The Impact of Trade Liberalisation on the Indonesian Food Crop Sector

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".......... academic economics and graduate training have become increasingly preoccupied with formalism and technique, to the exclusion of studying real world problems and issues that can be illuminated with some blend of theoretical, empirical, and institutional research " *(Hansen, W. Lee,1991).*

ACKNOWLEDGEMENTS

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GLOSSARY AND ABBREVIATIONS

Expression	Description
ADB	Asian Development Bank
AFTA	ASEAN Free Trade Area
AMS	Aggregate Measure of Support
ASEAN	Association of South East Asian Nations
BULOG	BULOG (*Badan Urusan Logistic*), National Logistics Agency
BPS	(*Biro Pusat Statistik*), Central Bureau of Statitistics
BAPPENAS	National Development Planning Agency
BAPAGMOD	BAPPENAS Agricultural Model
BKPM	Capital Investment Coordinating Board
BOP	Balance of Payments
CAP	Common Agrocultural Policy
CEPT	Common Effective Preferential Agreement
CCCN	Customs Cooperating Council Nomenclature
c.i.f.	Cost, Insurance and Freight
CBS	Central Bureau of Statistics

CSE	Consumer Subsidy Equivalent
CWFS	Centre for World Food Studies
DSR	Debt Service Ratio
EC	European Community
EU	European Union
EP	Export Promotion
ERP	Effective Rate of Protection
ERS	Economic Research Service (USDA)
FAO	Food and Agriculture Organization of the UN
f.o.b.	Free on Board
GDP	Gross Domestic Product
GNP	Gross National Product
GSP	Generalized System of Preferences
GSTP	Global System of Trade Preferences
GATT	General Agreement on Tariffs and Trade
HS	Harmonized System
IIASA	International Institute for Applied Systems Analysis
IFPRI	International Food Policy Research Institute
Inpres	*(Instruksi Presiden)*, President Instruction
IS	Import Substitution
LDC	Less-Developed Countries
MENKO EKUIN	The Co-ordinating Minister for Economics, Finance and Industry
MFN	Most Favoured Nation
MGAI	Morgan Grenfell Asia Indonesia

MTN	Multilateral Trade Negotiations
NAFTA	North America Free Trade Area
NTB	Non-Tariff Barrier
NRP	Nominal Rate of Protection
OECD	Organisation for Economic Co-operation and Development
PAKEM	*(Paket Mei)*, May Package
PAKJUN	*(Paket Juni)*, June Package
PAKTO	*(Paket Oktober)*, October Package
PAKNOV	*(Paket November)*,November Package
PAKDES	*(Paket Desember)*, December Package
PSE	Producer Subsidy Equivalent
REPELITA	Five Year Development Plan
ROW	Rest of the World
SUSENAS	Food Consumption Survey
SWOPSIM	Static World Policy Simulation Model
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
US	United States
USDA	United States Department of Agriculture
WIDER/UNU	World Institute for Development Economics Research (United Nations University)

ABSTRACT

Studies of agricultural trade policies in developed countries generally focus their attention on impacts in their own domestic markets. Less attention has been given to impacts on developing countries nor their need for special and differential treatment in multilateral trade negotiations.

This study assesses the impacts of trade liberalisation by modelling the outcome of the Uruguay Round of GATT negotiations. The removal of support in the industrialised nations on the Indonesian food crops sector was examined. Using the Static World Policy Simulation (SWOPSIM) model of world agricultural trade, the impacts on Indonesian consumption, production and net trade were estimated.

The results indicate that Indonesian exports of corn would expand, and the country could also become an exporter of rice. Imports of sugar could expand partly as a result of a reduction in Indonesian sugar subsidies. While multilateral trade liberalisation that results in higher world prices may have a negative effect on food importing developing countries, this was found not to be the case for Indonesia (at least for the food crops studied). The increase in producer welfare would more than compensate for the fall in consumer welfare, government subsidy expenditures would fall and the country's trade balance would improve.

In addition, continuing unilateral deregulatory and liberalisation measures in other sectors of the Indonesian economy, as well as in agriculture, will provide scope for the development of further new export opportunities.

Chapter 1

INTRODUCTION

1.1. The Uruguay Round of Multilateral Trade Negotiations

In the Uruguay Round, trade liberalisation has become a critical element, and although there has been a lively debate about agricultural protectionism and trade among developed countries, sufficient attention has not been paid to the interests of Less-Developed Countries (LDC's). Likewise Indonesia, (a developing country with a large population, low per capita income, and a growing labour force), which is a contracting party to the GATT is likely to be affected by the outcomes of that negotiation.

The Uruguay Round of multilateral trade negotiations, which commenced in 1986, is one of the first rounds of the General Agreement on Tariffs and Trade (GATT) in which agriculture has been specifically included among 15 negotiating groups. Agriculture's prominence arose largely from an acknowledgment that world agricultural markets are very distorted and unstable and that greater liberalisation of trade is desirable.

Developing countries would be among those that stand to be the most seriously affected - positively or negatively -by the outcome of the GATT negotiations on agricultural trade liberalisation, as in these countries, agriculture is generally much more important as a source of income and employment.

The range of countries affected by existing agricultural trade distortions is surprising and is reflected by the membership of the Cairns Group (Argentina, Brazil, Chile, Colombia and Uruguay from Latin America; Australia, Fiji, **INDONESIA** , Malaysia, New Zealand, the Philippines and Thailand from Asia/Pacific; and Canada and Hungary). Their ultimate goal was to see market forces dictate production and trade of agricultural products. As Oxley (1990) commented " *as far as most members of the Cairns Group were concerned the Round and the multilateral trading system were not worth having without agricultural trade liberalization* ".

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Given that protection of agriculture has been the greatest departure by the US, the European Union (EU, formerly the European Community) and Japan and given that moving agriculture into GATT will lay the basis for reducing US-EC trade wars, there is a significant degree of objectivity in the Cairn's proposal. Developing countries, therefore, have had a crucial role to play in these negotiations, and developed countries are clearly anxious to gain their support and convince them of the virtues of supporting systems of international liberalization in agriculture.

Over the past 40 years, seven rounds of multilateral trade negotiations have been launched and successively completed under the auspices of GATT (Andrews and Roberts, 1992). The eighth, known as the Uruguay Round, began in September 1986, and was shaped by the objectives set forth in the January 1986 Punta del Este Ministerial Declaration. Seven previous round of Multilateral Trade Negotiations (MTNs) have been held, successfully resulting in widespread tariff reductions for manufactured goodss and more recently in codes of conduct for non-tariff barriers. The Uruguay Round negotiations were :

"... aimed to achieve greater liberalisation of trade in agriculture and bring all measures affecting import access and export competition under strengthened and more operationally effective GATT rules and disciplines". Encompassed with the mandate were " the reduction of import barriers, reduce tariffs, circumscribe non-tariff measures, improve safeguards (emergency protection) arrangements, better control the incidence of subsidies affecting agricultural trade, improve the institutional structure of the GATT, improve access for tropical products...." Miller (1988) and Oxley (1990).

In the current Uruguay Round of negotiations, agriculture has taken on a high profile, because of the export subsidy wars between the EC and the US in third markets in the early 1980s. For agricultural commodities, a number of exceptions to the general GATT rules exist, largely reflecting the interests of the United States at the time the GATT was established. Difficulties in the interpretation or enforcement of these rules have allowed agricultural trade to remain largely outside the discplines of GATT. The US-EC subsidy war intensified as described by Oxley (1990), and the US agriculture industry contended that progressive increases in subsidies by the EU in recent years had enabled it to increase its share of markets.

The ground for overcoming the paralysing situation in the Uruguay Round of the GATT negotiations was in the May 1992 decision on Common Agricultural Policy (CAP) reform and the Draft Final Act (DFA) tabled by GATT Director General Arthur Dunkel in December 1991. Consequently, the only opportunity to reach a breakthrough was to get at least two of the main antagonists, the US and the EU, to end their open hostility in agricultural trade matters and to conclude a tentative bilateral agreement which could serve as a reference for a general GATT agreement. Talks between the US administration and the EU Commission were intensified, although at the same time the interests and strategies within the EU continued to diverge. On 20 November 1992 a three issue understanding was signed by US Secretary of Agriculture Madigan and EU Farm Comissioner MacSharry under the so-called "Blair House Agreement" aimed at arranging a bilateral solution to the agricultural dossier of the Uruguay Round (Manegold, 1993). With regard to this, the US-EU agreement closely follows the lines of the draft tabled in December 1991 by Director General Dunkel. Reform of agricultural policies resulting in greater market access, reduced internal support and a curtailment of subsidised exports would have a marked positive impact on the prices of agricultural commodities entering world markets.

