Indonesian interests in the agricultural negotiations under the Doha Development Agenda

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Starting from the 'July 2004 package', this study assesses the Indonesian interests in the agricultural negotiations under the WTO Doha Development Agenda. It applies a large-scale economic model of trade and production (GTAP). For Indonesian agriculture, global liberalisation bears positive prospects for vegetable oils and for animal products, and small adverse impacts on the protected rice and sugar sectors. The paper explores several policy instruments, including 'special products' for developing countries, in relation to policy objectives such as self-sufficiency in sugar, and the stabilisation of farm income.

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Preface

The Doha round of trade negotiations that is ongoing under the World Trade Organization (WTO) since 2001 has been called 'Development Agenda'. Indonesia is one of those developing countries seeking, more than ever before, to participate actively in the negotiation process. As a major agricultural importer and exporter, the country has a major stake in global efforts to liberalise agricultural trade. This paper assesses the Indonesian interests in the agricultural negotiations.

The Ministry of International Cooperation (DGIS) of the Netherlands sponsored this research through the PBSI programme, the programme for bilateral cooperation between Indonesia and the Netherlands. The research was implemented within the project 'Strengthening Agricultural Policies', a capacity building project targeted at enhancing Indonesian's capacity to develop and pursue international trade policies aimed at economic growth and development. The project brought together policy advisors and researchers from the Ministry of Agriculture in Indonesia with their counterparts at the Ministry of Agriculture, Nature and Food Quality in the Netherlands, and at Wageningen University and Research Center.

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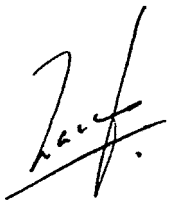

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Summary

This paper takes the 'July 2004 package' as a starting point to assess Indonesian interests in the agricultural negotiations under the WTO Doha Development Agenda. Since the start of the Doha round in 2001 the scope for liberalisation in agricultural trade has gradually declined, and Members agree on far reaching exemptions from reforms in individual products (special products for developing countries and sensitive products for developed countries). The ambitions on reforming domestic support in OECD countries seem to be moderate, at best, and a number of developing countries are less inclined to open their markets through improved access. This paper uses a large-scale economic model of trade and production (GTAP) to identify the possible impact of a realistic global liberalisation scenario in the spirit of the 'July 2004 package' on the Indonesian economy. Given the prevailing quite liberal trade regime in Indonesia the expected overall impacts on national income, trade and production are positive, but rather limited. For Indonesian agriculture global liberalisation offers positive prospects for vegetable oils and for animal products, while small adverse impacts on the protected rice and sugar sectors can be expected. Further analysis of a Safeguard Mechanism for rice reveals that temporary (seasonal) tariffs may be able to cushion the domestic rice sector against world price drops against moderate economy-wide costs. Even without a Safeguard Mechanism, the current binding overhang, i.e. the spread between the bond tariffs and actually applied tariffs, is large enough to allow Indonesia enough flexibility to shield domestic markets against an influx of cheap imports. The paper also analyses policies aimed self-sufficiency in sugar. We conclude that such a policy would entail very high macro-economic costs, as huge subsidies would be needed to move resources from other activities into sugar production.

1. Introduction

This paper discusses the interests of Indonesia in the agricultural negotiations under the Doha Development Agenda (DDA) of the WTO. It uses a global model of trade and production to quantitatively assess the possible effects of a successful Doha round on the world and on the Indonesian economy.

Since the start of the Doha round in 2001 the scope for liberalisation in agricultural trade has gradually declined. The recent 'July 2004 package' reveals that WTO members agree on far reaching exemptions from reforms in individual products (special products for developing countries and sensitive products for developed countries). The ambitions on reforming domestic support in OECD countries seem to be moderate, at best, and a number of developing countries is less inclined to open their markets through improved access.

It is against this background that we formulate our DDA scenario, and subsequently perform additional calculations to investigate some specific issues relating to Indonesian rice and sugar policies. In particular, we look into the effects of volatility in international rice markets in the post-DDA world, and how Indonesia might mitigate the possible negative consequences of downward price movements in the face of the great importance of rice for the rural economy. We also investigate costs and benefits of policy measures aimed at sugar self-sufficiency.

Several recent studies have shown that agricultural market access is one of the most important issues on the Doha development-round agenda (e.g. Anderson, 2004; Bouët et al., 2004b; Francois et al., 2003; World Bank, 2003). There is also much focus on tariff reductions in the present paper. Chapter 2 provides background to the Doha Development Agenda, and provides input into the discussions on tariff reduction formulae through an analysis at tariff-line level. We find that any formula that reduces post-UR bound rates by less than 80 per cent will leave most currently applied tariffs on agricultural imports into Indonesian untouched. Stated otherwise, Indonesia brings much capital to the negotiation table when it comes to improving other countries' access to its markets.

This study employs the GTAP model and database, and gives much detail on the agricultural sectors in Indonesia, and the South and East Asian region (chapter 2). While the impact of the Doha Development Agenda on global income is modest, as reported in chapter 3, Indonesia is one of the countries that reap above-average gains driven by the improved export performance in agriculture. The income form farming activities will rise. The export opportunities compensate by far the limited contraction of the rice and sugar sectors that occur as imports grow; designating rice a Special Product will counteract contraction at modest costs to exports. Criteria design for SPs is a potential deadlock, however, that may consume much of the scarce negotiating resources that developing countries have at their disposal.

The Indonesian government may want to manage the impact of world markets on the domestic sugar and rice economy in order to pursue domestic policy objectives relating to rural development, food security, etc. Most economists agree that the outright banning of

imports is a bad idea. Instead, we analyse tariff policies inspired by a strategic safeguard mechanism (SSM) in chapter 4, and find that an SSM provides effective protection at limited costs to society, and thus provides a proper alternative to policy makers if binding overhang is reduced. Chapter 5 concludes that there are firm interests for Indonesia in the Doha Development Agenda, some of which are on the defensive side, i.e. those that relate to defending flexibility for trade policies on key commodities. There are even larger offensive interests when it comes to the creation of market opportunities for Indonesian exports.

2. Protection, model and scenarios

2.1 Starting point: the global patterns of protection in agriculture

The Doha Development Round aims to obtain 'substantial improvement of market access, reduction of all export subsidies, in view of their progressive withdrawal, and substantial reduction of domestic support having effects on trade distortion'. These are the three 'pillars' in the agriculture negotiations under the Doha Development Agenda: market access concerns reductions in tariffs and tariff rate quotas; domestic support concerns commitments to reduce trade-distorting farm income policies; export competition concerns the promotion of agricultural exports through direct subsidies, export credits, subsidy element in food aid and state trading enterprises.

2.1.1 Domestic support

Domestic support to agriculture is monitored in the WTO according to the concept of the Aggregate Measure of Support (AMS), and member countries have agreed to bind and reduce their domestic support in the last multilateral trade round, the Uruguay Round (UR). The domestic support ceilings have never been binding since the UR for any member, partly due to the relatively soft definition of AMS that allows reallocation of expenditures between categories.[1] Most importantly, a significant part of domestic support has been shifted to the so-called 'Green box' which contains support that is considered minimally trade distorting and is not subject to reductions. Similarly, the so-called 'blue box', used mainly by the EU, has not been subject to reductions, and might possibly be extended in the DDA. Bringing down AMS will, therefore, not always result in actual reduction in domestic support.

Table 2.1 provides data on the subsidies from farm-income policies and export competition for selected countries and regions. These data are drawn from the OECD's estimates of producer support and adjusted to fit the GTAP database.[2] A negative number refers to a net tax on producers in that sector. It is evident that the European Union, North America (USA and Canada), Japan and Korea choose to subsidise their agricultural sectors, while most of the developing countries are taxing their farmers.

[1] Tangermann (1998) provides a discussion on these issues.
[2] The data does not include the so called 'Market Price Support' component, and is therefore lower than the OECD's Producer Support Estimates (PSE).

Table 2.1 Domestic support and export competition a) b)

	Indo-nesia	ASEAN	China P.R.	Japan and Korea	India	EU-25	North America	Brazil	South and Central America	Australia and New Zealand	All other countries
Million USD 2001											
Rice	-63	-413	-1,369	1,760	1,681	86	978	-29	-4	4	200
Sugar	-197	-169	-37	-37	-41	30	234	-140	-95	54	-249
Oilseeds	-10	-2	-155	224	597	3,712	5,337	73	-66	10	-142
Grains	-10	-213	-196	39	146	8,639	7,837	23	1,178	27	90
Vegetable Oils	-55	-107	-254	-11	-54	-194	-1	-222	-31	0	-64
Animal Products	-88	-450	-1,913	961	-166	12,896	5,879	-444	-1,112	521	-2,030
Other agriculture	-89	-413	-2,789	1,691	3,166	10,514	15,088	108	275	181	-2,650
Food processing	-1,095	-4,287	-14,590	-42,172	-546	-15,571	-221	-1,090	-3,823	-210	-3,388
% of value of output											
Rice	-1	-2	-3	3	6	3	25	-1	0	1	0
Sugar	-7	-4	-2	0	0	0	1	-2	-1	2	-1
Oilseeds	-1	0	-2	35	3	42	27	1	-1	2	-1
Grains	-1	-11	-2	8	3	61	32	1	11	3	0
Vegetable Oils	-1	-1	-4	0	-1	0	0	-3	0	0	0
Animal Products	-1	-2	-2	1	0	3	2	-1	-1	1	-1
Other agriculture	-1	-2	-2	3	5	9	18	1	0	1	-1
Food processing	-7	-13	-13	-19	-4	-4	0	-3	-3	-1	-2

a) Data is based on OECD producer support estimate (PSE), which measures trade distorting support for a good through the difference between the world price and its domestic price. Numbers do not directly relate to government budgets. See the annual Monitoring and Evaluation Report by the OECD Secretariat.
b) Negative number means a net tax; positive number means a net subsidy.
Source: GTAP version 6.4 pre-release (October 2004), calculations LEI.

2.1.2 Export subsidies

Export subsidies have received much criticism from academics and policymakers, and are widely believed to be amongst the most trade distorting forms of policies. The issue has received high priority in the current Doha round of negotiations. Between the kick-off of the round with the Doha ministerial declaration (WTO, 2001) and the latest general council decision of July 2004 (WTO, 2004), the wording on export subsidies has changed from '…reductions of, with a view of phasing out ...' to a much more ambitious '… ensure the parallel elimination of all forms of export subsidies..'. This signals a broad consensus that export subsidies will have to disappear over time.

Export subsidies are generally a consequence of domestic policy arrangement that aim at stabilising and increasing domestic prices in agriculture. The European Union's (EU) Common Agricultural Policy (CAP) provides a case in point. The CAP initially shielded the EU from imports through prohibitive tariffs, allowing the successful implementation of domestic market policies, which subsequently led to excess supply in key commodities. This excess supply had to be removed from the EU market in order to maintain high domestic prices, and this eventually required a disposition of surpluses on world markets at subsidised prices.

Under the UR only direct subsidies were subject to discipline. While taking the removal of subsidies further, the DDA also addresses indirect forms of subsidisation through various forms of institutional arrangements. These include food aid, officially supported export credits and state trading enterprises (STEs). The General Council decision (WTO, 2004) calls for the elimination of all forms of export subsidies, and Members have been instructed to work with the OECD to develop monitoring tools. The OECD (2000) study on export credits is the forerunner of much more work in this area.

Table 2.2 shows the notified usage of direct export subsidies between 1995- 2000. On average countries have been spending more than USD 7 billion annually on direct export subsidies, totalling 36 billion over the implementation period 1995-00. Of that total, almost 90 per cent (33 billion) are from the EU, making this region by far the largest user of direct export subsidies, but also the region with the sharpest reduction in budget outlays on export subsidies. The USA notified only USD 487 million of direct export subsidies, but according to OECD (2000), the USA has been the largest user of export credits to subsidise exports.

It is noteworthy that there are also positive notifications by developing countries, six of which did not make reduction commitments in the UR because they did not use them at the time. These countries are India, Korea, Morocco, Pakistan, Thailand and Tunisia.

In volume terms, grains represent the largest category of subsidised exports, whereas dairy products are the largest in value terms. With a few exceptions, countries have generally been able to stay clear of their value bindings, but volume bindings for some commodities have been more of a problem in some instances. Volume constraints on dairy products (mainly form the EU) have been the closest to become binding over the years. Skimmed milk powder and pig meat saw subsidised export volumes in excess of agreed levels in 1999.

