.

in the case of Japan, for example, it does not mean that 17 per cent of SIDSs' exports have an avera

rate of 1.2; it is simply the average of those products enjoying GSP treatment within that MFN rate

*** Preferences are not offered on these tariff items.

Table 6. Preferential trading arrangements for SIDSs in the Quad

African SIDSs

EU	**Canada**
ACP: Cape Verde, Sao Tome & Principe, Comoros, Seychelles, Mauritius *GSP:* same as ACP +Maldives *GSP-EBA:* Cape Verde, Sao Tome & Principe, Comoros +Maldives	*GSP:* Cape Verde, Sao Tome & Principe, Comoros, Seychelles, Mauritius +Maldives *GSP-LDC:* Cape Verde, Sao Tome & Principe, Comoros, +Maldives
United States	**Japan**
GSP: Cape Verde, Sao Tome & Principe, Comoros, Seychelles, Mauritius *GSP-LDC:* Cape Verde, Sao Tome & Principe, Comoros *GSP-AGOA:* Cape Verde, Sao Tome & Principe, Mauritius and Seychelles	*GSP:* Cape Verde, Sao Tome & Principe, Comoros, Seychelles, Mauritius +Maldives *GSP-LDC:* Cape Verde, Sao Tome & Principe +Maldives

Caribbean SIDSs

EU	**Canada**
ACP: Bahamas, Dominican Republic, Antigua and Barbuda, Barbados, Dominica, Grenada, Haiti, Jamaica, St. Kitts and Nevis, Saint Lucia, St. Vincent and the Grenadines, Trinidad and Tobago *GSP:* same as ACP + Cuba *GSP-EBA*: Haití	*GSP:* Antigua and Barbuda, Bahamas, Barbados, Cuba, Dominica, Grenada, Haiti, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent & the Grenadines, Trinidad and Tobago *GSP-LDC*: Haiti *CARIBCAN:* Antigua and Barbuda, Bahamas, Barbados, Dominica, Grenada, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago
United States	**Japan**
GSP: Bahamas, Dominican Republic, Antigua and Barbuda, Barbados, Dominica, Grenada, Haiti, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago *GSP-LDC*: Haiti *CBI/ CBTPA*: same as GSP	*GSP:* Antigua and Barbuda, Barbados, Dominica, Grenada, Haiti, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago *GSP-LDC:* Haití

Pacific SIDSs

EU	**Canada**
ACP: Fiji, Kiribati, Marshall Islands, Federated States of Micronesia, Nauru, Palau, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, Vanuatu, Samoa. *GSP:* same as ACP **GSP-EBA :** Kiribati, Solomon Islands, Tuvalu, Vanuatu, Samoa	*GSP:* Fiji, Kiribati, Marshall Islands, Nauru, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, Vanuatu, Samoa. *GSP-LDC:* Kiribati, Solomon Islands, Tuvalu, Vanuatu, Samoa
United States	**Japan**
GSP: Fiji, Kiribati, Palau, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, Vanuatu *GSP-LDC:* Kiribati, Solomon Islands, Tuvalu, Vanuatu, Samoa	*GSP:* Fiji, Kiribati, Marshall Islands, Federated States of Micronesia, Nauru, Palau, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, Vanuatu, Samoa. *GSP-LDC:* Kiribati, Solomon Islands, Tuvalu, Vanuatu, Samoa

Table 7. Commodity coverage in ATPSM

01100 Bovine meat	05440 Tomatoes
01210 Sheep meat	05700 Non-tropical fruits
01220 Pig meat	05710 Citrus fruits
01230 Poultry	05730 Bananas
02212 Milk, fresh	05790 Other tropical fruits
02222 Milk, conc.	07110 Coffee (green)
02300 Butter	07120 Coffee roasted
02400 Cheese	07131 Coffee extracts
04100 Wheat	07210 Cocoa beans
04400 Maize	07240 Cocoa butter
04530 Sorghum	07220 Cocoa powder
04300 Barley	07300 Chocolate
04200 Rice	07410 Tea
06100 Sugar	12100 Tobacco leaves
22100 Oil seeds	12210 Cigars
42000 Vegetable oils	12220 Cigarettes
05420 Pulses	12230 Other tobacco, mfd.
05480 Roots & tubers	26300 Cotton linters