1.2. Outcome of the Uruguay Round

The Uruguay Round reached an agreement and GATT chief Peter Sutherland brought a brown wooden gavel down on 15 December 1993, sealing the world's largest trade treaty. After seven years of acrimonious bargaining, envoys from 117 states approved a pact aimed at boosting economic growth and guiding international trade into the 21st century . It has been estimated that the new GATT treaty will boost global income between $US 200 billion and US$300 billion a year _ more than 1 percent of world GNP- over 10 years from 1995. According to officials' estimates, the agriculture deal under the treaty will also benefit the European Union, with net income increases of $US 30 billion (Evening Standard, Thursday, 16 December 1993).

The final Act embodying the results of the Uruguay Round of Multilateral Trade Negotiations on Agriculture can be summarized as follows (and shown in Figure 1.1.):

Market Access

Non-tariff barriers would be converted into tariff equivalents for the 1986-88 base period. Both ordinary customs duties and those resulting from tariffication are to be reduced on a simple average basis by 36 percent over six years from 1993 to 1999 but each individual tariff has to be reduced by at least 15 percent over the same period. Current access opportunities would be maintained. Where there are no significant imports, the minimum access opportunities of 3 percent of domestic consumption would be established, expanding to 5 percent by 1999.

Domestic support

All support to producers is to be reduced by 20 percent relative to the base period 1986-88 in equal instalments from 1993 to 1999. The commitments are expressed in the form of an Aggregate Measure Support (AMS) or equivalent commitments in which for each basic agricultural product a single figure for the value of all forms of support subject to reduction would be calculated. The exceptions are if product-specific or sector-wide domestic support represents at most 5 percent of the value of production, or if the domestic support policy has no (or minimal) distorting effects on trade or production (that is pre-clarifed in the "Green Box").

The Green Box covers a wide range of support measures, including general government services, for example in the areas of research, disease control, infrastructure, environment protection and food security. It also includes direct payments to producers, for example certain 'decoupled' forms of income support, structural adjustment assistance, direct payments under environmental programmes and under regional assistance programmes.

In addition, *Special and Differential Treatment of Developing Countries*, means the developing countries shall have the flelxibility to implement reduction commitments over a perid of 10 years, specifically not less than two-thirds of the reductions.

In recognising their need to encourage agricultural and rural development, developing countries are exempted from reduction commitments with respect to generally available input subsidies and investment aids.

Export Subsidies

Direct export subsidy expenditures and the quantity benefiting from such subsidies are to be reduced by 36 percent and 21 percent over six years starting from the average outlay of 1986-90 base period, or alternatively the 1991-92 base, respectively.

Figure 1.1.

FINAL AGREEMENT ON AGRICULTURE

Domestic Support	20 % reduction
Market Access	1. Tariffication
	2. 36 % reduction in 6 years
Export Subsidies	36 % outlay reduction
	21 % volume reduction by 1999
S & D	Larger de minimis wider green box
	LDC's fully exempt
SPS	Relevant International Organisations
	Standards
	Guidelines & recommendations

The Main Features
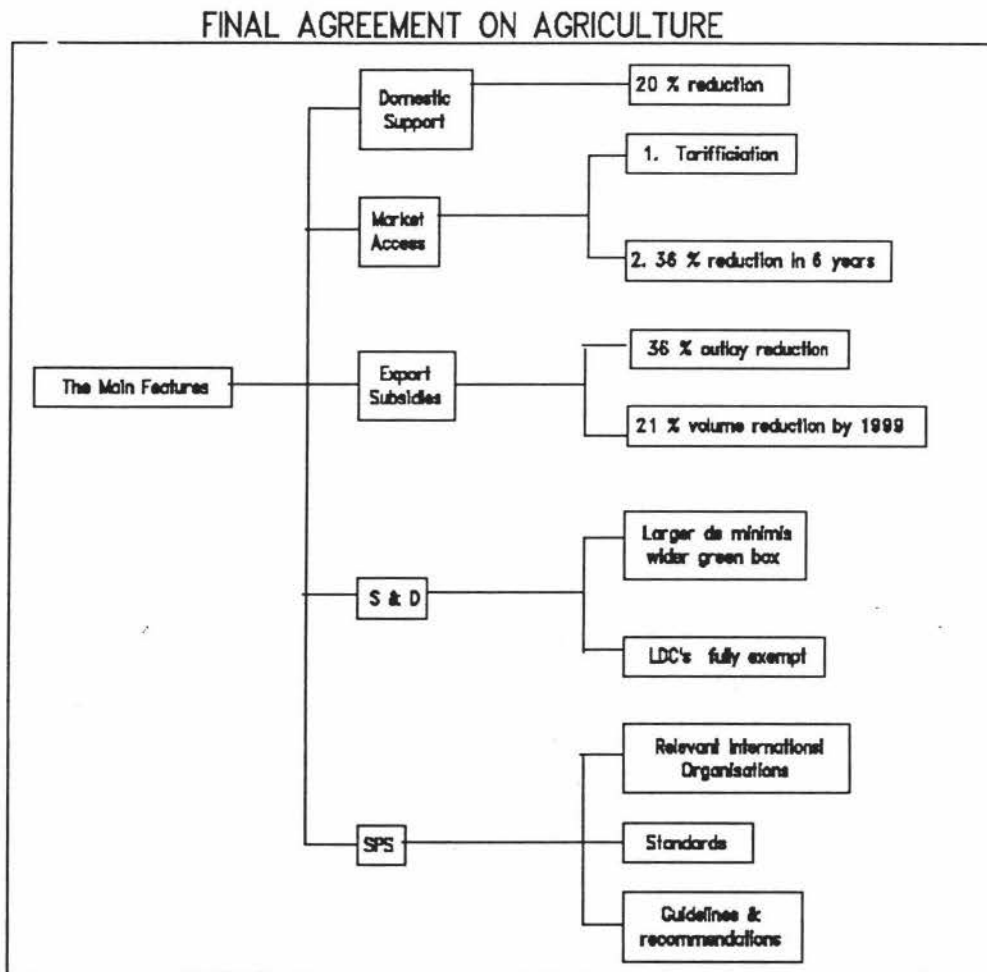
Source : Adapted from Dillon (1992) and GATT Secretariat (1993)

1.3. The Impacts of Trade Reform

The past decade has seen a considerable increase in the discussion and analysis of agricultural trade liberalization. One response by a number of international organizations has been to commission quantitative analyses designed to measure the degree to which farm policies have contributed to the crisis in agricultural trade. For example, one important finding of the joint UNCTAD/UNDP/WIDER(UNU) study in 1990, which is consistent with findings in other major studies of the impact of trade liberalization in agriculture, is that the phasing out of agricultural protection in the industrialized countries could have a dynamic impact on the evolution of agricultural production in developing countries and could provide the latter with a long term opportunity to expand their earnings from their agricultural exports. It says *"one effect would be an increase, at least for a transitional period, in world prices of basic foodstuffs such as grains, livestock products and edible oils" (pp. xxiv)*. This is in the interest of the majority of commodity-dependent developing countries, which are net exporters of agricultural products and would gain in both the short term and long term.

Enthusiasm for such research has received a substantial boost by the high profile which agriculture has played in the Uruguay Round of the GATT negotiations. Not surprisingly, these analyses have tended to focus mainly on the implications of policy reform among the 'major players' in these negotiations, especially the EU, the US and Japan.