Export subsidies display a considerable volatility over the years. The amount of export subsidies depends on the vagaries of world markets, in combination with the desire of

some countries to stabilise their own domestic markets. In value terms the volatility is even greater, since an additional price component enters the picture.

Table 2.2 Export subsidy notifications (USD million)

	1995	1996	1997	1998	1999	2000	Total
Members with export subsidy reduction commitments							
Australia	0	0	0	1	2	0	3
Brazil	0	0	0	0	-	-	0
Bulgaria	0	-	0	0	0	-	0
Canada	38	4	0	0	-	-	42
Colombia	18	22	25	23	0	0	88
Costa Rica	0	0	105	123	20	-	248
Cyprus	3	3	2	4	0	-	12
Czech Republic	40	42	40	42	35	24	223
EC	6,292	6,684	4,915	5,835	5,588	3,048	32,362
Hungary	41	18	10	12	13	-	94
Iceland	6	1	0	0	0	-	7
Indonesia	0	0	0	0	0	0	0
Israel	19	13	6	1	1	0	40
Mexico	0	0	36	4	-	-	40
New Zealand	0	0	0	0	0	-	0
Norway	83	78	102	77	128	-	468
Poland	0	16	9	14	55	36	130
Romania	0	0	0	2	7	-	9
Slovak Republic	8	8	13	12	12	12	65
South Africa	40	42	18	3	5	3	111
Switzerland-Liecht.	447	369	295	292	-	-	1,403
Turkey	30	17	39	29	28	27	170
United States	26	122	112	147	80	-	487
Uruguay	0	0	0	0	0	-	0
Venezuela	3	20	2	5	-	-	30
TOTAL	7,094	7,459	5,729	6,626	5,974	3,150	36,032

Notes: The number for the EC in 2000 comes from: EU WTO Notification (New and Full Notification Pursuant to Article XVI:1 of the GATT 1994 and Article 25 of the Agreement on Subsidies and Countervailing Measures, G/SCM/95/EEC), exchange rate used EUR-US = 0.8956.
Source: Author's calculation based on WTO (2002a).

2.1.3 Market access

Countries protect their domestic markets in a number of ways. The resulting pattern of protection measures is often complex and faces the exporter with a non-transparent administrative burden, involving tariffs, quota, technical standards, sanitary and phytosanitary standards, import licenses, infrastructure charges, and, increasingly popular after the

UR, anti-dumping duties. All these measures tend to raise the domestic price in of the imported good above its 'world' price, i.e. the price that the exporter actually receives.

Tariffs

Tariffs are the most commonly applied form of import protection. Market access negotiations in the GATT/WTO have generally been based on tariff bindings, or schedules of concessions tabled under GATT rules that define a maximum or ceiling rate for trade restrictions. The coverage and level of these bindings is an important element of the initial conditions for the negotiations. While tariffs in the OECD (and Latin America) are generally bound, many Asian and African economy tariffs remain unbound despite more than a four-fold increase in the coverage of developing-country tariff bindings in the Uruguay Round.

Tariffs on industrial goods in OECD countries have been subject to negotiated reductions since the 1950s, but agricultural tariffs have only been included in the multilateral agreements since the conclusion of the Uruguay Round in 1994. With the implementation of Uruguay Round commitments, average ad valorem tariffs in the industrial countries generally are around 3 per cent. However, there are important exceptions. One of these is textiles and clothing, where the average rate is roughly three times this overall average. The other exception is agriculture, which we discuss more thoroughly below.

For both industrial tariffs and agricultural tariffs, the phenomenon that bound rates exceed applied rates, or 'binding overhang' (Francois and Martin, 2003) is an important element for the initial negotiations in the Doha round. The binding overhang may reduce the effectiveness of bound tariff reductions. For example, Francois et al. (2003) show that, in general, for developing countries, binding overhang is large enough that reductions in the range of 50 per cent are necessary to force any reductions at all in average applied rates for countries like Brazil.

In agricultural trade the use of non-ad valorem tariffs is widespread, sometimes in conjunction with quota. In fact countries levy tariffs in a number of different ways:

- As a per centage of the value of imports (ad valorem tariffs), the most straightforward form of a tariff;
- As a monetary amount per unit of import such as cents per ton (specific tariffs);
- As a combination of the two, such as 12.5 per cent plus 20 cents per ton (compound tariffs).

Tariffs may also vary based on the time of year (seasonal tariffs). Seasonal tariffs are widely applied on EU imports of horticultural products, which essentially open 'import windows' in exactly those periods when domestic production in the EU is low, and close the window through prohibitive tariffs when domestic production is high. Tariffs may also be determined by complex technical factors such as sugar or alcohol content.

Specific tariffs are widespread in agriculture. In the USA and the EU about 44 per cent of the agricultural tariff lines are specified in non-ad valorem terms. One advantage of specific duties, from the importer's perspective, is their administrative simplicity, since they avoid the problem of having to value imports. However, specific tariffs tend to discriminate against low-quality goods, as they place a heavier burden on lower priced items within a given tariff-line. Since developing country imports are often of a lower quality,

and lower priced, than comparable goods originating from industrialised countries, specific tariffs tend to disadvantage developing country exporters.

Contrary to ad valorem tariffs, the distorting effect of specific duties is difficult to determine. To estimate the ad valorem equivalent (AVE) of a specific tariff one needs transaction volumes as well as prices. The latter are usually difficult to obtain and typically display variations over time, in part due to exchange rate fluctuations.

Gibson et al. (2001) estimate the average of bound agricultural tariffs across 113 countries specified solely in ad valorem terms to be 58 per cent, while the average AVE of non-ad valorem tariffs is 123 per cent.

Tariff-rate quota

The Uruguay Round negotiations resulted in 'tariffication', which is the process of converting agricultural non-tariff barriers (NTBs). Variable import levies and import quotas were converted into bound tariffs (maximum tariffs set at established rates). Tariffication resulted in a more transparent tariff-based system of border protection that allowed for an initial set of tariff cuts.

Since the conversion of NTBs into tariffs could lead to prohibitively high tariffs, GATT members agreed to provide a minimum level of import opportunities for products previously protected by NTBs. This was accomplished by creating tariff-rate quotas (TRQs), which generally impose a relatively low tariff (in-quota) on imports up to a specified level, with imports above that level subject to a higher tariff (over-quota).

According to Gibson et al. (2001) only about 6 per cent of the agricultural tariff lines are subject to TRQs, and 33 out of the 133 countries in their study use this instrument. However, TRQs are typically applied in 'sensitive' products, meats, dairy and cereals, and therefore are a significant factor in global trade. The effects of TRQs are difficult to ascertain, as either the in-quota tariff, the quota level or the out-of quota tariff may be binding. In addition, the process of administration and the allocation of the TRQ to specific exporters contribute to the non-transparency of the system. As with any quantitative market restriction, TRQs give rise quota rents, that may accrue to the importer, the exporter or is shared amongst them (De Gorter, 2001).

The average over-quota tariff in Gibson et al. (2001) equals 128 per cent, with peaks running as high as 250 per cent. This shows that countries tend to use TRQs on products that they whish to protect from international competition.

Preferences

While the negotiation in the GATT/WTO concern market access conditions on a Most Favoured Nation (MFN) basis, i.e. non-discrimination amongst trading partners, a web of preferential agreements governs most South-North trade (GSP, ACP, EBA, AGOA etc.). These agreements typically provide preferential access, i.e. at lower than MFN rates, to industrialised markets, but often 'sensitive' agricultural products are excluded from such agreements. The existence of preferences implies a priori that multilateral reductions on an MFN basis reduce the value of these preferences, see Bouët et al. (2004b) for an empirical study, and Achterbosch et al. (2004) for an analysis for Africa.

However, there are big questions as to the utilisation of preferences. Low utilisation rates may result from administrative complexity, and associated costs, information defi-

ciencies and from complex rules of origin. Since preferential trade agreements provide member countries reductions on tariffs, rules of origin are needed in order to establish whether a given good is actually eligible for duty reductions. These rules of origin are usually extremely detailed and complex, and may contribute to the low level of preference utilisation.

Obviously, if preferences are not effectively utilised to begin with, then erosion is less of an issue. Instead, preferential regimes should be more transparent and less restrictive. For example rules of origin should be simplified (Augier et al., 2004).

2.2 Measuring import protection

2.2.1 The global post-Uruguay Round tariff structure

With all the usual caveats on providing aggregate measures of trade protection, we present here estimates of applied trade protection for broad country groups. Estimated tariffs are from the MacMaps database which is a joint effort by the Centre d'études Prospectives et d'information Internationales (CEPII) and the International Trade Centre (WTO/ITC). This database is used to convert tariffs applying to trade in products measured at a very disaggregate level (HS6) into their ad valorem equivalent. The import protection measures include ad valorem tariffs, specific tariffs, quota, tariff rate quota regimes, and anti-dumping duties. An important feature of this dataset is its inclusion of existing trade preferences, including GSP, ACP, AGOA and existing bilateral preferences. See Bouët et al. (2004a) for a comprehensive documentation.

Figure 2.1 provides a summary view of the tariff landscape. It compares the simple average across products of ad valorem tariff equivalents levied by a country group (on their imports) to the average tariff faced (by their exporters) in this country group.[1]

[1] It is generally difficult to derive a good measure of average tariffs. One well-known problem relates to the use of trade weights. If tariffs are weighted by their corresponding trade flows, the average tends to be lowered in case very high tariffs prohibit trade to occur (the endogeneity problem). On the other hand, simple average may put too much weight on high tariffs if the corresponding trade flow is rather small. In our case, the averages are somewhat hybrid: first, the original data is aggregated from the HS-6 level using basically unweighted averages to arrive at averages per GTAP commodity (see Bouët et al., 2004). From the GTAP commodity level, we calculate the trade-weighted averages for all products and all regions, using bilateral imports as weighting factor, and excluding intra-regional trade. This takes into account the importance of a particular trade flow between any pair of trading partners. We then proceed to calculate simple unweighted averages across products. An alternative measure would be the calculation of import duties (and quota rents) collected.

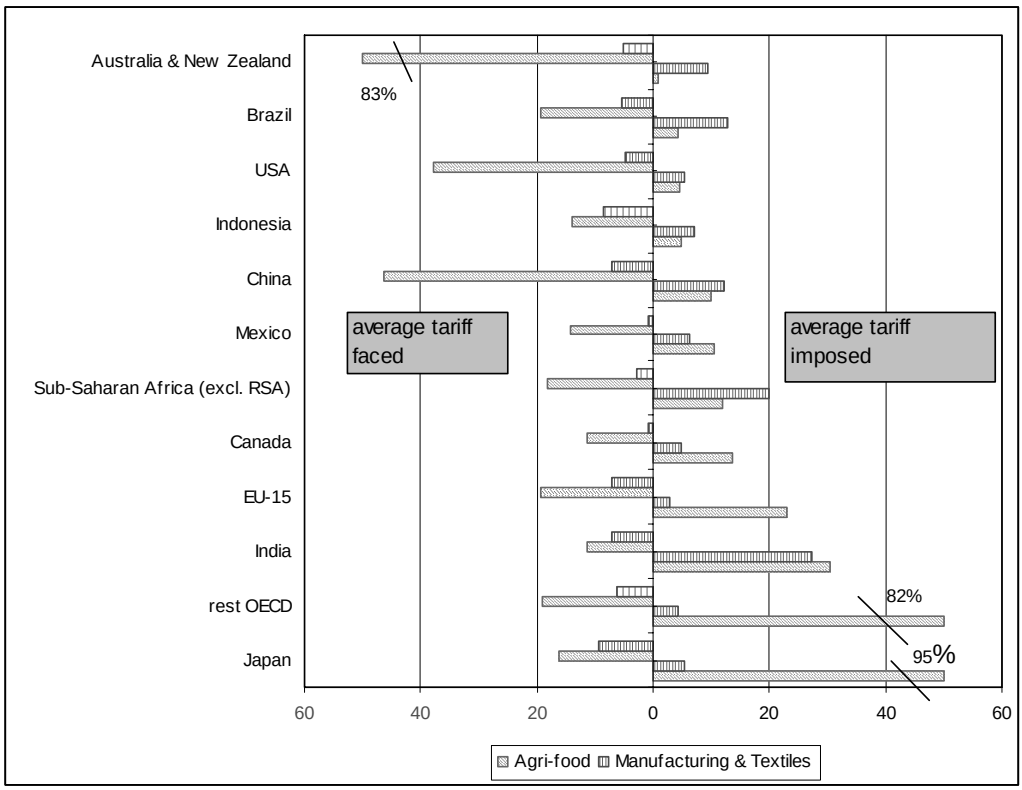

Figure 2.1 Average tariffs imposed and average tariffs faced by exporters
Source: GTAP database 6.3 (pre-release, June 2004), calculations LEI.