Table 8. Global distortions: Revenues and rents by commodity (in $ million)

	World		SIDSs		
	Tariff revenue	**Rent forgone**	**Tariff revenue**	**Export revenue**	**Rent received**
Bovine meat	3 859	105	7	4	0.00
Sheep meat	241	589	24	0	0.00
Pig meat	615	66	6	0	0.00
Poultry	2 183	165	37	3	0.00
Milk, fresh	87	2	0	1	0.00
Milk, conc.	1 093	419	36	2	0.23
Butter	534	169	10	0	0.00
Cheese	1 057	360	16	6	0.62
Wheat	1 882	2 315	27	14	0.64
Rice	705	955	85	3	0.22
Barley	439	583	0	0	0.00
Maize	2 652	2 120	10	0	0.00
Sorghum	74	17	0	0	0.00
Pulses	338	1	8	1	0.00
Tomatoes	184	35	0	0	0.00
Roots & tubers	103	0	5	7	0.00
Apples	1 119	15	8	0	0.00
Citrus fruits	537	15	1	23	0.05
Bananas	639	390	1	91	11.36
Other tropical fruits	251	0	0	18	0.00
Sugar	1 850	789	35	1110	271.82
Coffee (green)	576	3	1	183	0.00
Coffee roasted	20	0	0	11	0.00
Coffee extracts	7	0	0	0	0.00
Cocoa beans	61	0	0	118	0.00
Cocoa powder	44	0	0	4	0.00
Cocoa butter	48	0	0	10	0.00
Chocolate	1 314	108	9	7	0.11
Tea	357	0	1	15	0.00
Tobacco leaves	2 173	20	1	75	0.04
Cigars	3 684	0	14	41	0.00
Cigarettes	27	0	0	51	0.00
Other mfd. tobacco	666	0	1	0	0.00
Oilseeds	2 634	188	8	34	0.10
Cotton linters	288	29	0	0	0.00
Vegetable oils	2 894	1	41	273	0.00
Total	35 235	9 457	394	2 106	285.19

Source : ATPSM database.

Table 9. Impacts on world commodity prices of alternative scenarios

	Ambitious	Conservative	Tariff-50
	(%)	(%)	(%)
Bovine meat	8	3	3
Sheep meat	10	4	7
Pig meat	4	2	2
Poultry	7	2	4
Milk, fresh	10	4	7
Milk, conc.	18	6	6
Butter	25	10	8
Cheese	16	7	7
Wheat	13	5	2
Rice	3	1	1
Barley	3	1	1
Maize	4	1	2
Sorghum	1	0	0
Pulses	4	1	1
Tomatoes	3	2	2
Roots & tubers	3	1	3
Apples	4	2	3
Citrus fruits	2	1	1
Bananas	2	1	1
Other tropical fruits	3	1	2
Sugar	10	3	4
Coffee (green)	1	0	1
Coffee roasted	0	0	0
Coffee extracts	0	0	1
Cocoa beans	0	0	0
Cocoa powder	1	1	1
Cocoa butter	1	1	1
Chocolate	6	3	5
Tea	4	1	2
Tobacco leaves	4	1	3
Cigars	6	2	4
Cigarettes	2	1	2
Other mfd. tobacco	14	5	8
Oilseeds	2	1	2
Cotton linters	2	1	1
Vegetable oils	4	1	2

Source : ATPSM simulations.

Table 10. Impacts of alternative scenarios on key variables ($ million)

	Ambitious	Conservative	Tariff-50	Preferential	Compensatory
Export revenues					
SIDSs					
World	40 381	13 747	21 386	21 386	21 386
Govt. revenue					
SIDSs	-96	1	-47	-47	-49
World	-1 455	4 891	-4 176	-4 191	-4 363
Quota rents					
SIDSs	-254	-124	-166	-78	83
World	-4 638	-1 225	-1 926	-1 911	-1 740
Welfare					
SIDSs	-271	-145	-150	-62	97
World	24 981	10 737	12 944	12 944	12 944

Source : ATPSM simulations.