However, researchers have also turned their attention toward the potential implications of policy reform in developing countries. Work in this area includes Tyers and Anderson (1989a, 1989b), and Krissoff, Pariss and Huff (1990) cited in Goldin and Knudsen (1990). These were attempts to develop models for policy analysis in the developing country liberalization studies. The first comprehensive analysis of the impact of developed country agricultural policies on the LDCs was that of Valdes and Zietz (1980). Their methodology is simple, straightforward and well-documented. Numerous models are now available for estimating the magnitude of these various effects. For example, the Static World Policy Simulation Model (SWOPSIM) developed by the Economic Research Service of the United States Department of Agriculture (USDA) is based on a partial equilibrium comparative static system. Other studies include Frohberg,

Fisher and Parikh (1990) under the auspices of the Food and Agriculture Programme (FAP of the International Institute for Applied Systems Analysis (IIASA), and the Rural Urban North South model (RUNS) of the Organization for Economic Co-operation and Development (OECD). However, most have to date focused on the interests of industrial countries. As pointed out by Skully *et al* (1988), most of the technical analyses in support of the Uruguay Round of negotiations have been directed towards the policies of the chief protagonists in the industrialized world. Little attention has been given on special and differential (S & D) treatment for developing countries in the agricultural negotiations.

At the start of the 1980s, the Indonesian trade regime was inward-oriented, promoting investment by both the public and private sector in highly protected activities geared towards supplying the domestic market. Initially the primary instrument of protection was a high and disparate tariff structure which was supplemented by a proliferation of non-tariff barriers (NTBs) in the form of restrictive licences (World Bank, 1991). In its 1991 report, the World Bank states that from 1982, the steady weakening in the prices of Indonesian's commodity exports (particularly oil) and the adverse effects of the world recession, resulted in slower economic growth. The collapse in oil prices in early 1986, and the forecast of continued slow domestic growth, encouraged the Indonesian government to reassess this strategy.

A slow down in economic growth, combined with a deteriorating external payments situation, has led Indonesian planners to adopt a more open and outward-oriented approach in order to diversify export earnings, increase domestic competitiveness and encourage new sources of growth. This new direction is reflected in recent trade reforms (a series of deregulation packages) aimed at moving away from a trade regime based upon non-tariff barriers (NTBs) towards a less-distorted regime based on import tariffs and to provide exporters with access to imported inputs at world prices. For agriculture, trade liberalization is understood as being a part of this new, outward-oriented approach.

As part of the overall economic reform movement, calls for agriculture trade reform continue to mount through GATT, in reports of the government's major creditor, in key bilateral government meetings, and from technocrats within the government's own ministries. Such calls are supported by the World Bank 1987 report (cited in Baharsjah *et al*, 1989) that the positive gains from agricultural trade liberalization would include a reduction in domestic food costs, improved efficiency in the allocation of production resources, and the stimulation of growth and technological transformation of markets where Indonesia may have a comparative advantage. The efficiency gains from a more outward-oriented trade strategy have been proposed as an important new source of growth for the agricultural sector.

Over the past decade the main objective of agriculture in Indonesian has been import substitution, first in rice and then in all other foodstuffs. The largest contribution has been from growth in rice production, which has been achieved in significant part due to government policies, including investment in irrigation, research, extension programmes for new technologies and input pricing policies. The government has also heavily influenced prices of other important food crops, particularly soybeans, sugar, and wheat, through control of imports and intervention in domestic markets. Rosegrant (1989) found that intervention in maize and cassava markets has been less pronounced. Imports of soybeans and sugar have been controlled to maintain domestic prices of these commodities far above world prices. Government objectives in exercising control over prices have included price stabilization, provision of incentives to boost domestic production and farm income,and reduction in foreign exchange costs of food imports.

Given government concerns with farm income and with potential adjustment problems in the process of liberalization, an attempt to assess the impact of full trade liberalization would be helpful. In this study, the impact of trade liberalization policies on crop production is analyzed using the SWOPSIM framework model. In later chapters the model is briefly outlined, the GATT and Indonesian government trade policies for major food crops are described, and key impacts of liberalization will be presented.

1.4. The Objectives of the Study

This study is focused on the implications of the Uruguay Round of the GATT outcome on the Indonesian agricultural sector, as well as on unilateral liberalisation. The objectives of this study are :

1. To describe a series of wide-ranging Indonesian trade reforms over the last decade.

2. To provide a quantitative assessment of the impacts of developed countries trade liberalisation as well as examining Indonesia's unilateral reforms, under a series of scenarios.

3. To analyze the potential gains and benefits of agricultural liberalisation.

4. To provide a policy framework for future reform.

1.5. Organization of the Thesis

The thesis is organized in seven chapters. The next two chapters describe the major economic and trade reforms in Indonesia over the last decade with special emphasis on agricultural trade policy and the government's level of support to agriculture.

Chapter 4 reviews recent studies of government intervention in agriculture, the outcome of the Uruguay Round of Negotiations and unilateral Indonesian liberalisation. Chapter 5 contains the modelling approach and its application. This chapter shows the mechanism of the SWOPSIM (Static World policy Simulation Modelling) Framework and an attempt to update its database. Chapter 6 describes the results of the quantitative ananlyses by discussion and interpretation of the general findings. Chapter 7 provides a summary of the study, the conclusions that can be drawn from it, and suggestions for further actions or study.

Chapter 2

MAJOR TRADE POLICY REFORMS IN INDONESIA

2.1. Economic Reforms

Indonesia's experience of trade reforms varied over the "New Order government" period. An historical overview suggests that major changes in the direction of trade are linked to major political and economic crises. The "New Order" government undertook substantive liberalisation of the economy between the period 1967 until now. A summary of the adjustment programme in the 1980s is given in Table 2.1.

The policy approach adopted by the New Order was characterized by the introduction of the 1967 Foreign Investment Law which aimed to restore investors confidence and encourage private investment in priority sectors. It resulted in a notably increased domestic production, and tariffs on some products were also increased.

During the period following the oil boom in 1973-1982, trade and industrial policies were directed at influencing the pattern of industrialisation through the protection of domestic industries. The quadrupling of oil prices and the continuation of these high prices until 1982, dulled much of the government's resolve to institute reforms that would provide a greater role for the private sector, instead there were more protectionist and interventionist policies. Indonesia adopted an import substitution strategy beginning with final consumer goods and then moving on to intermediate and capital goods (Pangestu, 1989).

The regime that developed was characterised by escalating protection through tariff and non-tariff barriers, and high and variable effective rates of protection. However, macroeconomic policy was fairly sound during the new order period. It was characterised by concern for controlling inflation and prudent fiscal policy.

Throughout the 1980s a series of major reform measures took place as indicated in Table 2.2. Falling oil prices had important implications for Indonesia due to a fall in foreign exchange earnings.

Table 2.1. Chronology of the adjustment programme, 1983-1992

Policy Instrument	Description
Exchange rate	1. Rupiah was devaluated by 28 percent against US dollar on March 30, 1983 from Rp 703 to Rp 907 per dollar; since the exchange rate has been made more flexible; 2. Rupiah was devaluated by 31 percent against the US dollar on September 12, 1986 from Rp 1,134 to Rp 1,644 per US dollar.
Fiscal Policy	1. Tight fiscal policy, since 1983, marked by: a. large capital and import intensive projects (particularly investment in manufacturing, petrochemicals and mining) rephrased in May 1983; b. major cutback in public real capital spending; c. more resources for social programmes; d. restraints on civil service employment and salaries 2. Tax reform enacted in january 1983, involving simplification of both tax structure and tax administration of all tax resources, excluding taxes on foreign trade.
Monetary and Financial Policy	1. Financial reform initiated on june 1, 1983, involving removal of credit and rate ceilings for state bank's operations, a reduction in the scope of credit programmes and introducing of new market-oriented instruments of monetary control; 2. New deregulation measures introduced in December 1988, and March 1989 aimed at enhancing financial sector prudential standards and efficiency, and developing the capital market by, among others, removing barriers to entry; 3. Improved monetary management to control inflation and to curb exchange rate speculation; Removal of central bank's credits ("liquidity credits") and major reduction of economic sectors covered by subsidised "priority credits" in January 1990 to curb inflationary pressures. 4. New regulations introduced on March 14, 1991, which are aimed at strengthening the capital base of banks and tightening supervision over financial institutions. The new measures require the banking system to meet the BIS guidelines on capital adequacy ratio 8 per cent of the bank assets by December 1993.