On average, trade barriers on agri-food products are higher than those on manufacturing products, and this holds for all countries and country groups considered. Note that we have included tariffs on textiles and clothing in the calculations for the manufacturing products, which raises the averages in this product group. The average ad valorem tariff on industrial goods alone in OECD countries is currently reduced to about 3 per cent. The developing countries included in the chart tend to impose higher tariffs on their manufacturing imports than on agri-food products, reflecting their tendency to protect capital-intensive activities.

In agri-food, the average tariffs levied by non-OECD countries appear to be smaller than the tariffs that their exporters have to pay, but there are exceptions to that rule. India, for example imposes higher protection on its imports of agri-food products, and Sub-Saharan Africa imposes relatively high protection on manufacturing imports while its exporters encounter low tariffs on their export destinations. This mainly reflects the preferential trade agreements with the EU.

Within the OECD countries there is some variation in the tariff profiles. Generally, the agri-food exporters Australia and New Zealand charge low tariffs on food imports. Canada protects mainly its dairy markets and this is reflected in a comparatively high average tariff. On the other hand, the average agri-food tariffs in the EU-15 are above 20 per cent, and those for Japan are on average in excess of 90 per cent, reflecting the extremely high protection in the rice market, ruminant meat and sugar. Since most trade occurs be-

tween OECD economies, the agricultural exporters face high tariffs on average on their export markets.

In summary, the picture emerging is that developing countries tend to protect their manufacturing more than their agriculture. However, within the group of developing countries, the picture is mixed. Some face higher tariffs than others on their export markets, reflecting existing preferential agreements. Also, the patterns of protection afforded to their domestic producers through trade barriers differ, and it is impossible to infer a priori conclusions as to the likely effects of globally lower trade barriers.

For Indonesia we observe that its applied protection in 2001 is low on average, around 5 per cent in agri-food and slightly higher in manufacturing and textiles. We also see that the protection afforded is lower than the protection faced by Indonesian exporters, which points to potential export revenue gains from a multilateral reduction of tariffs.

2.2.2 Patterns of border protection in Indonesia

The current pattern of border protection in Indonesia, its profile of bound rates and its profile of applied rates determine the potential impact of the specific tariff reduction modalities that are to be agreed in the Doha negotiations. Below we present data obtained from the AMAD database, which contains information on bound ad valorem tariff rates in agriculture, as well as information on TRQs.[1] The bound rates are directly from Indonesia's commitment schedule, and the AMAD database contains 1331 Indonesian tariff lines at the HS-8 level. Figure 2.2 provides a picture of the tariff landscape. With the exception of a few peaks, the landscape is rather flat, with most bound tariffs in the range 40-60 per cent. The important exceptions are found in dairy, sugar, rice and beverages. See table 2.3 for summary statistics for the agricultural commodities only, and calculated at the HS-2 group level. We also estimate the current binding overhang, i.e. the difference between bound rates and the post-UR applied rates. The overhang is very large indeed and this reflects the fact that Indonesia has reduced its tariffs far below the URA commitments in the wake of the Asia crisis. The current low rates reflect an already liberal trade regime, with most tariffs around 5 per cent. Two exceptions are sugar and rice where specific tariffs are applied, and in the case of rice also quantitative import restrictions. Another exception is (alcoholic) beverages.

The DDA negotiations on agriculture have introduced several approaches to achieve tariff reform. The European Union has favoured a Uruguay Round (UR) approach in its agricultural proposals, which defines as the goal an average cut in tariffs. The Uruguay Round has in practice led to the outcome that larger cuts were applied to tariffs that were already relatively low, while applying only modest reductions to high tariffs.

The USA and the CAIRNS group have proposed a formula approach. The fundamental difference to a UR approach is that a formula approach sets out rules to cut tariffs on each tariff-line. Specifically, these countries proposed to apply a Swiss formula approach on account that it achieves higher proportional cuts in higher tariff rates and results in a maximum ceiling tariff per tariff line. The Swiss formula is the most appropriate modality

[1] AMAD is a collaborative effort between USDA/ERS, OECD, Agriculture Canada, UNCTAD, FAO and the EC. See www.amad.org.

for a reduction of address tariff escalation. The so-called Derbez text that emerged during the Cancun ministerial proposed to combine both a UR approach and a Swiss formula in a 'blended' formula as a modality for market access negotiations. See Sawit (2004) for a detailed analysis on Indonesia. The more recent July package of 2004 speaks about 'tiered formulae', without specifying exactly what this might look like.

Table 2.3 clearly shows that very substantial reductions in bound rates would be required to actually reduce Indonesian applied rates. Required reductions larger than 80 per cent are not uncommon, given the enormous binding overhang. Consequently, all of the suggested reduction modalities would have little impact on applied tariffs, but could reduce some of the bound rates substantially. The consequent reduction of binding overhang would limit Indonesia's future ability to raise tariffs above current levels.

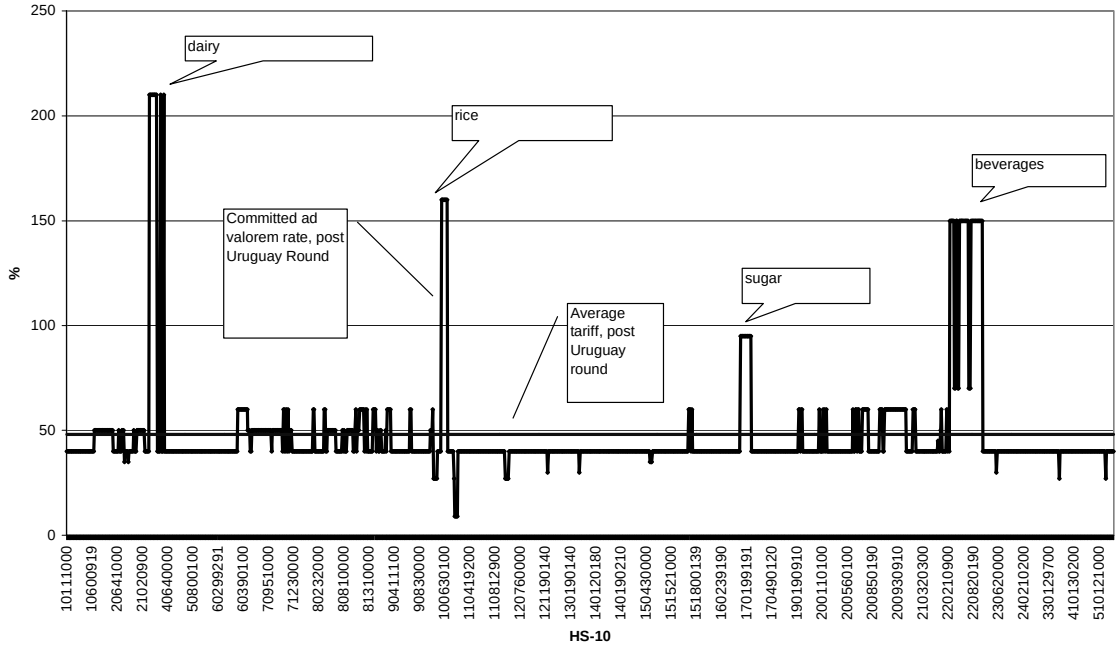

Figure 2.2 Post Uruguay Round tariff landscape Indonesia, bound rates

Table 2.3 Bound and applied tariff rates imposed by Indonesia (per cent ad valorem)

		Bound rate, %			*Applied rate, %*			*Reduction of bound rates, required to equalise bound and applied rate %*
HS 1996	Commodity group	Max	Min	Mean	Max	Min	Mean	Mean
01	Live animals	40	40	40	15	0	5	89
02	Meat bovine and non-bovine	50	40	48	5	5	5	89
03	Fish, fish products	.	.	.	15	0	5	100
04	Dairy, eggs and honey	210	40	90	5	0	4	92
05	Hair and feather	40	40	40	5	0	4	91
06	Ornamental plants	60	40	45	20	10	13	70
07	Vegetables	50	40	45	5	0	5	89
08	Nuts and fruits	60	40	46	5	5	5	89
09	Coffee, tea and spices	60	40	44	5	5	5	88
10	Rice and cereals a)	160	27	103	5	0	3	91
11	Processed cereals (flours, flakes) and starch	40	9	36	5	0	4	87
12	Oilseeds	40	27	40	5	0	4	90
13	Vegetable saps	40	30	39	5	0	4	89
14	Bamboo, rattan and other plant fibres	40	40	40	5	0	2	95
15	Vegetable oil and animal oils	60	35	42	10	0	5	88
16	Animal products	40	40	40	5	5	5	88
17	Sugar and -products b)	95	40	54	5	5	5	88
18	Cocoa products	40	40	40	5	5	5	88
19	Cereal products	60	40	41	5	5	5	88
20	Processed vegetables and -fruits	60	40	49	5	5	5	89
21	Soya sauce and other food preparations	60	40	41	5	5	5	88
22	Beverages	150	40	125	170	5	129	13
23	Animal feed products	40	30	40	5	0	1	96
24	Tobacco and - products	40	40	40	15	5	9	78

Notes: Mean values per HS-2 group calculated from tariff-line data at HS-10 level; a) For rice the bound rate includes estimate of the ad-valorem equivalent of specific tariffs. The column 'applied rate' only contains the average of ad applied valorem tariffs. The current applied specific tariff is Rp 430/kg. At current world prices and exchange rates this is roughly 20 per cent ad valorem. b) For sugar the bound rate includes estimate of the ad-valorem equivalent of specific tariffs. The column 'applied rate' only contains the average of applied ad valorem tariffs. The current applied specific tariff is Rp 700/kg for raw sugar (Rp 550/kg for cane sugar). At current world prices and exchange rates this amounts to roughly 30 per cent ad valorem. Source: Bound rates are from AMAD database, Applied rates have been obtained from Departement Pertanian. Calculations LEI.

2.3 Model, data and scenarios

2.3.1 Scenarios

The challenge in constructing scenarios is to translate bound rates and bound AMS ceilings, which are negotiated under DDA, into changes to the applied levels that can be incorporated in the modelling analysis. As usual one has to make simplifying assumptions to capture the spirit of the likely set of policy changes without being trapped into the details of the (legal) agreements. Our analysis of the impact of the DDA on the world and on Indonesia is structured around one central DDA scenario. On top of this scenario we run alternative variations to investigate some special issues, such as inclusion of Special Products (SP), and sugar and rice policies in Indonesia.

Our basic 'realistic' DDA scenario assumes the following with regard to the three pillars in the agricultural negotiations:

- Market access: 30 per cent reduction of applied levels of protection;
- Domestic support: 5 per cent reduction of applied levels;
- Export subsidy: 75 per cent reduction.

This scenario purports to reflect the current stance in the negotiations: substantial progress in market access albeit less in applied rates than in bound rates; limited progress on domestic support - despite strong commitments to lower AMS ceilings, perhaps - as the EU and the USA strive to expand the definition of the blue box and put increasing amounts of support in the green box; finally, we believe that very substantial reductions of export subsidies can be achieved in this round. See chapter 2 for more detail.

In most of the analysis we leave policies in all non-agricultural sectors untouched in order to concentrate on agricultural issues. But in order to assess the relative importance of agriculture versus industry and services we also conduct a liberalisation experiment that reduces industrial tariffs by the same 30 per cent as agricultural tariffs.

In one of the scenarios we simulate the potential impact of special products. We see little fundamental difference between 'sensitive products' proposed by OECD countries, and special products in developing countries. Special or sensitive are taken to be those products for which current levels of (bound) border protection are high. We than largely exempt sensitive/special products within this tariff range from liberalisation by assuming a 'symbolic' 5 per cent cut on applied support or border measures.

2.3.2 Model

Our analysis uses calculations done with the general equilibrium model of the Global Trade Analysis Project. The GTAP model is a comparative static multi-sector multi-region general equilibrium model. Each country or region is depicted within the same structural model. The regional household to which the income of factors, tariff revenues and taxes are assigned represents the consumer side. The regional household allocates its income to three expenditure categories: private household expenditures, government expenditures and savings. For the consumption of the private household, the non-homothetic Constant Difference of Elasticities (CDE) function is applied.