Table 11. Impact on welfare of the five scenarios ($ million)

	Ambitious	Conservative	Tariff-50	Preferential	Compensatory
SIDSs	-271	-145	-150	-62	97
Developed agri. Importers[1]	6 971	2 706	3 801	3 801	3 768
Developed agri. Exporters[2]	2 779	1 427	1 321	1 333	1 314
European Union	10 806	6 286	3 917	3 925	3 873
Developing agri. Importers[3]	531	-139	-99	-88	-102
Developing agri. exporters[4]	643	136	362	323	317
All developed	19 958	11 083	9 442	9 463	9 354
All developing[5]	4 175	-89	2 647	2 622	2 736
Least developed countries	849	-194	855	860	854
World	**24 981**	**10 737**	**12 944**	**12 944**	**12 944**

1. Japan, Norway, Republic of Korea, Switzerland.
2. Australia, Canada, New Zealand, United States.
3. India, Kenya, Pakistan, Sri Lanka, Zimbabwe.
4. Argentina, Brazil, Indonesia, Malaysia, Philippines, Thailand, South Africa.
5. Excludes LDCs.
Source : ATPSM simulations.

**Table 12. Welfare impacts by commodity group on individual SIDSs
from 50 per cent tariff reduction ($ million)**

	Meat	Dairy	Cereals	Vegetables	Fruit	Sugar	Beverages	Tobacco & cotton	Oilseeds	**Total**
Bahamas	-1.0	-0.7	-0.1	0.0	0.0	-0.1	0.0	0.5	0.0	-1.4
Barbados	-0.8	-0.8	-0.2	-0.1	-0.1	-3.6	-0.1	-0.2	-0.1	-6.0
Cape Verde	-0.1	-0.4	-0.3	0.0	-0.1	-0.1	0.0	0.0	-0.1	-1.1
Comoros	-0.2	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	-0.4
Cuba	-3.8	-7.0	-6.6	-0.7	0.2	20.2	0.0	1.3	-1.0	2.5
Dominica	-0.2	-0.1	0.0	0.0	-0.4	0.0	0.0	0.0	0.0	-0.8
Dominican Rep.	20.8	-2.6	-4.6	0.1	-0.7	-2.3	0.1	1.9	-1.6	11.3
Fiji	-0.9	-0.6	0.0	0.3	0.2	-20.5	0.0	0.3	0.3	-20.9
Grenada	-0.4	-0.3	-0.1	0.0	0.0	-0.1	0.0	-0.1	0.0	-1.0
Haiti	1.3	-1.0	2.3	1.1	1.9	-0.9	0.1	0.0	-0.5	4.2
Jamaica	-4.0	-2.5	-1.6	-0.3	-0.7	-12.2	-0.1	0.0	-0.6	-21.9
Maldives	-0.2	-0.3	-0.1	0.0	-0.1	-0.1	0.0	-0.2	0.0	-1.1
Mauritius	1.7	-2.3	-1.1	-0.1	-0.3	-28.1	-0.3	-0.4	-0.4	-31.2
Papua New Guinea	-4.0	-0.4	-1.1	0.6	0.5	0.8	1.4	-0.2	4.2	1.8
Sao Tome & Principe	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1
Seychelles	-0.1	-0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	-0.2
Solomon Islands	0.1	0.0	-0.2	0.9	0.0	0.0	0.0	-0.1	0.4	1.0
St. Lucia	-0.5	-0.3	-0.1	0.0	-1.3	-0.1	0.0	-0.1	0.0	-2.5
St. Vincent & the Grenadines	-0.3	-0.1	-0.2	0.0	-0.6	-0.1	0.0	0.0	0.0	-1.4
Trinidad & Tobago	-1.3	-3.2	-0.8	-0.2	-0.2	-0.2	-0.2	0.7	-0.6	-6.0
Vanuatu	0.1	0.0	-0.1	0.0	0.0	0.0	0.0	-0.1	0.1	0.0
Total	**6.2**	**-23.0**	**-14.9**	**1.6**	**-1.7**	**-47.5**	**0.8**	**3.3**	**0.1**	-75.2

Source : ATPSM simulations

Figure 1. SIDSs: Main agricultural exports as a percentage of total agricultural exports, 2000