Trade Policy	1. Across-the board reductions in nominal in April 1985, October 1986, and May 28th, 1990; 2. Measures to provide internationally priced inputs to exporters announced on May 6, 1986, and May 28,1990. This scheme permits exporters and suppliers of inputs for exporters to bypass the import licensing system and import tariff or, if they cannot bypass the system, to reclaim import duties, although the cost imposed by the NTBs cannot be rebated. The import bias of the protective system had been lessened but not uniformly; 3. Major deregulation of import licensing system announced in december 25, 1986, January 15, 1987, May 28, 1990, and July 1992; 4. Additional measures to reduce anti-export bias announced in December 1987 reducing regulatory framework for exporters; 5. Major removal of non-tariff barriers, switch from non tariffto tariff barriers, and general reduction of tariff rates on May 28, 1990 and July 1992. Also covering simplification of licensing producers in trade, manufacturing, health and agricultural business the policy package is aimed at reducing high cost economy; 6. Further removal of non-tariff barriers, general reduction of import tariff and reopening of several business fields to new domestic and foreign investors was announced in June 2nd 1991. Several major features of the reform cover out-right import bans of cold-rolled steel coils, and other steel products, abolition of the export quota system on built-up commercial vehicles and reopening of car component manufacturing to new investors.
Other Regulatory Framework	1. Reorganisation of customs, shipping and ports operations announced in April 1985 to reduce handling and transport cost for exports and simplify the administrative procedures governing inter island and foreign trade. Further deregulation of maritime activities announced on November 21, 1988 to reduce cost and encourage private sector participation, including foreign capital and foreign shipping companies; 2. Measures to reduce the investment and capacity lisencing requirements, relax foreign investment regulations, and reduce local content programme; 3. Measures announced on July 6, 1992 to allow joint venture firms to hold land titles (right to use the land) and use them for credit collateral, liberalised imports of used machinery, plant equipment and other capital goods, and liberalise expatriate works permits.

Source: Nasution, Anwar (1992)

As shown in Table 2.2. around 60 per cent of government revenue comes from taxes on oil corporations so that there was a substantial fall in government revenue available for development expenditures. The government response was ambivalent. While the need for resource mobilisation, for increased foreign exchange reserves through the promotion of non-oil exports and for the increased role of the private sector were recognised, it took some time before political will become strong enough to push policy reforms.

In the period of 1982-1985 the government responded quickly in terms of exchange-rate management and austerity measures. In March 1993 the rupiah (Indonesian currency) was devalued by 50 percent. Devaluation, however, helped increase the nominal value of government revenues in rupiah terms despite the decline in oil revenues. Austerity measures came in the form of budget cuts and increased efforts to prevent leakages. In terms of resource mobilization efforts, significant reforms in the financial and fiscal sectors with the 1983 banking deregulation and the tax reforms of 1984 were implemented. Furthermore, in the period 1982-1986, especially 1983-1984, many licenses were issued to importers. As a result, several types of import licenses outside the general import licenses developed, tariff reforms in 1985 were rationalised substantially by an across-the-board reduction in the range and level of nominal tariffs. The purported objective of the approved importer system was a combination of protection and foreign-exchange saving. It was estimated for 1986 that 28 percent of the total number of items imported, 26 percent of the total import value, and 31 percent of value added were restricted. According to Pangestu (1991) several types of import licenses were issued for :

(1) Importer/producers, who needed to import raw materials or intermediate goods (*importir produsen*).

(2) Agents licensed to import a particular brand of product (*agent tunggal*).

(3) Producer/importers who were the only ones approved to import products that they were also producing (*produsen importir*), such as Giwang Selogam on behalf of Krakatau Steel, the state-owned steel mill, which imports all steel products.

(4) The import of certain goods, for example plastic raw materials such as polyethylene, which was designated to a number of the state trading companies (*importir terbatas*).

Table 2.2. Changes in Policy Direction and Economic Conditions

		1967-1972 Rehabilitation & stabilisation	1973-1981 Oil Boom	1982-1985 Initial Oil Price Decline	1986-Now Rapid Oil Price Decline
Economic Setting	GDP DSR	High Growth 10 %	Mod. High Growth 7-8 % p.a.	Slow growth 3-5 % p.a.	Slow Growth 3-5 % p.a.
	Percent Total Export	14-20 %	14-20 %	20-25 %	30-38 %
	Inflation	1-10 %	10-47 % p.a.	4-12 % p.a.	5-9 %
	Oil/Exports	60 %	60-80 %	70-70 %	50 %
	Manu/Exports	1 %	1-3 %	4-11 %	18-25 %
	Oil/Gov. Rev	50 %	60-70 %	50-60 %	40-50 %
Macro	Fiscal (Rel.Prudent) Monetary (Anti Infl.) Exch.Rate	 Tight Unify Mulfiple ER & Devl.1971 Open Cap. Account	Bal. Budget:High Govt.spending Current Ceilings;unsuccesful Deval. 1978-Dutch Disease Begin	Austerity and Begin Resource and Mobilization Tight Deval.1983-fiscal Deval.1986-BOP 1988-depreciation	Continued Austerity & Res. Mobiliz Tight Effective ER management
Industrial Policy		Initial Phases Import Substituion (final goods)	Continued IS interm.and cap goods	Continued IS Industrial deepening Local. Beginning Exp Or.	Export Oriented Strong N-oil exports Battle cry
Trade Policy		Beginning Protection	Increased Protection (some decline 1980) Mainly tariffs High & Var. ERP	Increased Protection (increased use NTBs) some EP	Decline in Protection Strong EP Some Mixed Signals
Investment		Liberal	Increasingly Restrictive	Still Restrictive	Fall in Restrictive
Financial		Open	Closed;Banks channel oil money	Still closed but Increased competition	Open Increased competition

Source : Pangestu, 1989

In the phase 1986-1989, the sharp decline in petroleum prices that occurred in 1986 marked the turning point in the present phase of deregulation. At this stage deregulation was usually aimed at removing the bias against exports caused by the prevailing system of protection and not yet at removing the source of distortions.

This phase was characterized by the introduction of the May 1986 Package, a new and improved duty drawback.This packet allowed exporters to obtain a refund on the duty paid on imports used to produce exports, and to bypass the import monopolies as long as the imported goods were used in export production. Furthermore, Pangestu (1991) noticed that following the devaluation there were several important policy packages aimed at improving the investment climate and increasing non-petroleum exports. In the October 1986 and January 1987 deregulation packages the number of goods imported under the approved system was reduced and replaced by tariffs. In June and July 1987 two deregulation packages, namely investment deregulation and rationalization of textile quotas were altered. The main changes were aimed at reducing the discretionary powers of officials and unnecessary administrative procedures and costs.

The impact of deregulation to date shows an encouraging result. The government's deregulation initiatives since 1986, aimed at boosting local industry and in particular, manufactured goods for export, have been very successful. Major deregulation packages have been implemented not only in trade policy, but also in financial and capital markets, tax policy and investment regulations. The beneficial results of these efforts have been clear -- non-oil exports and imports have grown substantially over the last decade, especially the last five years. Non-oil exports have increased substantially with growth rates of 31 percent per annum in 1987 and 35 percent per annum in 1989.The value of non-oil exports, shown in Table 2.3, was US$11.5 billion in 1988 and US$ 13.5 billion in 1989.

Table 2.3.Indonesia Imports (CIF)

(In Million US Dollars)

Commodity	Non Oil and Gas	Oil and Gas	Total
1984	5,868.7	16,010.1	21,887.8
1985	5,868.9	12,717.8	18,586.7
1986	6,528.4	8,276.6	14,805.0
1987	8,579.6	8,556.0	17,135.6
1988	11,356.9	7,681.6	19,218.5
1989	13,480.1	8,678.7	22,158.8

Source : Central Bureau of Statistics

Figure 2.1. depicts how the composition of Indonesia's exports has changed dramatically over the past decade. In 1992, non-oil and gas exports accounted for approximately 68 % of total revenues compared to 52.6 % in 1991, 50.1 % in 1987 and only 17.9 % in 1981.