A representative producer for each sector of a country or region makes production decisions to maximise profits by choosing inputs of labour, capital, and intermediates to produce a single sector output. Producers can substitute primary factors for each other, modelled with a Constant Elasticity of Substitution (CES) functional form, while intermediates are used in fixed proportions (Leontief). In the case of crop production, farmers also make decisions on land allocation. Intermediate inputs are produced domestically or imported, while primary factors cannot move across countries. Internationally traded commodities are assumed to be distinguished according to region of origin. Using this so-called Armington assumption implies that for example wheat imported from the US is different from wheat imported from the EU, and trade flows in both varieties have their own price tag. A great advantage of the Armington assumption is the possibility to model bilateral trade flows and bilateral trade policies.

The GTAP model includes two global institutions. All transports between regions are carried out by the international transport sector. The trading costs reflect the transaction costs involved in international trade, as well as the physical activity of transportation itself. Using transport inputs from all regions the international transport sector minimise its costs under the Cobb-Douglas technology. The second global institution is the global bank, which takes the savings from all regions and purchases investment goods in all regions depending on the expected rates of return. The global bank guarantees that global savings are equal to global investments.

The welfare changes are measured by the equivalent variation. This tells us how much money can be taken away from the representative household, or must be given to the representative household, to make it as well off as without the policy change. In practice, the equivalent variation correlates with changes in real GDP. We also report changes in farming income. This is measured as change in value added derived from agricultural activities, and hence excludes income from off-farm activities that the rural household may be engaged in.

Taxes are included in the theory of the model at several levels. Production taxes are placed on intermediate or primary inputs, or on output. Some trade taxes are modelled at the border. Additional internal taxes can be placed on domestic or imported intermediate inputs, and may be applied at differential rates that discriminate against imports. Trade policy instruments are represented as import or export taxes/subsidies. A detailed discussion of the basic algebraic model structure of the GTAP model can be found in Hertel (1997). Our model is implemented in GEMPACK, a software package designed for solving large applied general equilibrium models. The model is solved as an explicit non-linear system of equations, through techniques described by Harrison and Pearson (1996).

2.3.3 Data

We use the version 6.4 pre-release (September 2004) of the GTAP database that is benchmarked to the year 2001. A special feature of the database is the trade protection information that comes from the MacMaps database. This is a joint effort by the Centre d'études Prospectives et d'information Internationales (CEPII) and the International Trade Centre (WTO/ITC). This database is used to convert tariffs applying to trade in products measured at a very disaggregate level (HS6) into their ad valorem equivalent. The import

protection measures include ad valorem tariffs, specific tariffs, quota, tariff rate quota regimes, and anti-dumping duties. These are all converted into ad valorem equivalents. An important feature of this dataset is its inclusion of existing trade preferences, including GSP, ACP, AGOA and existing bilateral preferences. See Bouët et al (2004a) for a comprehensive documentation.

Information on domestic agricultural support is consistent with OECD producer Support Estimate information, but limited to OECD members and a few non-members.

The GTAP database contains economy-wide information 87 regions or individual countries and information on 57 commodities. For the purposes of this study we have aggregated those into 11 regions and 10 commodities, listed in figure 2.3. See Appendix 1 for more details.

Figure 2.3 Aggregation of the database

	Commodities	*Regions*
1	Rice	Indonesia
2	Sugar	ASEAN (excl. Indonesia)
3	Oilseeds	China P.R.
4	Grains	Japan and Korea
5	Vegetable Oils	India
6	Animal Products	EU-25
7	Other agriculture	North America (US and Canada)
8	Food processing	Brazil
9	Manufactures	South and Central America
10	Services	Australia and New Zealand
11		All other countries

3. Impact of the Doha Development Agenda

3.1 The world economy and Indonesia

As negotiations under the Doha Development Agenda proceed, the prospects for strong economic benefits from the round get bleaker. More or less consistent estimates of static national income gains to the world economy were first estimated at 0.8 per cent (Francois et al. 2003, inspired by the Harbinson proposal); then at 0.1 per cent of GDP under a partial liberalisation based on the Derbez-text (Achterbosch et al., 2004); and at less than 0.07 per cent of global GDP in our current study inspired by the agreement of July 2004.[1,2]

3.1.1 Global effects

Below we report on the results of our model simulations under a realistic Doha scenario. On the global level, we estimate gains of USD 11 billion in agriculture, and of USD 10 billion in non-agriculture. Because of the small share of agriculture in the global economy, the relative gain is much bigger in agriculture (0.6 per cent of global agricultural GDP) than in non-agriculture (0.04 per cent of global non-agricultural GDP). Figure 3.1 reveals the distribution of national income gains over the agriculture economy and the non-agriculture economy, by region. Typically, OECD countries receive gains in agriculture, while the developing countries have the stronger gains in the non-agriculture economy, i.e. in the activities of extraction, manufacturing, and services.

While almost all regions gain from taking part in the trade liberalisation, the spread is unequal over countries. Several developing regions score well above the global average, notably India, the ASEAN countries (excluding Indonesia), and Brazil. Of the OECD countries, those in the Far East (Japan, South Korea, Australia and New Zealand) reap substantial gains, which are largely driven by agricultural reforms in Japan and Korea. The benefits in the EU are in line with the EU share in the global economy. We report a slight net loss for the US, giving the US little incentive to push hard on a deal. The national income gain in Indonesia amounts to 0.3 per cent of GDP, far above the world average. Most gains occur in manufacturing and services.

[1] The welfare calculations are based on a measure of equivalent variation (EV).

[2] Note that the current study makes use of an updated data set that provides a much better representation of preferential trade agreements and binding overhang in tariffs. Both preferences and 'water' are abundant in global trade, and they strongly reduce the global gains from improved market access. The Derbez-study by Achterbosch et al. did, however, already incorporate this effect. The gains reported in the text exclude the gains from increasing returns to scale, trade facilitation, or investment gains.

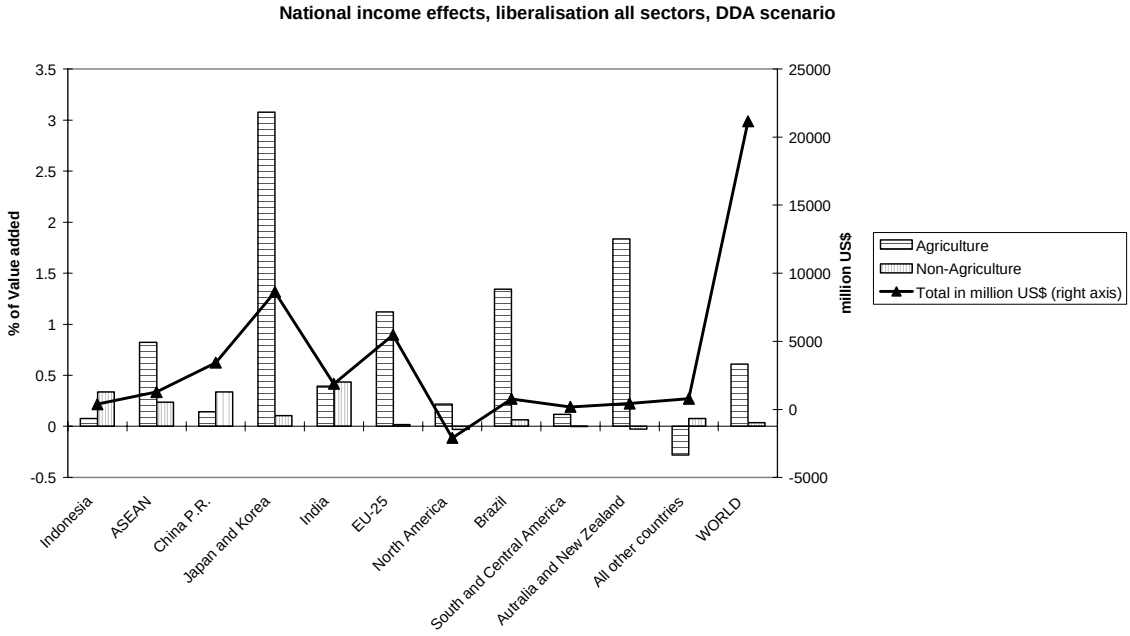

Figure 3.1 National income effects of a DDA liberalisation in all sectors

Under the agriculture negotiations, the July package reveals that little action is expected on the critical pillars of domestic support and market access. Consequently, the gains in agriculture are quite small. What is the contribution of the three pillars to these global gains? 94 per cent of gains relate to improved market access for agricultural products, 4 per cent to reduced domestic support and just 1 per cent to the downscaling of export competition policies. Note that these results are highly sensitive to the design of the scenarios, and specifically to the unambitious 5 per cent cut in domestic support that was assumed. What is revealing, nonetheless, is that the global gains from a 75 per cent reduction of export subsidies are quite modest. The export competition pillar covers much more than export subsidies, therefore our results will underestimate the potential gains from this pillar. The agriculture dossier under the Doha Round seems to have made most progress under a pillar that shows little potential for substantial welfare gains in developing countries.

3.1.2 The Impact of the Doha Round on Indonesia

Trade theory is straightforward in predicting that the gains from global liberalisation accrue to those countries that remove their own distortions. Yet, Indonesia has quite a liberal trade regime, and few public means are allocated to support agricultural production or exports. This explains why the Doha round does little to boost Indonesian GDP (figure 3.1). There are more indirect ways, however, for the Indonesian economy to benefit from participating in a global liberalisation effort. The matter returns below. First, we zoom in on the results of the liberalisation for Indonesia.

National income. We compare the contribution of policy changes to welfare in Indonesia and in the rest of ASEAN. For Indonesia the gains from improved market access have to compensate for the negative effect of a global reduction of domestic support and of export subsidies. The downward effect is due to the fact that Indonesia is a net importer in commodities that have their subsidies reduced. By consequence of the reduced support to rice, sugar and grains and the like, world market prices rise and import prices rise accordingly.

Comparing the impact on Indonesia with the rest of ASEAN, what strikes is that the gain in the latter region from countries opening up their markets is about four times bigger. Basically, the other ASEAN countries are able to materialise more export gains than Indonesia. The implication is that Indonesia - being a part of the global trading system – should aim to fulfil more of its export potential in order to derive firm benefits from the system.

Sectoral impact. Figure 3.2 compares the changes in value of output in sectors of the Indonesian economy. It should be read as an indication for changing patterns of specialisation after reform.

In Indonesia most food crops are largely unaffected, and there is a substantial expansion in food production. Rice and sugar both contract slightly, thereby allowing resources to move into animal production and the oilseed/vegetable oil production, which both expand by 3 to 6 per cent. Looking just at quantities of output, there is 2.5 per cent growth in oilseeds and animal products, and over 6 per cent in vegetable oil.

The opportunities in animal products and vegetable oil relate to policy changes in Japan and Korea, which open up the highly protected market for rice, grains and oilseeds in these regions. ASEAN countries and North America fill the gap. More resources in these countries are absorbed by rice production, which opens up opportunities for Indonesia to increase its share on world markets for oilseed crops and vegetable oil. As the EU, Japan and Korea reduce their strong policies on dairy, beef and other animal products, Indonesia can be among the countries that expand their livestock sectors, albeit in strong competition with Brazil, Oceania, and other ASEAN countries.

Below we discuss in more detail the impact on agriculture of a DDA reform that covers only agriculture and food.