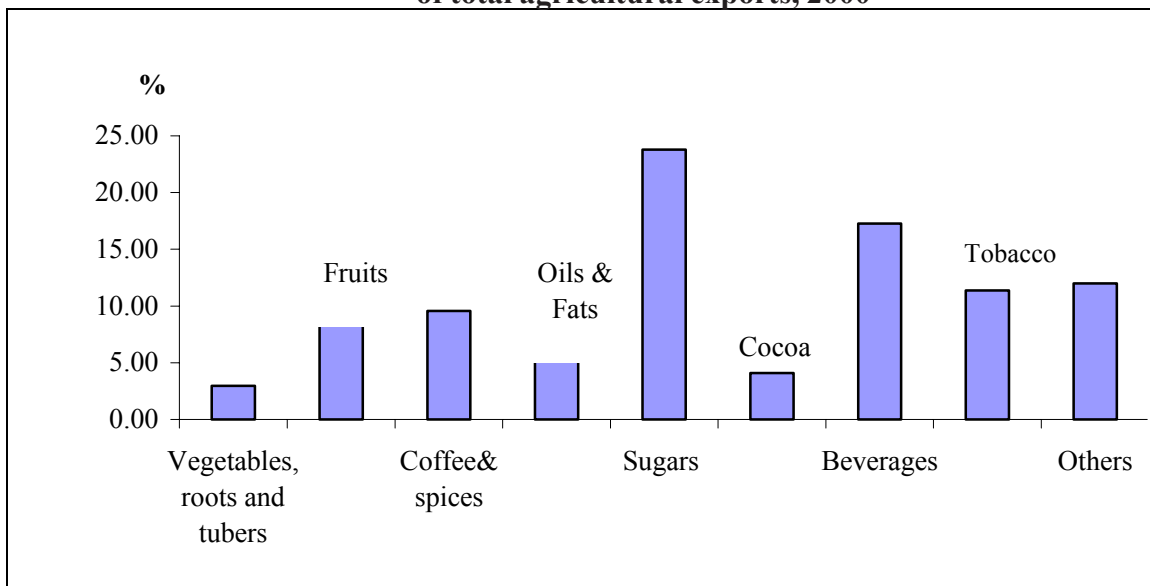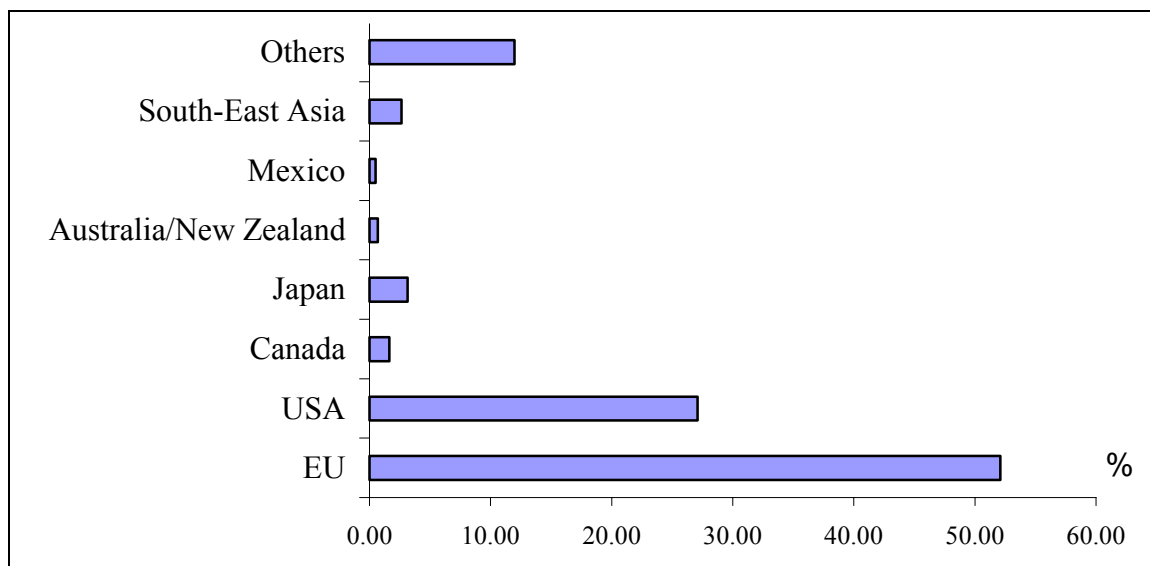**Figure 2. SIDSs: Destination of agricultural exports, 2000**

Figure 3: Quota rents with a binding out-of-quota tariff