Figure 2.1. Percentage Contribution to Export Revenues of the Oil and Gas & Non-Oil and Gas Sectors 1981 - 1992 (%).
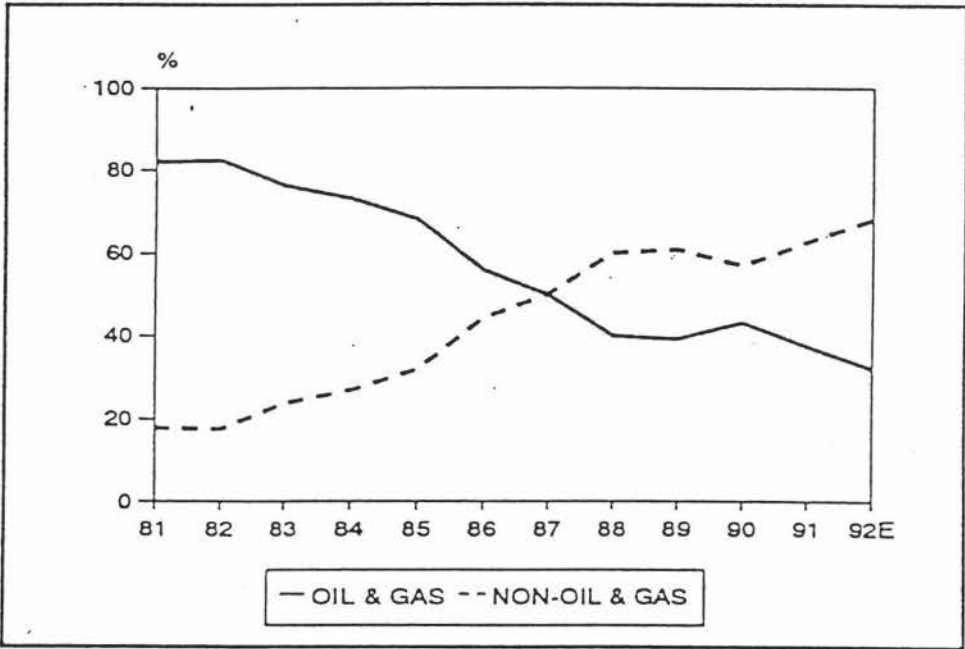
Figure 2.2. Development of Indonesia's Imports 1985 -1992 (US$ Billion)
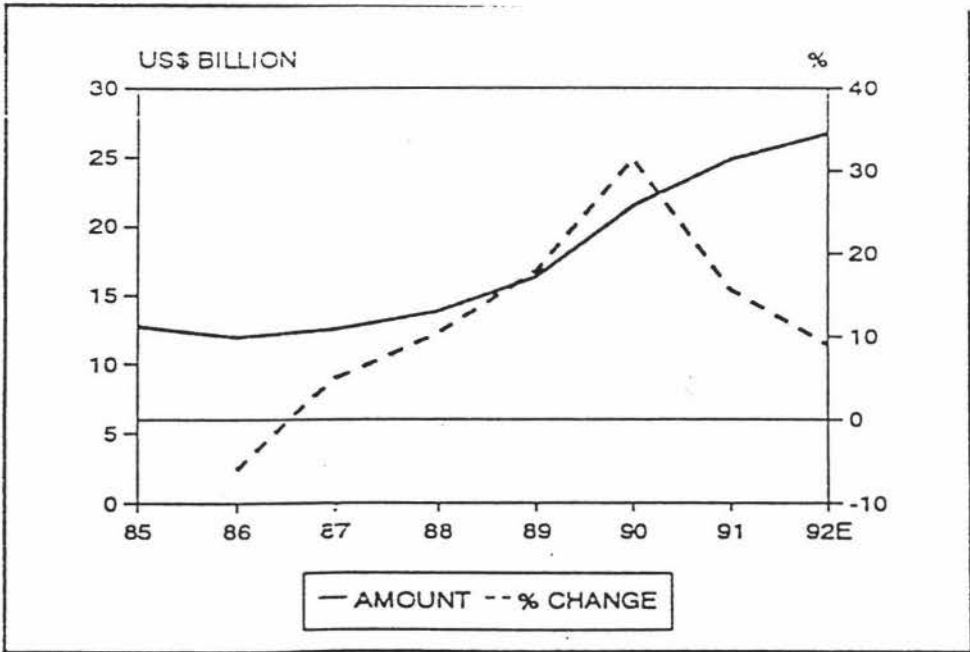
Import growth has been successfully curtailed after the rapid expansion from 1989 to 1991, particularly in 1990, when imports surged by 31.5 % as shown in Figure 3.2. Growth has mainly been due to the importing of capital equipment necessary for the high level of foreign and domestic investment in Indonesia in recent years.

The latest data provided by Morgan Grenfell Asia Indonesia (MGAI, 1993) and Indonesian Economic Update (1993) illustrates that in real terms, GDP growth in 1992 was just below 6 % compared to 6.5 % in 1991 and 7.4 % in 1999. In 1991, manufacturing surpassed agriculture for the first time to become the largest component of GDP. In 1985, manufacturing was only the third largest component of GDP, behind agriculture and mining, of which oil and gas accounted for 90 percent. However, between 1985 and 1991 as shown in Table 2.4. the contribution of manufacturing industry to GDP increased from 15.8 % to 19.9 %, while the contribution of agriculture during the same period fell from 22.7 % to 18.5 % and mining from 18.2 % to 15.6 %.

Table 2.4. Major Components of GDP in 1991 compared to 1985

(%)

	1985	1991
Manufacturing	15.8	19.9
Agriculture	22.7	18.5
Mining	18.2	15.6
Trade	12.2	13.2

Source : MGAI, 1993.

Indonesia's balance of payments has traditionally shown a large trade surplus which has been offset by an even larger services deficit leaving a small overall current account deficit. In fiscal years 1990/91 and 1991/92, the merchandise trade balance declined. At the same time the sharp increase in private sector short term offshore borrowings caused the services account to deteriorate.

Table 2.5. Indonesian Balance of Trade (In million US Dollars)

Year	Exports (FOB)	Imports (CIF)	Balance
1984	21,887.8	13,882.1	8,005.7
1985	18,586.7	10,259.1	8,327.6
1986	14,805.0	10,718.4	4,086.6
1987	17,135.6	12,248.5	4,765.3
1988	19,218.5	13,248.5	5,970.0
1989	22,158.8	16.359.6	5,799.3

Source : Central Bureau of Statistics

Consequently, Indonesia's current account deficit more than doubled to US$ 3,741 million in 1990/91 compared to US$ 1,599 million in 1989/90 (MGAI, 1993). However, with the good performance of non-oil and gas exports and the slower growth of imports, combined with the impact of restrictions on offshore borrowings, the current deficit has improved even beyond the government's own expectations.

2.2. Trade Policies and Practices

The fundamental change in the economic structure of Indonesia was the result of a series of economic deregulation policies which were applied by the government to create a more open and outward-looking economy by encouraging more liberal foreign trading consistent with the GATT principles. The outward-looking policy emphasizes increasing export of non-oil commodities, through increasing their competitiveness and access to the market (GATT secretariat, 1991).

In attempting to gain international markets, Indonesia is active in various international fora to discuss a more liberal world trade system. In multilateral fora other than GATT, Indonesia has participated in the Global System of Trade Preferences

(GSTP) and in a number of bilateral General System of Preferences (GSP) arrangements with developed countries. In the early 1980's when there was serious disruption in the world economy, such as the instability of oil prices, realignment of foreign exchange rates and the weakening of the price of primary products, various deregulation policy measures were taken by the government to save the economy and simultaneously to place a more stable foundation for the continuation of national development. Such a deregulation policy has focused on and succeeded in the trading, industrial, transportation, investment and banking sectors.

Indonesia has been quite successful in shifting its trade policy regime away from the use of quantitative restrictions to the use of tariffs. Tariffs are now the main trade policy instrument and existing quotas are continuously being replaced with tariffs. Surcharges are designed to alleviate the adjustment burden on some industries following the removal of quantitative restrictions.