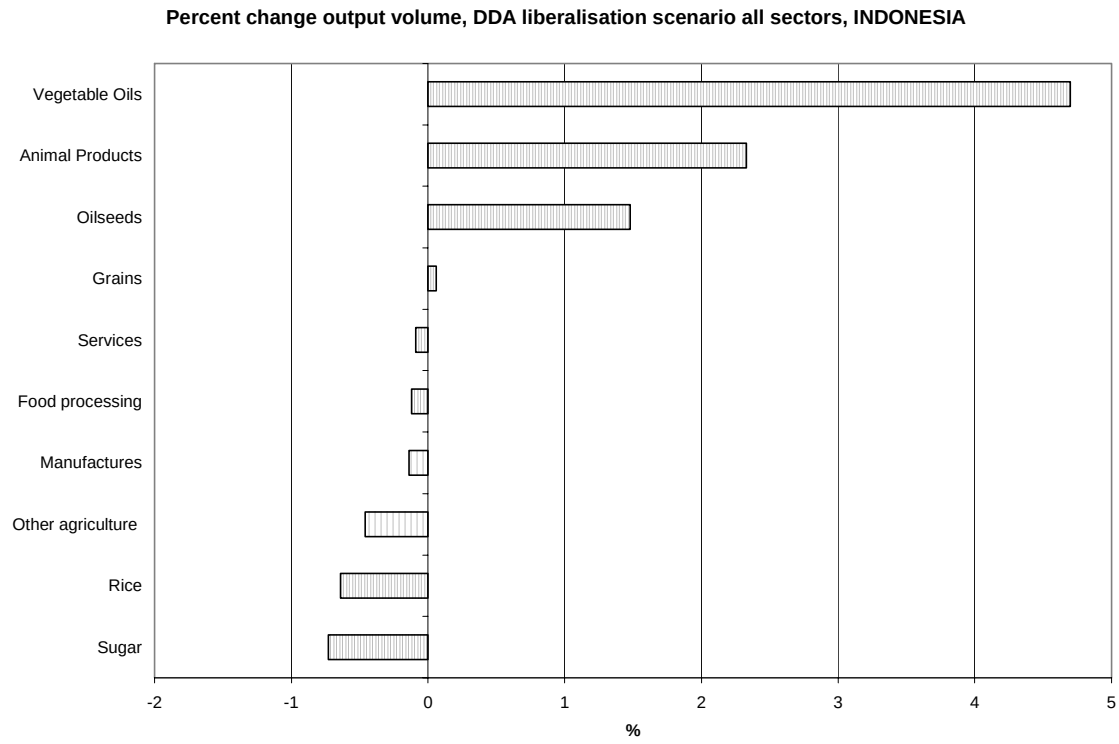

Figure 3.2 Output in Indonesia after Doha reform, by sector (per cent change)

Farm income.[1] There will, of course, be a consequent adjustment in the revenues from farming over the various sectors. The decline in rice and sugar output is partly compensated by steeper prices. Figure 3.3 provides detail on the changes to real farmer income from a DDA reform, and to the drivers of change. Regarding the level of farm income, we find strong losses in the OECD countries that result from reduced levels of trade-distorting support; losses are fully compensated, however, through increased support under the Green Box. Farmers in emerging Asia - Indonesia included - gain under DDA, largely because of increased prices for their output (table 3.1). The results for Indonesia have to be interpreted with care because farming is often a part-time activity. In the lowland and upland area the share of agricultural (and fishing) activities in income is just about 50 per cent, in the coastal area it is just one-third.[2] We report on changes to the income from farming activities only, and exclude the returns from fishing activities from the analysis. It will be clear that a proper analysis of the household impact from trade liberalisation will have to include the effect on off-farm income.

We find that average real income from farming (all activities) in Indonesia could increase by 1.2 per cent after the DDA reform of global agricultural policies. For the

[1] Change in real farm income is calculated as the CPI-deflated change in value added of agricultural activities.
[2] These data are ICASERD data for 2001.

potential gain to materialise, farmers will need to shift resources into the production of vegetable oil and animal products.

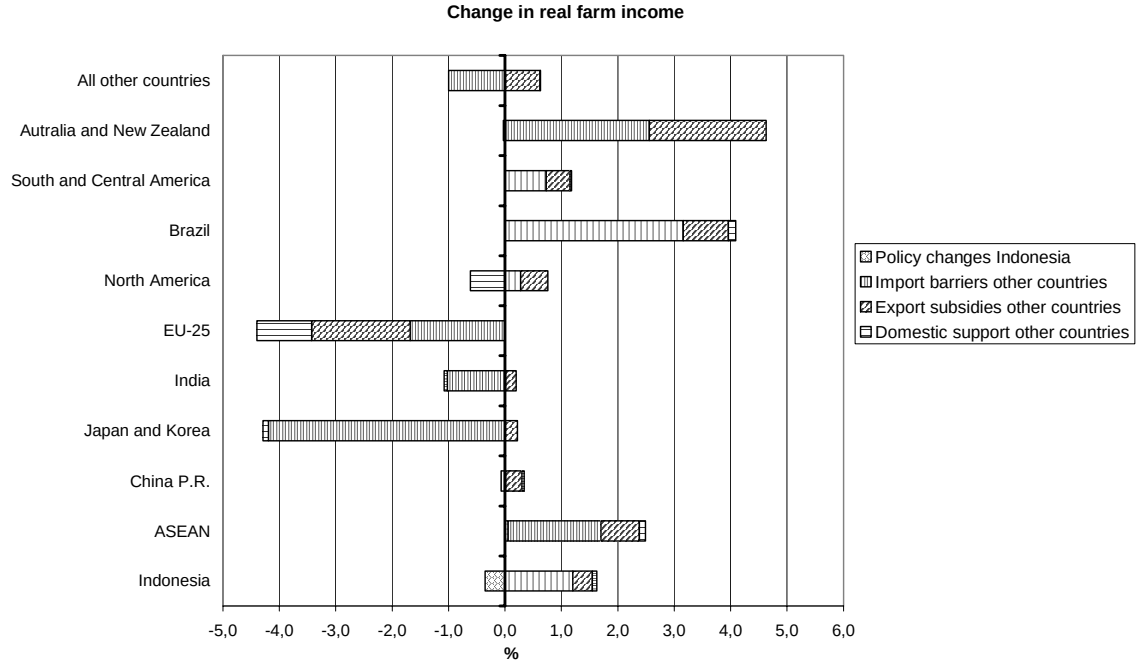

Figure 3.3 Impact of DDA on farm income, by region (per cent change)

The decomposition of the total change allows us to pinpoint the policies that drive change. Keep in mind our scenario design! The reduction of export subsidies and domestic support bears little impact outside the EU and Oceania. Nonetheless, Indonesian farmers benefit from rising market prices for their rice and oilseeds - as support policies become less distorting or decline, supply contracts, and prices rise. Increased market access is the biggest cause of adjustments worldwide. Indonesian export opportunities improve under the Asian rice domino; when Japan and Korea open up their markets for rice from the ASEAN region, Indonesian farmers get opportunities to step up their exports of animal products and vegetable oil, and take over market share from other ASEAN countries in these products. We find that a removal of protection on Indonesian agriculture slightly reduces farm income by about 0.4 per cent, a reflection of the minor contraction in rice and sugar production.

Most rural households are net buyers of food, i.e. consumption outweighs household supply. Although real farm income rises, the net impact on the rural household is likely to be negative. The income gain is partially based on the upward pressure on prices for agricultural products. The net impact in the household depends on their food balance. Hertel et al. (2004) show that poor agricultural households in Indonesia are likely to witness a net income drop in the face of global liberalisation, as their food budget rises without being fully compensated by rising remuneration for their activities.

Table 3.1 Farm revenue after DDA reform (per cent change to base data)

	Output (1)	Price (2)	Farm revenue (1+2)
Rice	-0.67	0.24	-0.43
Sugar	-0.56	0.19	-0.37
Oilseeds	2.36	1.4	3.76
Cereals	0.29	0.68	0.97
Vegetable oil	6.45	0.27	6.72
Animal products	2.7	0.57	3.27

Source: Model simulations.

Employment and wages. Before we discuss the impact of reform on employment and wages, first a note on the specification of the labour market in the GTAP analysis. In the analysis we assume full employment of labour resources at all times in the analysis. This reflects our hypothesis that trade reform will not increase total demand for labour.[1] In the agricultural economy in Indonesia, chances are bigger that trade reform will alter the structure of labour demand than its volume, basically because the labour force is already fully employed in farm and off-farm activities. The output changes reported above will affect the distribution over sectors. In addition, we expect the distribution of labour over the formal and informal economy to change, an effect that we cannot quantify.

We find that labour demand follows the shifts in agricultural production, i.e. a slight reduction of the demand for labour in rice and sugar farming (and the processing of these crops) by less than 1 per cent; substantial increases of 2.5 to 4.5 per cent in the sectors vegetable oil and animal products. The agricultural economy specialises more into the supply of vegetable oil and animal products, which require more land and capital per unit of product, and less labour than rice and sugar. By consequence, wages decrease somewhat in comparison to wage levels in ASEAN and other East Asian regions, which experience the inversed output trend. In Indonesia the increase of land rents by 1 per cent transfers income from land labourers to land owners. As trade theory predicts, the reduced border protection on manufactures results in a decline of domestic capital prices. The decline is partly undone by an increased demand for capital from agriculture.

The realisation of potential gains. The results indicate that a key challenge to Indonesia is to improve export performance in agriculture. Globally, enterprises in the food sector have incorporated consumer concerns and regulatory demands regarding health, quality and the environment into their production, marketing and distribution activities. The core of large retailers and trans-national 'agribusiness' corporations has introduced various technical specifications that govern quality and safety of local and imported food products, e.g. the

[1] We assume full employment not only for labour but for land as well. This specification limits the scale of national income gains because we do not allow the endowment stock to grow.

guidelines from EurepGAP and British Retail Consortium.[1] As tariffs decline in global food trade, such technical standards that importers impose become the more impeding trade barriers. They were once skilfully described as 'the emerging rocks in the ebbing tide.'

The organisational response has generally been to integrate buyers and sellers within so-called supply chains, which is controlled by the dominant link in the chain. In many cases this requires direct investments of the controlling link into the primary stages of production. For such chains to reach out to agriculture in Indonesia requires quality and stability of supply, and a sound investment climate. The constructive attitude towards liberalisation under the WTO signals a drive towards openness in Indonesia, which improves investment climate. Such intangible benefits from the WTO will support the value adding in agriculture through processing and exports.

3.2 Exempting SPs from multilateral liberalisation

In the previous section we looked at the effects of a possible outcome of the Doha round, but without taking into account the important issue of 'special products'. Members agreed in the July package that

'Developing country Members will have the flexibility to designate an appropriate number of products as Special Products, based on criteria of food security, livelihood security and rural development needs. These products will be eligible for more flexible treatment. The criteria and treatment of these products will be further specified during the negotiation phase and will recognise the fundamental importance of Special Products to developing countries.'

At the same time, developed country members are also granted considerable leeway by allowing for so-called 'sensitive products' that will receive a more 'flexible' treatment with regard to market access commitments:

> 'Without undermining the overall objective of the tiered approach, Members may designate an appropriate number, to be negotiated, of tariff lines to be treated as sensitive, taking account of existing commitments for these products.'

And furthermore:

> 'The extent of MFN-based tariff quota expansion and any required tariff reduction for all such products will be determined in the negotiations. A base for tariff quota expansion will be established, taking account of coherent and equitable criteria to be developed in the negotiations. In order not to undermine the objective of the tiered approach for all such products, MFN-based tariff quota expansion will be provided

[1] In marketing, standards operate as a response to an increasing demand for differentiation and quality (including safety) in food consumption. In production, standards are instrumental to achieving efficiency gains within a food chain, by reducing waste, co-ordination cost and incompatibility between links in the chain (Reardon et al., 2001).

under specific rules to be negotiated taking into account deviations from the tariff formula.'

It is interesting to note that this wording implies that developing countries will have to justify the designation of SPs according to food security criteria and similar considerations, while the text speaks of no such justification in the case of sensitive products for developed countries. It seems evident that those products are deemed 'sensitive' that are currently subject to regulated trade under tariff rate quota (TRQ).

The exact parameters for designation of special products as well as sensitive products have to be negotiated, and it is at this point difficult/impossible to foresee the outcomes. However, we have undertaken to estimate the possible effects of exempting products from liberalisation efforts. Given the coarse nature of our commodity aggregation we are of course rather limited in the choice of products. In the simulation experiment, we therefore allow each region to designate at most one product as SP.

In order to arrive at some general principles for designation of SPs, we have used two simple indicators: 1) the existing level of border protection. Assuming that existing protection patterns reveals countries' preferences as to what they see as products that deserve protection, we select those agricultural products that currently have the highest applied tariffs. This indicator is combined with 2) the output weighted contribution to total farm income. This indicator should reveal the importance of the commodity concerned for rural incomes, and we choose those products that contribute the highest shares. All this leads us to a rather simple list: For all the Asian countries we assume Rice to be a special product, except for India, where we assume vegetable oils to be of particular importance. The EU is very likely to continue some form of restrictive sugar policies, in spite of recent moves towards reforms of the EU sugar regime. For North America and South-and Central America we assume animal products to be special. Finally, Brazil, the Oceania region and our heterogeneous 'rest of world' are not assumed to designate SPs.

Modelling SPs. Our implementation of SPs is very straightforward, and is certainly an oversimplified representation of what will eventually be negotiated in the Doha round: we simply assume that members choose not to liberalise policies in their SPs. That is, they do not commit to further reductions in market access barriers, and if applicable no reduction of domestic support and no reduction of export subsidies.

Table 3.2 reveals the economy-wide welfare effects, from excluding SPs in the worldwide liberalisation efforts. The world as a whole would forego USD 2.2 billion, or about 20 per cent, relative to the original USD 11.2 billion gains (USD 21.1 billion including manufactures) discussed in the previous section. The foregone income gain is unequally distributed, though. It is mainly the high income regions that have high current protection levels and choose not to liberalise their sensitive products that would potentially loose: Not reforming the EU25 sugar regime and maintaining the practice of export subsidisation implies a net loss of about USD 1.4 billion. Similarly, not opening the highly protected rice markets in Japan and Korea leads to a drop in welfare equivalent to USD 1.1 billion in this region, with a negative welfare impact on rice exporting regions in Asia.

Even more disturbing is the effect on real farm incomes. While farm incomes in Japan and Korea and in the EU25 would rise relative to the original scenario, the low-income

regions in our model would see a (very) slight, and negligible drop in their farming incomes. Hence, while high-income regions would transfer resources from consumers and citizens to farmers in sensitive products, farmers in low-income countries would not experience significant income gains from the exclusion of SPs. The reason for this result is that the multilateral non-inclusion of products in the liberalisation efforts hampers export opportunities for low-income countries. This is especially evident in the rice (JAKO) and sugar (EU25) case. To Indonesia, the decline in export opportunities due to SPs is insignificant in our model.

Table 3.2 Welfare effect of designating Special Products (million US dollar)

	Total EV Million USD 1=2+3+4	Border protection 2	Export subsidies 3	Domestic support 4	Real farm income (%) 5
Indonesia	-4	8	0	-0.02	
ASEAN	-48	-78	31	-1	-0.9
China	12	71	0	-0.06	
Japan/Korea	-1,133	1,381	270	-22	1.11
India	2	4	-2	0	-0.06
EU25	-1,377	-120	1,273	15	1.37
US/Canada	-697	-685	-21	9	-0.83
Brazil	-17	39	-56	0	-0.22
South/C. America	-24	-114	89	1	-0.45
Austr./New Zealand	49	161	-110	-3	0.21
Rest of the World	946	-104	1,050	-1	-0.27
Total	-2,239	-2,293	57	-3	-

Note: table reports changes in income due to SPs, relative to Doha scenario without SPs.
Source: model simulations.

4. Possible Indonesian policy response

4.1 Sugar self-sufficiency through domestic support

Indonesia used to be a major sugar exporter in the past, but has turned into a sugar importer during the 1970s. Sugar consumption has outpaced domestic sugar production during the 1990s. In 2002 Indonesia imported about 1.5 million metric tonnes, which accounted for almost half of consumption. Reduced sugar acreage and lower yields have contributed to declining sugar production. Attaining sugar self sufficiency is a declared policy objective in Indonesia.

Our model allows us to assess macro-economic consequences of such policies, and in this section we attempt such an evaluation. It must be kept in mind, however, that we are unable to take all the agronomic specificities of sugar production into account, and our results should be seen as a 'first cut' of analysis.

We model the self-sufficiency policy by specifying a model closure in which sugar self-sufficiency is exogenously imposed, and we let an output subsidy adjust freely to attain that goal. Self-sufficiency is defined as the portion of total domestic consumption covered from domestic production. However, since the subsidy has to be financed, we impose on the model a closed government budget. Revenue neutrality is obtained by tax replacement through a uniform tax on private consumption (or income) that is just sufficient to cover the sugar subsidy. The scenario is implemented in a virtual 'post-Doha' world, i.e. on top of the base scenario used to assess the DDA.

Table 4.1 reports on the key outcomes of this scenario. While self-sufficiency would be an attainable goal according the model, it is also a very costly policy. The size of the output subsidy required to provide the incentives to expand domestic sugar production amounts to USD 1.7 billion, or 85 per cent of producer cost. This would lead to a more than 50 per cent rise in sugar output and to a sizeable drop in domestic market prices as domestic sugar becomes available at subsidised prices. Sugar expansion goes at the expense of rice output. Since our model assumes full employment of land (and other production factors), the additional sugar land has to come from other uses, mostly from existing rice land. The implied trade-off between sugar self-sufficiency and food security could be softened if unused land could be brought into sugar production.

The fiscal implications of the policy are not negligible. To finance the subsidy, a total tax of more than USD 2 billion is required, or 1.4 per cent of GDP. As is the case with all taxes, a dead-weight loss occurs if an output subsidy is afforded to sugar producers. In this case, we estimate the loss to be about USD 0.4 billion.

Of course the analysis could be further refined. For example, the effect of introducing higher yielding varieties could be included as well as the effects of expanding sugar acreage into hitherto unused areas. Such elaborations would require more information on the agronomic specificities as well as information on the cost of these measures.

Table 4.1 Effects of sugar self-sufficiency policy

Impact on sugar and land markets	
Output subsidy per unit, % of producer cost	85
Output volume, % change	54
Domestic market price, % change	-56
Producer price, % change (*)	-12
Producer revenue, % change	42
Land share sugar	4% -> 7%
Land share rice	27% -> 26%
Fiscal implications	
Total subsidy, USD	1.7 billion
Total consumer tax revenue, USD	2.1 billion
Dead-weight loss	0.4 billion
Consumption tax, % of GDP	1.4

Note: (*) The change in producer price refers to both raw and processed sugar. The drop in the combined price is caused by cheaper sugar input prices (due to the subsidy) into sugar processing.
Source: model calculations.

4.2 Managing effects on the domestic rice sector through SSM border measures

Chapter 3 has described that under the DDA scenario, rice imports step up by 20 per cent and domestic supply contracts. This section describes two policy options for the Indonesian government to manage these effects, in order to stabilise the rice sector. The first policy option is stabilisation of rice farm income, while the second option is stabilisation of domestic prices. Stabilisation of the domestic rice economy is of particular concern to Indonesian policy makers, as rice occupies such an important position in the rural economy and in national food security. As a major rice importing country, the domestic price of milled rice is highly influence by the world market. The influence became more significant as the world market price of rice declined since the mid 1990s and in the wake of the Indonesian abolition of rice import restrictions in 1998. Rice imports are also a very seasonal phenomenon, with domestic rice production covering consumption during most months of the year, and excess demand occurring during the period October to February.

In order to cushion the domestic rice economy from world market volatilities and especially from downward price movements, policy makers might seek recourse to temporary trade policy measures such as import restrictions and raised tariffs. The existing GATT framework provides instruments to temporarily raise protection against imports. Numerous proposals for agricultural safeguard mechanisms as part of special and differential treatment for developing countries have been made in the ongoing the Doha round. See Ruffer and Vergano (2002) for a useful discussion and a summary.

The argument that developing countries should have access to a special safeguard arrangement is based on two main considerations. First, the *vulnerability* of producers, and especially low-income and resource-poor producers, to a sharp drop in market prices caused either by unexpectedly low world market prices or a surge in imports. Second the

absence of alternative risk management and safety net instruments. Furthermore the desire for a developing country safeguard is supported by a perception that there is an imbalance in the current Agreement in Agriculture (AoA) because the use of the Special Safeguard (Article 5) is mainly confined to developed countries since it was limited to countries which chose the tariffication option in making their tariff commitments. Many developing countries opted for ceiling bindings instead of bound rates, and consequently did not have access to the Special Safeguard.

Safeguards are an alternative to requesting high bound tariffs for stabilisation purposes. To the extent that countries will be able to negotiate higher bound tariffs on some agricultural products, as part of the negotiations on SPs, the case for a safeguard mechanism in addition is diminished. However, if bound rates come down then it might be worthwhile to consider safeguard mechanisms.

4.2.1 Farm income stabilisation through variable tariffs

We simulate world price drops through increased harvest in the main rice exporting region, ASEAN (Thailand). The production increase is technically implemented through a neutral TFP shock in that region. A variable import tariff adjusts such that producer revenues from rice farming are kept constant in face of the dropping world prices. Hence, if world rice prices drop sharply, a high tariff will be needed to avoid the influx of cheaper imports, and hence to avoid large downward impact on domestic prices. In order to get an idea about the possible range of responses to variable world prices, we use a Systematic Sensitivity Analysis to calculate means and variances of all the endogenous variables in our model.

Table 4.2 presents key results from this analysis. The mean simulated world price drop for rice imported into Indonesia equals -9.5 per cent, with a standard deviation of 3.0 per cent. In order to compensate for these drops, the mean change of the power of the import tariff has to be 16.6 per cent. The lower panel of the table and figure 4.1 show the ranges in which the tariff level and the domestic price move, assuming a 75 per cent confidence interval.[1] In case of large simulated price drops of almost -16 per cent, a tariff level of 56 per cent is required to stabilise farm incomes, implying more than a doubling from the current level of 25 per cent, but well within the bound rate agreed under the URAA. At the low end, a tariff of 35 per cent would suffice.

[1] We use Chebychev's inequality to establish the confidence intervals. This does not imply any prior assumptions as to the nature of the underlying distribution of the variables.

Table 4.2 World price volatility and rice income stabilisers

	Mean		Standard deviation
Change in world price, %	-9.5		3.0
Change in power of tariff, %	16.6		4.2
	High	Mean	Low
World Price change %	-15.6	-9.5	-3.5
Tariff level, ad valorem %	56	46	35
Domestic price USD/100Kg	30	30	30

Source: Model simulations.

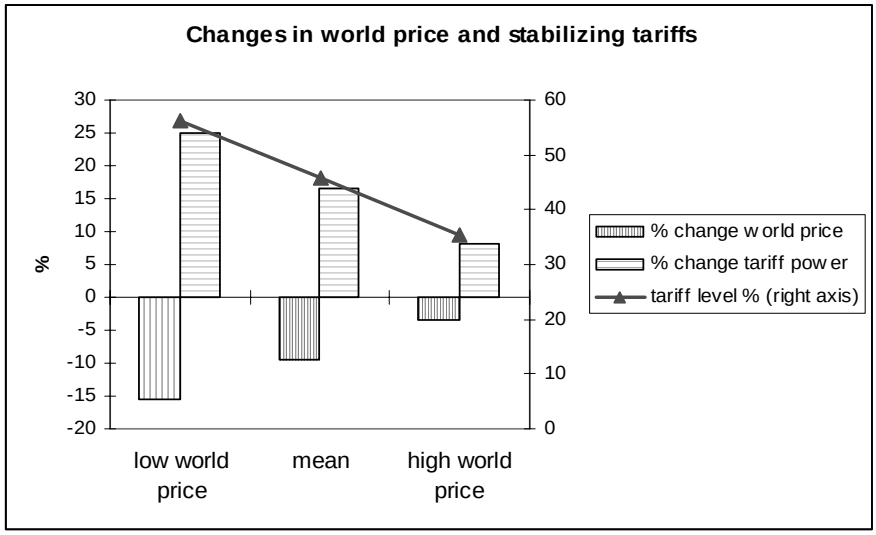

Figure 4.1 World price volatility and rice income stabilisers

4.2.2 Stabilising domestic prices through variable tariffs

The first policy option discussed above has as its objective the stabilisation of rice farmer incomes. This objective, which is also implicitly taken to be our 'trigger' to invoke the safeguard mechanism is rather difficult to measure and operationalise in practice. It is relatively easier to monitor domestic prices and border prices and to invoke the safeguard if prices drop below a certain threshold level. In fact, the price trigger is also one of the mechanisms under the current Agricultural Safeguard under the Uruguay round Agreement. The other mechanism is a volume trigger. In this section we employ a price-based trigger to counter-act falling rice world prices.

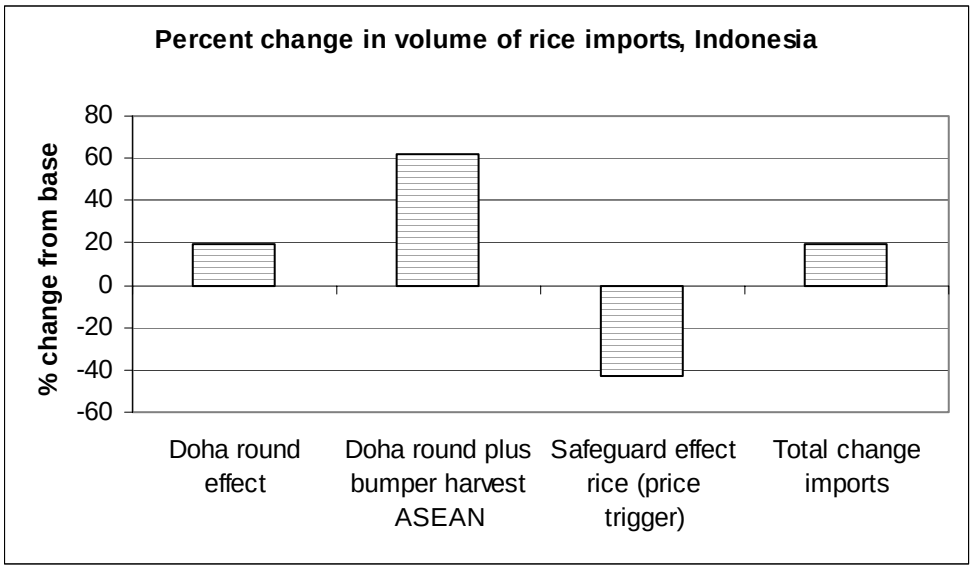

Figure 4.2 Managing rice imports with a price-triggered safeguard

Technically, we again simulate a world price drop through increased harvest in the main rice-exporting region, ASEAN (Thailand). A variable import tariff adjusts such that the ratio of domestic to foreign prices remains constant at pre-simulation levels. Hence, the drop in world prices does not induce Indonesian consumers to switch to imports, as they do not experience ('see') the price differential.