Trade policy, as an integral part of the national development policy, refers to the context of national development which is drawn up in Five Year Development Plans (REPELITA). The formulation of trade policy is the full responsibility of the Minister of Trade and its implementation may be stipulated through a joint decree of the ministers concerned. In formulating import and export policies the Department of Trade undertakes co-ordination with other relevant institutions, such as the Department of Finance, Department of Agriculture, Department of Industry, and Department of Health under the co-ordination of MENKO EKUIN (*the Co-ordinating Minister for Economics, Finance and Industry*) (GATT Secretariat,1991). The implementation of trade measures used by Indonesia consists of tariffs, surcharges, quantitative restrictions, customs valuation, government procurement, export quotas, export taxes, and subsidies.

With the adoption of the Harmonized System (HS), the number of tariff rates in the Indonesian Customs Tariff almost doubled, from almost 5,000 to slightly more than 9,100 as shown in Table 2.6.

Table 2.6. The Tariff Rates

Tariff rates	Total Tariff Items	
	1985 (CCCN)	1989 (HS)
0 %	278	714
5 %	1130	2094
10 %	571	
15 %	235	753
20 %	607	406
30 %	785	893
40 %	424	1634
50 %	207	571
60 %	150	581
80 %	-	1371
100 %	17	-
200 %	2	86
Specific charge	521	29
Total	4927	9154

Source : GATT Council, Trade Policy Review Mechanism the Republic of Indonesia, 1991.

There were three disturbing features regarding the transparency and uniformity of the 1989 legal tariff schedule. First, Wymenga (1991) found that there were about 600 tariff splits in the manufacturing sectors. This aimed at maintaining tailor-made assistance for certain manufactured products. The tariff splits were incorporated by introducing 485 nine-digit tariff classifications coded "ex" and they were introduced to tailor protection for domestic producers of the products for which a split position was

set. Second, additional import surcharges were implemented to guard against dumping, or as a compensation for reduced protection from licensing. Third, a number of tariff exemptions existed such as preferential duty discounts ranging between 25 and 50 % for imported goods from ASEAN countries, and partial and complete tariff exemptions as general facilities granted by the Capital Investment Coordinating Board (*BKPM*).

According to the 1991 GATT Secretariat Report, Indonesian tariffs were reduced across-the-board. Further substantial tariff reforms prior to Harmonization were contained in the packages of May and October 1986, January and December 1987, and November 1988. While lowering average tariff rates, these reforms also increased tariffs or import surcharges to compensate domestic manufacturers by the removal of certain import licenses.

Since the issuance of the Policy Package of 6 May 1986 (in the framework of the tariffication system) Indonesia has deleted several non-tariff regulations and substituted tariffs, including those which have become zero percent tariffs. Since the reduction in tariffs, the structure has changed and a majority of the tariff items are at a relatively low tariff rate. Furthermore, in the policy of May 1990, tariff policy was directed to tariff reduction/elimination, tariff simplification, moving from specific tariffs to ad valorem tariffs and tariffication of NTBs.

Recognising the limitations of its past trade strategies, Indonesia rigorously adopted a more outward-looking trade strategy in the second half of the 1980s. Subsequent trade deregulation measures gave an important stimulus to non-oil manufactured exports which have increased substantially in the recent years. Trade reforms on the import side played a mjor role in relaxing the restrictive import licensing system. At the beginning of 1989, import restrictions applied to 800 Customs Cooperating Council Nomenclature (CCCN) items, compared with the end of 1985 when more than 1,700 CCCN items were under import control. The share of domestic production of tradeable goods subject to import licensing was reduced from about 40 % in 1985 to 28 % in 1986. Agriculture and manufacturing accounted for 12.2 and 15.6 percentage points, respectively, of the 28 percent domestic production under import licensing (Wymenga, 1991).

Table 2.7. Coverage of Import Licensing, Export Restrictions, and Non-tariff
Barriers (NTBs) in 1989.

(Percent of the value of production)

	Coverage of Import Licensing	Coverage of Export Restrictions	Coverage of all NTBs
Agriculture	39.98	18.17	58.15
Mining & Quarrying	0.04	74.84	74.88
Manufacturing	29.56	17.51	47.07
Manufacturing (excl.oil & gas)	68.06	12.78	50.84
All tradeables	38.06	27.21	55.06

Source : Wymenga (1991)

Trade policies on exports became increasingly important as industrial policy instruments. In addition, more export quality standards were developed to promote Indonesia's reputation for producing quality agricultural products. Other regulations were introduced to exploit international market power by restricting the exports of certain agricultural products. As shown in Table 2.7. slightly more than 27 percent of domestic production of tradeables was subject to the above restrictions in 1989. Combining the coverage of import licensing and export restrictions in Table 2.7. yields 55 percent of all NTBs in the production of all tradeables. Turning to export promotion instruments, a quantification of the net results of these trade policies in 1989 in terms of nominal protection on domestic prices, and effective protection on value added is necessary. Wymenga (1991) argues that by estimating nominal rates of protection (NRPs) and Effective Rates of Protection (ERPs), policy makers are provided with quantified estimates of the extent to which the trade regime subsidies or penalises industrial sectors, and as a consequence reflects potential effects on investment resource allocation in Indonesia. This trade measurement is important as trade policy interventions create distortions in the economy.

Previous studies of protection for Indonesia, such as Fane and Phillips (1987), Pangestu and Budiono (1986), Pitt (1981) and World Bank (1980), all showed higher protection levels for import-competing sectors than for export-competing sectors, which created an anti-export bias.

Table 2.8. gives average rates of nominal protection and overall average effective rates of protection respectively for aggregated sectors which varied widely across economic sectors in 1989. The average ERP for all tradeables was 15 percent which was remarkably higher than the overall average NRP of 9.3 percent. Nominal protection was lowest in the mining and quarrying sector and just below average in agriculture. The ERP measures the extent to which value added in the existing policy exceeds the value added that domestic producers would have received under free-trade conditions. Both the direct impact on output prices and the indirect effects of protection on the prices of inputs were assessed. A positive ERP indicates that the sector is effectively protected by the trade regime. Remarkably high ERPs occur, when sectors have very small value-added under free-trade conditions.

Looking to the sectors aggregated by trade category, Table 2.8. also indicates the high nominal assistance by import-competing sectors (20.8 %) in comparison with the negative NRP for export competing sectors (-4.4 %). In relation to primary production, effective rates for agriculture were found to be much lower than manufacturing. A comparison by trade category indicated that the trade regime provided higher levels of effective assistance to import-competing sectors (44.4 %) than to export-competing sectors (-6.4 %). The highest effective protection levels were given to food, beverages and tobacco, and engineering. Textiles, clothing and footwear, and non-metallic products had ERPs slightly above the average ERP for non-oil manufacturing (63.6 %) (Wymenga, 1991).

Table 2.8. Average ERPs and NRPs for Aggregated Sectors in 1989

(percent of 1987 production values)

Sectors	NRP	ERP
Import-competing	20.8	44.4
Export-competing	-4.4	-6.4
Agriculture	7.8	13.9
Mining & Quarrying, oil	0.2	-0.7
Non-oil manufacturing	17.9	63.6
All tradeables	9.3	15.0

Source : Wymenga, 1991.

Indonesia's trade regime has changed remarkably by shifting from a protectionist trade strategy to more export-oriented trade policies. Although a range of deregulation measures were taken, including subsequent removals of NTBs for over 50 percent of restricted imports by 1989, nominal and effective protection levels in 1989 were still providing higher assistance to import-competing industries than to export-competing industries.

The sequencing evident in trade reforms indicates that the Indonesian government has responded to economic crises by undertaking appropriate economic-stabilization policies comprising of exchange-rate adjustments, reduction of the fiscal deficit, and consistent monetary policies.

Chapter 3

REVIEW OF AGRICULTURAL POLICIES
AND PERFORMANCE IN INDONESIA

3.1. An Overview

This chapter provides a review of agricultural sector developments in Indonesia during the past two decades. It also examines the past and future role of trade policies in the context of changing government policy objectives. The Indonesian government has embarked on a series of deregulatory reforms since 1985. The chapter reviews the structure of policy trade-offs as posed by specific commodities (rice, soybean, sugar, cassava, wheat and livestock) trade patterns, and policy objectives are discussed.