Figure 4.2 shows the effects of the safeguard on the change in the volume of rice imports. The variable tariff clearly neutralises the effect of 'bumper harvest ASEAN' that would lead to an increased supply of rice at cheaper prices, and would lead to a 40 per cent rise of imports above the levels of our virtual post-DDA world. The DDA simulation alone would lead to a 20 per cent rise in rice imports, most of which caused by lower Indonesian tariffs on rice.

Figure 4.3 further decomposes the income effects of this policy into the various factors involved. Indonesia's own policy changes under the simulated DDA round simulation lead to a slight drop in aggregate farm income (-0.35 per cent) while policy changes by other countries would raise both farm income (+1.55 per cent) and raise national income (+USD 20.16 million). The bumper harvest in the ASEAN region would reduce farm incomes (-0.39 per cent) but raise national incomes, as cheaper rice benefits consumers. The price stabilisation almost fully compensates for the reduced farm income caused by competition from cheaper rice incomes, but the loss in national income due to raised imports tariffs is limited because higher tax revenues partly compensate for the reduced availability of cheaper rice to consumers.

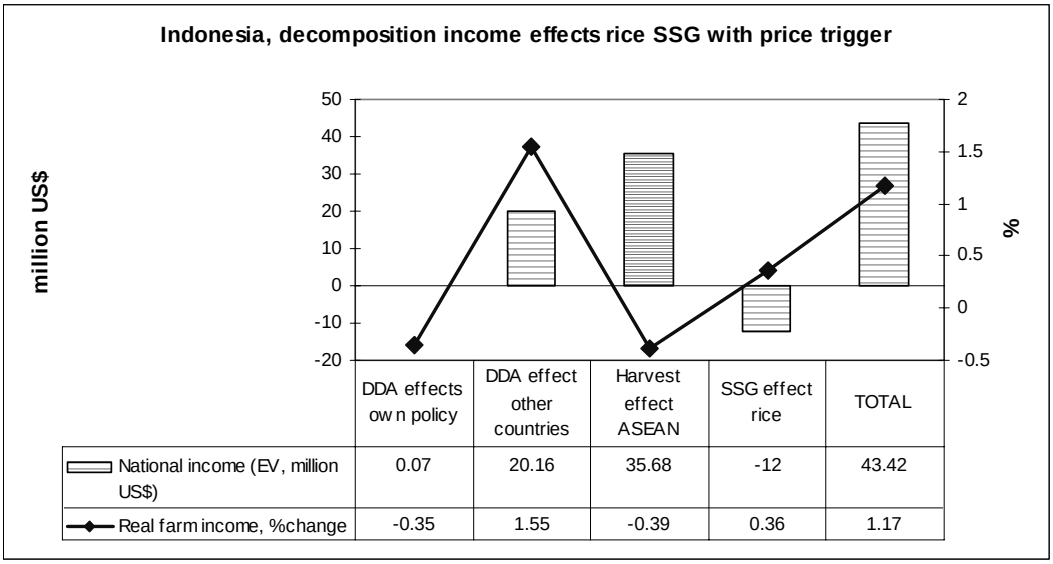

Figure 4.3 National income and farm income under a price-triggered safeguard

5. Conclusions

This paper has employed a large-scale economic model to quantify potential interests of Indonesia in the agricultural negotiations under the Doha Development Agenda. As with all such modelling studies the analysis represents an abstraction from many details and could be refined in various ways. From our analysis we can draw a number of conclusions.

Model results. Indonesia's quite liberal trade regime emerged in the wake of the financial crisis in Asia during the late 1990s. Given low applied protection in Indonesia, we estimate only small economy-wide welfare (efficiency) gains from own reforms. In fact, all effects of trade reform are rather small because the integration of Indonesian agriculture with global markets is quite limited. Small-simulated drops in rice and sugar incomes are more than compensated through expansion in vegetable oils and animal products. Overall, this results in a small improvement of farmers' incomes. The realisation of these potential benefits depends on the ability to shift resources into these promising areas of agricultural production. Indonesia's active participation in the DDA might facilitate this process of change through its impact on the investment climate in the country.

Trade negotiations. Our results quantify a range of interests of Indonesia in the agriculture negotiations. Some are on the defensive side, aimed at conserving flexibility for protectionist policies. Others are on the offensive side, and relate to the realisation of export potential through domestic transformation of agriculture, and improved access to export markets.

Defensive interests of Indonesia in the negotiations include: (i) Current applied tariffs are very low, while bound rates are high. The resulting binding overhang gives a lot of flexibility to increase border protection should Indonesia want to protect domestic activities from world markets. (ii) Formula reductions of bound rates will have a limited impact on applied rates. A tiered formula retains flexibility, especially if 'special products' are to be exempted from reduction commitments. (iii) In rice we find a double-digit rise of imports in the DDA scenario due to reduced border protection at slightly rising world prices. The import surge could be mitigated through designating rice as special product (SP). The cost of this price-based policy in terms of national income loss is limited, while an import ban or restrictive quota regime would entail significant welfare losses. Not only would an import ban lead to losses in consumer welfare, through more restricted availability, but the country would also forego tariff revenues. Criteria design for SPs is a potential deadlock, however. (iv) Safeguards are an alternative to requesting high bound tariffs for stabilisation purposes. To the extent that Indonesia will be able to negotiate higher bound tariffs on some agricultural products, the case for a safeguard mechanism in addition is diminished. However, if bound rates come down then it might be worthwhile to consider safeguard mechanisms.

Offensive interests in the negotiations include: (i) Domestic support reduction by OECD is estimated to have small negative impacts on the net importing Indonesian econ-

omy through higher import prices. However, higher world sugar prices that would result from some reforms in OECD countries would support expansion of the sugar sector in Indonesia. (ii) The simulations show a limited effect on Indonesia of improved market access to other countries. The limited realisation of export potential is due to current specialisation pattern. Diversification into first-stage processing to add value to primary products would lead to positive prospects in animal products and vegetable oils. (iii) If aggressive opening of other markets is attained, Indonesia will also have to lower its own bound rates, hence loosing some flexibility. This flexibility can be regained through pushing for a Special Safeguard Mechanism (SSM) and/or Special Products (SP). Alternatively, maintaining global protection levels would also leave Indonesia's flexibility untouched, but this comes at the cost of foregoing future benefits of opening markets.

References

Abbott, P. and L. Young, *Export competition issues in the Doha Round*. Paper presented at the international conference Agricultural Policy Reform: where are we heading? Capri (Italy), June 2003.

Achterbosch, T.J., H. Ben Hammouda, P.N. Osakwe and F.W. van Tongeren, *Trade Liberalisation under the Doha Development Agenda: Options and Consequences for Africa*. LEI, The Hague, 2004.

Anderson, K., *Subsidies and Trade Barriers*. Challenge Paper prepared for the Copenhagen Consensus project, presented at a roundtable in Copenhagen, 24-28 May 2004.

Augier, P., Gasiorek, M. and C. Lai-Tong, *The impact of Rules of Origin on Trade Flows*. Paper presented at the Economic Policy Fortieth Panel Meeting, Amsterdam, 15/16 October 2004.

Bouët, A. ,Y. Decreux, L. Fontagné , S. Jean and D. Laborde, *Computing an exhaustive and consistent, ad-valorem equivalent measure of applied protection: a detailed description of MAcMap-HS6 methodology*. Paris, CEPII, 2004.
www.cepii.fr/anglaisgraph/bdd/macmap/method.pdf.

Bouët, A., J Bureau, Y. Decreux and S. Jean, *Assessing the impact of multilateral agricultural liberalisation: the contrasted fortunes of developing countries in the Doha Round*. Paper presented at the 7th Annual Conference on Global Economic Analysis, Trade, Poverty and the Environment, Washington D.C. June 17-19, 2004. www.gtap.org.

Francois, J., H. van Meijl and F. van Tongeren, *Trade liberalisation and developing countries under the Doha round*. CEPR discussion paper DP4032. 2003.

Francois, J.F. and W. Martin, 'Formula approaches to market access negotiations'. In: *World Economy* (2003).

Gibson, P., J. Wainio, D. Whitley and M. Bohman, *Profiles of Tariffs in Global Agricultural Markets*. Economic Research Service, U.S. Department of Agriculture. Agricultural Economic Report No. 796. 2001.

Harrison, W.J. and K.R. Pearson, 'Computing solutions for large general equilibrium models using GEMPACK'. In: *Computational Economics* 9 (1996), pp.83-127.

Hertel, T.W. (eds)., *Global Trade Analysis*. Cambridge University Press: Cambridge MA., 1997.

Hertel, T.W., M. Ivanic, P. Preckel and J.A.L. Cranfield, 'The earnings effect of multilateral trade liberalisation: Implications for poverty'. In: *The World Bank Economic Review* 18 (2004) 4, pp. 205-236.

Meijl, H. van and F. van Tongeren, 'The Agenda 2000 CAP reform, world prices and URAA GATT-WTO export constraints'. In: *European Review of Agricultural Economics* 29 (2002) 4, pp. 445-470.

Organisation for Economic Cooperation and Development (OECD), *An Analysis of Officially Supported Export Credits in Agriculture.* Directorate for Food, Agriculture and Fisheries and Trade Directorate, Joint Working Party of the Agriculture Committee and the Trade Committee, COM/AGR/TD/WP(2000)91/FINAL, Paris, December. 2000.

Reardon, T., J.-M. Codron, L. Busch, J. Bingen and C. Harris (2001) 'Global change in agrifood grades and standards: Agribusiness strategic responses in developing countries'. In: *International Food and Agribusiness Management Review* 2 (2001) 3.

Ruffer, T and P. Vergano, *An agricultural safeguard mechanism for developing countries.* DFID, www.dfid.gov.uk. 2002.

Sawit, M. Husein, *Penggunaan Tiered Formula untuk Pemotongan Tarif buat produk Pertanian Indonesia*. Bogor: CASER, (november 2004).

World Bank, *Global Economic Prospects 2004: Realizing the Development Promise of the Doha Agenda.* The World Bank, Washington D.C., September 2003.

WTO (2004), Doha work programme: Draft general council decision of 31 July 2004, General Council, WT/GC/W/535.

WTO, *Export Subsidies: background paper by the secretariat.* Committee on Agriculture, Special Session (April 2002), TN/AG/S/8. 2002.

WTO, *Members' Usage Of Domestic Support Categories, Export Subsidies And Export Credits, Background Paper by the Secretariat.* Committee on Agriculture, Special Session, (5 March 2002), TN/AG/S/1. 2002.

WTO, *Ministerial Declaration.* WTO Ministerial conference, Fourth Session, Doha 9-14 November 2001, WT/MIN(01)/DEC/W/1. 2001.

WTO, *Negotiations on agriculture.* First draft of modalities for the further commitments, Committee on Agriculture, Special Session (18 March 2003), TN/AG/W/1/Rev.1. 2003.

Young, L., P. Abbott and S. Leetma, *Export competition: Issues and options in the agricultural negotiations*. IATRC Commissioned paper No. 15. www.umn.edu/iatrc. 2001.