The agricultural development strategies of the Indonesian government over the past two decades were consistent with the overall framework of national economic development and were primarily aimed at : (a) stimulating production and growth in rural incomes and employment to reduce rural poverty; (b) export expansion and import substitution to earn/save foreign exchange; AND (c) ensuring long-term food security (World Bank, 1992).

3.1.1. Contribution of Agriculture to GDP and Labour Absorption

At the end of the 1960s when Indonesia was a low-income, low growth country, agriculture dominated the economy. In 1969-1971 the broad agricultural sector, which includes crops, livestock, forestry, and fisheries accounted for almost half of the total GDP (Table 3.1). Agriculture plays a central role in the Indonesian economy. The share of agriculture in GDP was 47 percent in 1969 (the first five years of the first 25 years Long Run Development Plan). After dropping precipitously in the 1970s, agriculture's share of GDP declined more slowly in the 1980s. The share gradually decreased to 23.6 percent in 1987/89.

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This declining pattern is also shown by the share of agricultural employment to the national labour force. Table 3.2. shows that in 1971, 26.5 million Indonesian workers were in agricultural employment which accounted for 64.2 percent of the total labour force. Almost 20 years later (1989) with 41.3 million, this sector absorbed 56 percent of the country's labour force.

Trends in agricultural growth are summarized in Table 3.3. According to the new GDP series, the overall economy grew 5.5 percent annually during 1978-88, the agriculture sector grew at almost 4 percent per year, and the food crop sector at a rate of 4.2 percent per year (Kasryno *et al*, 1993).

During the 1980s agriculture grew at the rate of around 4 percent, providing strong support to the growth in agriculture-based manufacturing industry, and contributed an increasing share to the country's export earnings (Suryana, 1992). The most noticeable achievement is that in the mid 1980s the economy had shifted from being the largest rice importer to being self-sufficient in the country's main staple food.

Table 3.1. Percentage Composition of GDP by Sectoral Origin

Sector	1969/91 Average	1973/75 Average	1978/80 Average	1983/85 Average	1987/89 Average	1993/95 Average
A. At Current Market Prices						
Agriculture	47.6	31.8	27.5	22.9	23.6	-
Food Crops	28.6	21	15.6	14.3	14.5	-
Other	18.9	13.8	11.9	8.7	9.1	-
Mining/ Quarrying	6	18	22.2	17.9	13	-
Industry	12.5	13.5	16.9	20.4	23.6	-
Manufacturing	8.9	8.9	10.9	14.4	17.9	-
Construction	3.1	4.1	5.5	5.6	5.1	-
Services	33.9	33.6	33.4	38.8	39.8	-
Total	100	100	100	100	100	-
B. At Constant Market Prices						
Agriculture	45.5	38.5	31.8	22.6	21.1	19
Food Crops	27.5	22.9	18.8	14.1	12.9	-
Other	18.3	15.7	13	8.5	8.2	-
Mining/ Quarrying	9.8	11.7	10.2	19.9	16.3	14
Industry	11.7	15.2	20.2	20.3	23.4	27.5
Manufacturing	8.5	10.4	14	14.4	18	22
Construction	2.7	4.4	5.6	5.6	5.3	5.5
Services	33.1	34.6	37.8	37.3	38.3	39.5
Total	100	100	100	100	100	100

Source : Central Bureau of Statistics, Statitistical Yearbook of Indonesia, Various Years.

Table 3.2. Employment by Main Sectors, 1971 - 1989

Sector	1971 million	1971 %	1980 million	1980 %	1982 million	1982 %	1985 million	1985 %	1989 million	1989 %
Agriculture, Forestry & Fisheries	26.5	64.2	28.8	54.8	31.6	54.7	34.1	54.6	41.3	56.3
Mining and Quarrying	0.1	0.2	0.4	0.7	0.4	0.7	0.4	0.7	0.4	0.5
Manufacturing	2.7	6.5	4.4	8.5	6	10.4	5.8	9.3	7.3	9.9
Electricity, gas & water	0	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Construction	0.7	1.6	1.6	3.1	2.2	3.7	2.1	3.4	1.8	2.5
Wholesale, retail trade & restaurants	4.3	10.3	6.6	12.9	8.6	14.8	9.4	15	10.9	14.9
Transportation, storage & communications	1	2.3	1.5	2.9	1.8	3.1	2	3.1	2.2	3
Finance, insurance, real state & business services	0.1	0.2	0.2	0.4	0.1	0.2	0.3	0.4	0.4	0.5
Public services	4.1	107.7	7.7	15.1	7.1	12.3	8.3	13.3	8.9	12.1
Others	1.9	4.6	0.7	1.4	0	0	0.1	0.1	0.1	0.1
Total	41.3	100	51.2	100	37.8	100	64.5	100	73.4	100

Source : Central Bureau of Statistics

Farm food crops (rice, corn, soybeans,and cassava) constitute the largest single component of agricultural GDP (Table 3.3). Between 1969-89, the farm crops subsector grew at an average annual rate of 4.2 percent. Consequently, the farm food crop share of agricultural GDP has remained constant at 60 percent over the past two decades. Within agriculture, foodcrops continued to dominate in terms of income and employment.

Table 3.3. Subsector Share of Agricultural GDP and Growth Rates

	Shares (%)						Growth Rates (% p.a.)		
	1969	1970	1975	1980	1985	1989	1969-79	1979-89	1969-89
Farm food crops	60.0	59.0	59.3	58.9	62.1	60.9	3.7	3.8	4.2
Farm non-food crops	12.5	11.9	10.1	11.2	13.4	13.6	2.2	5.8	4.9
Estate Crops	3.0	3.0	3.0	3.0	2.6	2.7	4.3	2.2	3.3
Livestock	10.3	10.3	11.2	9.7	10.6	10.6	2.7	4.7	3.8
Fishery	6.6	6.8	6.2	6.8	6.9	7.3	3.9	4.5	4.6
Forestry	7.6	9.0	10.2	10.4	4.4	4.9	7.3	-5.5	-1.5
Total Agriculture	100	100	100	100	100	100			

Source : Central Bureau of Statictics

The performance of the agricultural sector in Indonesia has been influenced by three basic sets of government policies (Ministry of Agriculture, 1989; Investment Prospect on Agriculture in Indonesia, Jakarta 1990). First, the sound macro-economic policies which were based on growth, equity and stability objectives, with agriculture viewed as a leading section or engine of growth for the national economy. Second, the government gave very high priority to rice, soybean and corn production. These policies were translated into various programmes that strongly encouraged the increases in production of these crops, ranging from providing inputs, research and extension to marketing and distribution. The third major set of policies encouraged crop investment and livestock and fishery development. The government launched large-scale planting and rehabilitation programmes for large enterprises as well as for smallholders. In the livestock subsector an even faster growth was achieved. Suryana (1992) pointed out that during the last 20 years (1968-1988), annual growth rates for meat, eggs, and milk production were 7.3 percent, 14.8 percent, and 12.6 percent respectively.

Positive economic policy developments of the past several years have set the foundation for sustained growth in coming years. The current five-year development plan (REPELITA V), begun in April 1989, proposes to shift the burden of economic development to the private sector. The drive to diversify the economy and increase non-oil exports has been successful. To help stimulate the development of an export-oriented manufacturing sector, an agenda of policy reform was initiated in 1985, which ultimately resulted in deregulation of many aspects of the national economy. These reform measures were geared to the manufacturing sector for the most part, and not toward agriculture.

3.1.2. Agricultural Trade Performances

Indonesia is a net exporter of agricultural goods (excluding forestry products) and the agricultural trade surplus has grown steadily over the past 20 years. Imports have not grown as rapidly as exports, primarily due to the expansion of domestic rice production which substituted for imports.

The trade surplus in Indonesia's agricultural sector has been growing over time, due to a competitive exchange rate, investments in rice production, and deregulation of agricultural trade during the last decade. Indonesia's top five exports shown in table 3.4 are rubber, shrimp, coffee, palm oil and tea.

Indonesia's current imports reflect the influence of economic growth on the structure of production and consumption. The top five are cotton, wheat, soybeans, feedstuffs, and sugar. Wheat, sugar and whole soybeans are imported to meet growing demand for processed food products.