Appendix 1 Grouping of Sectors and Regions

Table A1.1 Commodity grouping of the GTAP database

Current grouping (10-sectors)			GTAP database (64-sectors)		
No.	Code	Commodities	No.	Code	Commodities
1	Rice	Paddy rice, processed rice	1	pdr	Paddy rice
			23	pcr	Processed rice
2	Sugar	Sugar cane, sugar beet, sugar	6	c_b	Sugar cane, sugar beet
			24	sgr	Sugar
3	Osd	Oilseeds	5	osd	Oil seeds
4	Gro	Cereal grains nec	3	gro	Cereal grains nec
5	Vol	Vegetable oils and fats	21	vol	Vegetable oils and fats
6	Anpr	Animal products	9	ctl	Cattle,sheep,goats,horses
			10	oap	Animal products nec
			11	rmk	Raw milk
			12	wol	Wool, silk-worm cocoons
			19	cmt	Meat: cattle,sheep,goats,horse
			20	omt	Meat products nec
			22	mil	Dairy products
7	Oagri	Other agricultural products	2	wht	Wheat
			4	v_f	Vegetables, fruit, nuts
			7	pfb	Plant-based fibers
			8	ocr	Crops nec
8	Ofood	Other food products	25	ofd	Food products nec
			26	b_t	Beverages and tobacco products
9	Mnfcs	Manufactures	13	frs	Forestry
			14	fsh	Fishing
			15	coa	Coal
			16	oil	Oil
			17	gas	Gas
			18	omn	Minerals nec
			27	tex	Textiles
			28	wap	Wearing apparel
			29	lea	Leather products
			30	lum	Wood products

			31	ppp	Paper products, publishing
			32	p_c	Petroleum, coal products
			33	crp	Chemical, rubber, plastic prods
			34	nmm	Mineral products nec
			35	i_s	Ferrous metals
			36	nfm	Metals nec
			37	fmp	Metal products
			38	mvh	Motor vehicles and parts
			39	otn	Transport equipment nec
			40	ele	Electronic equipment
			41	ome	Machinery and equipment nec
			42	omf	Manufactures nec
10	Svces	Services	43	ely	Electricity
			44	gdt	Gas manufacture, distribution
			45	wtr	Water
			46	cns	Construction
			47	trd	Trade
			48	otp	Transport nec
			49	wtp	Sea transport
			50	atp	Air transport
			51	cmn	Communication
			52	ofi	Financial services nec
			53	isr	Insurance
			54	obs	Business services nec
			55	ros	Recreation and other services
			56	osg	PubAd-min/Defence/Health/Educat
			57	dwe	Dwellings

Table A1.2 Regional grouping of the GTAP database

Current grouping (10 regions)			GTAP database (87 regions)		
No.	Code	Country/region	No.	Code	Country/region
1	INDON	Indonesia	10	idn	Indonesia
2	ASEAN	ASEAN	11	mys	Malaysia
			12	phl	Philippines
			13	sgp	Singapore
			14	tha	Thailand
			15	vnm	Vietnam
			16	xse	Rest of Southeast Asia
3	CHINA	China, Hong Kong	4	chn	China
			5	hkg	Hong Kong
4	JAKO	Japan, Korea	6	jpn	Japan
			7	kor	Korea
5	INDIA	India	18	ind	India
6	EU25	European Union	37	aut	Austria
			38	bel	Belgium
			39	dnk	Denmark
			40	fin	Finland
			41	fra	France
			42	deu	Germany
			43	gbr	United Kingdom
			44	grc	Greece
			45	irl	Ireland
			46	ita	Italy
			47	lux	Luxembourg
			48	nld	Netherlands
			49	prt	Portugal
			50	esp	Spain
			51	swe	Sweden
			58	cyp	Cyprus
			59	cze	Czech Republic
			60	hun	Hungary
			61	mlt	Malta
			62	pol	Poland
			64	svk	Slovakia
			65	svn	Slovenia
			66	est	Estonia
			67	lva	Latvia
			68	ltu	Lithuania
7	NAME	North America	21	can	Canada

			22	usa	United States
8	BRAZ	Brazil	30	bra	Brazil
9	SCAM	Rest South and Central America	23	mex	Mexico
			24	xna	Rest of North America
			25	col	Colombia
			26	per	Peru
			27	ven	Venezuela
			28	xap	Rest of Andean Pact
			29	arg	Argentina
			31	chl	Chile
			32	ury	Uruguay
			33	xsm	Rest of South America
			34	xca	Central America
			35	xfa	Rest of FTAA
			36	xcb	Rest of the Caribbean
10	OCEA	Oceania	1	aus	Australia
			2	nzl	New Zealand
			3	xoc	Rest of Oceania
11	ROW	All other regions	8	twn	Taiwan
			9	xea	Rest of East Asia
			17	bgd	Bangladesh
			19	lka	Sri Lanka
			20	xsa	Rest of South Asia
			52	che	Switzerland
			53	xef	Rest of EFTA
			54	xer	Rest of Europe
			55	alb	Albania
			56	bgr	Bulgaria
			57	hrv	Croatia
			63	rom	Romania
			69	rus	Russian Federation
			70	xsu	Rest of Former Soviet Union
			71	tur	Turkey
			72	xme	Rest of Middle East
			73	mar	Morocco
			74	tun	Tunisia
			75	xnf	Rest of North Africa
			76	bwa	Botswana
			77	zaf	South Africa

			78	xsc	Rest of South African CU
			79	mwi	Malawi
			80	moz	Mozambique
			81	tza	Tanzania
			82	zmb	Zambia
			83	zwe	Zimbabwe
			84	xsd	Rest of SADC
			85	mdg	Madagascar
			86	uga	Uganda
			87	xss	Rest of Sub-Saharan Africa

Appendix 2 Checking the Validity of the GTAP Database for Indonesia

To get indication on the validity of our GTAP simulation results, we checked the validity of the GTAP 6.4 database. The spreadsheet below shows the results from comparing the data from the 2000 input output table for Indonesia (IO) to the 2001 GTAP 6.4 database. The check comprised two steps. (1) Align the 175 sector IO table to the 10-commodity aggregation that we apply in the current analysis. (2) Compare corresponding values for the most critical elements for the GTAP analyses, i.e. the composition of value added; the structure of intermediate deliveries; the absorption of output over demand categories; and national income (GDP). For each corresponding value 'x' in the spreadsheet, we calculate:

$x_i = IO_i - GTAP_i$

which implies that if :

x>0 GTAP underestimates IO table
x<0 GTAP overestimates IO table

Our criterion for validity is that for all |x|>0.1, the validity is debatable; all deviations by more than 10 per cent are marked in the spreadsheet by a shaded cell.

We conclude that overall validity is acceptable. A full revision of data for Indonesia is very much desirable given the substantial divergence in factor shares, intermediate deliveries, and GDP. Five issues should specifically be addressed:

a) GTAP allocates 20-30 per cent higher labour shares in agriculture. Pearson et al. (2003) report labour shares in the range of 20-30 per cent;
b) Distribution of value added over sectors in both tables match;
c) Labour costs to the sector is overestimated by the GTAP database especially in rice and cereals; capital costs are large in GTAP for oilseeds, cereal and oagri;
d) GTAP registers about 20 per cent more intermediate inputs in oilseeds than the IO (25 per cent on the diagonal), and 20 per cent less in VegOil. Probably due to the fact that primary processing of soya bean (oil) is included in OtherFood;
e) Absorption of goods and services in agriculture looks excellent. Export demand is overestimated in GTAP at the expense of services.

Table A2.1 Data check

VALUE ADDED													
	Net value added (I	Rice	Sugar	Oilseeds	Cereals	VegOil	AnProd	OthAgri	OthFood	Manufacture	Services	Total intermediate input	
	Labour	-916	-289	-36	-142	383	343	-348	415	812	4.363	4.583	
	Capital	2.372	-492	515	530	-517	275	2.628	210	1.502	6.372	13.397	
	Net value added	1.455	-781	480	387	-134	618	2.280	625	2.314	10.735	17.980	
	Factor shares (%)												
	Labour	-0,223	-0,008	-0,215	-0,284	0,185	0,025	-0,131	0,042	0,006	0,003	-0,008	a)
	Capital	0,223	0,008	0,215	0,284	-0,185	-0,024	0,131	-0,042	-0,005	-0,003	0,008	
	Total	0,000	0,000	0,000	0,000	0,000	0,001	0,000	0,000	0,001	0,000	0,000	
	Distribution of value-added over sectors (%)												
	Labour	-0,023	-0,007	-0,001	-0,004	0,007	0,004	-0,014	0,006	-0,009	0,042	0,000	b)
	Capital	0,018	-0,006	0,004	0,004	-0,007	0,000	0,019	-0,003	-0,040	0,012	0,000	
	Total	0,005	-0,006	0,003	0,002	-0,003	0,001	0,008	-0,001	-0,029	0,021	0,000	
	Capital includes operating surplus and depreciation												
INTERMEDIATE DELIVERIES													
	0,000	Rice	Sugar	Oilseeds	Cereals	VegOil	AnProd	OthAgri	OthFood	Manufacture	Services	Total intermediate input	
	Labour	-0,103	-0,031	-0,082	-0,242	0,030	-0,001	-0,078	0,007	0,011	-0,022	0,006	c)
	Capital	0,095	-0,046	0,273	0,236	-0,190	-0,029	0,152	-0,033	0,025	-0,040	0,024	
	Rice	0,008	0,000	0,000	0,000	0,000	-0,006	0,000	-0,003	0,000	-0,002	0,004	
	Sugar	0,000	0,117	0,000	0,000	0,000	0,001	0,000	-0,011	0,000	-0,001	-0,001	
	Oilseeds	0,000	0,000	-0,265	0,000	0,005	0,007	0,000	0,018	0,001	0,000	0,001	
	Cereals	0,000	0,000	0,000	0,019	0,012	0,002	0,000	0,027	0,000	0,000	0,002	
	VegOil	0,000	-0,002	-0,016	0,000	0,094	0,007	-0,021	0,007	0,000	-0,001	0,003	
	AnProd	0,001	0,000	0,002	0,007	-0,001	-0,055	0,005	0,000	0,000	0,000	0,001	
	OthAgri	0,000	0,003	-0,001	0,000	0,066	-0,004	-0,043	-0,079	0,010	0,004	0,002	
	OthFood	0,000	-0,001	0,000	0,000	0,000	0,101	0,001	0,035	0,002	0,003	0,009	
	Manufactures	0,007	-0,035	0,048	-0,025	-0,046	-0,017	-0,027	-0,026	-0,028	0,017	-0,026	
	Services	-0,007	-0,005	0,040	0,006	0,030	-0,004	0,013	0,057	-0,022	0,043	-0,025	
	Total	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	
	Total intermediate	0,008	0,077	-0,192	0,006	0,160	0,030	-0,074	0,026	-0,036	0,062	-0,030	d)
ABSORPTION													
						Final domestic demand	total exports (fob)						
		Priv. Cons	Gov. Cons	Investment	Stock chang	total	EEXT	total demand					
	6 Rice	1.765	0	0	215	1.980	-25	1.955					
	7 Sugar	111	0	0	-39	71	-10	61					
	8 Osd	-74	0	0	0	-75	-7	-81					
	9 Gro	323	0	0	31	354	-2	352					
	10 Vol	632	0	0	14	646	210	856					
	11 Anpr	1.812	0	22	-95	1.740	-423	1.316					
	12 Oagri	1.274	0	0	55	1.329	-504	825					
	13 Ofood	1.520	0	0	-40	1.480	-714	766					
	14 Mnfcs	4.063	0	6.179	1.893	12.136	-9.759	2.377					
	15 Svces	3.561	739	26.193	198	30.691	8.221	38.912					
	Total	14.986	739	32.395	2.232	50.351	-3.012	47.339					
						Final domes	total exports (fob)						
		Priv. Cons	Gov. Cons	Investment	Stock chang	total	EEXT	total demand					
	6 Rice	-0,025	0,000	0,000	0,029	0,025	-0,005	0,000					
	7 Sugar	0,037	0,000	0,000	-0,029	-0,037	-0,008	0,000					
	8 Osd	0,010	0,000	0,000	-0,001	-0,010	-0,010	0,000					
	9 Gro	-0,032	0,000	0,000	0,043	0,032	-0,011	0,000					
	10 Vol	0,055	0,000	0,000	0,004	-0,055	-0,059	0,000					
	11 Anpr	0,094	0,000	0,003	-0,014	-0,098	-0,083	0,000					
	12 Oagri	0,093	0,000	0,000	0,007	-0,093	-0,100	0,000					
	13 Ofood	0,062	0,000	0,000	-0,003	-0,062	-0,059	0,000					
	14 Mnfcs	0,043	0,000	0,077	0,024	-0,120	-0,144	0,000					
	15 Svces	-0,271	-0,072	0,285	0,002	0,058	0,056	0,000					e)
	Total	-0,044	-0,010	0,151	0,010	-0,097	-0,107	0,000					
GDP	USD 2001 million			Rp billion		Rp/USD a)							
	from final demand	n.a		n.a		8.416							
	from VA	17.979		1.298.751.834									
	from GDP table	-9.306		1.143.353.105									
	a) average rate for 2000. source: FX history, conversion table: USD to IDR (interbank rate)												