Table 3.4. Indonesia's Major Agricultural Exports and Imports, 1982-90

(US$ Million)

	82	83	84	85	86	87	88	89	90
Exports									
Rubber	770	415	984	856	714	749	1037	1229	952
Shrimp	165	204	206	183	228	297	353	541	513
Coffee	343	363	506	568	650	753	499	577	448
Palm Oil	103	92	95	170	114	214	313	279	
Tea	94	116	156	211	134	106	119	137	176
Imports									
Cotton	174	175	214	180	172	266	302	377	485
Wheat	151	335	278	261	274	244	226	291	288
Soybeans	-	62	130	80	83	63	138	102	146
Feeds	65	71	101	87	130	133	127	215	192
Sugar	243	134	3	4	19	31	40	117	130

Source : Winrock International and BAPPENAS.

Feedstuffs are inputs into the developing livestock industry. The fastest growing categories of imports are soybeans and other oils and livestock products and feeds. Growth in domestic demand for these products is likely to accelerate in the future, and thus imports will continue to grow, unless there are shifts in domestic supply.

Table 3.5. Indonesia's Agricultural Trade Balance, 1974-90

(US$ Million)

	74-76	79-81	84-86	88-90
Exports	1124	1884	2612	3748
Imports	742	1529	995	1504
Balance	382	315	1317	2245

Source : Winrock International and BAPPENAS

Indonesia's trade with other ASEAN countries has grown rapidly in recent years, although still smaller (15 percent of growth, Table 3.5) than trade with industrialized nations (Suara Pembaruan (14 January 1993). An ASEAN trade agreement was concluded in January 1992, which will bring about a phased reduction of tariffs over the next 15 years for intra-ASEAN trade.

Table 3.6. Total Trade Intra-ASEAN 1985-1990

	1985	1990	Growth (%)
Brunei	3.0 %	2.1 %	6.7
Indonesia	11.0 %	8.1 %	8.0
Malaysia	25.2 %	26.4 %	15.9
Philippine	4.9 %	3.5 %	7.2
Singapore	45.6 %	47.1 %	15.6
Thailand	10.2 %	12.8 %	20.1
Total	100.0	100.0	14.8

Source : Suara Pembaruan 14 January 1994

Table 3.7. ASEAN Trade 1985, 1990

	1985	1990	Growth (%)
Intra-ASEAN	19.7 %	17.7 %	14.8
East Asia	33.8 %	34.4 %	17.7
NAFTA	18.7 %	18.2 %	16.7
EC	11.5 %	14.8 %	23.4
ROW	16.2 %	15.0 %	15.5
Total	100.O %	100.0 %	17.3

Source : Suara Pembaruan 14 January 1993

The major agricultural policies affecting food crops are Indonesia's administered price system and associated border measures, input subsidies for fertilizer, pesticides, credit and irrigation, and government-financed research and extension.

To show the level of agricultural production in Indonesia, the following tables (Tables 3.9 to 3.16) present the level of production, consumption and trade of major agricultural commodities from 1989/1990 to 1991/1992. Among food crops, only cassava is primarily exported, while for wheat, corn and soybean the country is a net importer.

Table 3.8. Indonesia's Agricultural Exports and Imports, 1980-92

(000 tonnes)

Year	Rice		Wheat	Maize		Sugar	Soybean
	Export	Import	Import	Export	Import	Import	Import
1980	0.0	2.026,5	1.444,4	14.9	19.8	416.2	193.5
1981	0.0	525.4	1.392,9	4.8	0.0	705.2	361.3
1982	0.0	382.2	1.482,9	0.5	196.9	602.5	361.9
1983	0.0	1.154,9	1.713,2	17.9	50.9	158.5	390.9
1984	11.0	375.2	1.526,4	159.8	58.9	0.0	400.5
1985	405.1	0.0	1.216,3	3.5	49.3	1.2	330.1
1986	240.7	0.0	1.691,1	4.4	60.6	26.2	342.7
1987	118.6	124.2	1.603,1	4.7	164.2	145.6	349.4
1988	19.9	26.0	1.715,9	37.4	0.0	128.4	586.5
1989	138.6	443.9	1.744,7	6.0	0.0	328.6	411.6
1990	17.5	46.0	1.710,4	0.0	0.0	277.1	456.5
1991	0.0	178.9	2.101,4	0.0	0.0	305.9	490.9
1992	74.0	633.9	2.107,3	0.0	0.0	306.7	526.4
Avrg	78.8	455.2	1.650,0	19.5	46.2	261.7	400.2

Source : BULOG Rogasar

3.2. Food Crop and Livestock Policies

3.2.1. Rice Production and Policy Issues

Rice is the most important food crop, and the staple food for the majority of the population. Rice production has been the focus of Indonesian agricultural policy for the past two decades. Indonesia has made tremendous strides in production of rice, with the application of improved techniques contributing to high levels of production. This helped Indonesia achieve self-sufficiency with respect to rice production in mid-1980s. For 1992, Indonesia has procured substantial quantities of rice in the world market in an effort to bolster drought-reduced domestic supplies. The principal objective of the government's agricultural policy is food security. The predominant role of rice in the food system means this objective has been pursued by policies to achieve rice self-sufficiency and to maintain rice price stability. As the rate of population growth increase surpasses expansion in domestic rice production, wheat and other starchy staples become increasingly important as sources of calories in the Indonesian diet.

Table 3.9. Rice : Production, Trade and Stocks

(Milled Basis)

Year	Production	Imports	Consumption	Endings Stock
		(1,000MT)		
1989	10,530	29,072	412	104
1990	10,502	29,266	60	50
1991	10,140	28,680	179	0
1992	10,500	29,250	700	0

Source : Central Bureau of Statistics and US Embassy.

During the last decade BULOG was successful in stabilizing market prices for rice, and keeping them within the floor and ceiling prices. At the same time BULOG has kept its domestic procurement to under 10 percent of domestic production. As the rupiah was overvalued in 1986, Indonesian prices have been kept at or above world parity. The World Bank study (reference) suggested that Indonesia's policy would be to continue to keep the rice price at world parity. Keeping prices below world parity would needlessly tax rice producers.

3.2.2. Wheat Production and Policy Issues

Table 3.10. summarizes the area, and production of wheat in Indonesia. Data in Table 3.10. supports the notion that the Indonesian government has allowed increased consumption of wheat products in 1991 and 1992 as a means of relieving pressure on rice production. The government 's program of diversifying into staples and encouraging production of secondary food crops, such as corn, soybeans, and cassava, will contribute to maintaining rice self-sufficiency. Indonesia's wheat imports in 1991 rose by a staggering 29 percent over the year earlier, as the Indonesian government encouraged consumption of cheaper wheat products in response to high rice prices resulting from drought-reduced supplies.

Table 3.10. Wheat : Production, Trade and stocks

Year	Production	Imports	Consumption	Ending Stocks
	------------------------- 1,000 MT --			
1990	0	1817	1940	384
1991	0	2346	2280	450
1992	0	2200	2350	350

Source : Central Bureau of Statistics and the US Embassy

The government of Indonesia exercises considerable control over the level of wheat consumption in Indonesia, as BULOG is the only government agency authorized to import wheat.

3.2.3. Corn Production and Policy Issues

Trends in area, and production of corn in Indonesia as whole are shown in Table 3.11. Based on data from Kasryno *et al* (1993), corn production grew at a rate 4.8 percent per year during the period 1970-88. In 1991/92 corn production increased about two percent above the level of the previous year in the primary production areas of Lampung (Sumatra), Central Java and East Java. Farmers in certain areas planted corn rather than rice due to uncertainty over the onset of the rainy season, thereby contributing to additional supplies. A rapidly expanding poultry industry in Indonesia is the driving force behind increased utilization of corn for feed. A 1989 deregulation measure allowing free trade in corn has helped to stabilize prices and ensure adequate supplies for the poultry feed industry. Corn imports in 1992 were 200,000 tonnes, a 33 percent increase from the level in 1991. Exports remain a small but regular factor.

Table 3.11. Corn : Production, Trade and Stocks

(Dry Corn Kernel)

Year	Area	Production	Imports	Exports	Ending Stock
	(1,000 ha)	------------------	(1,000 MT) --		
1990	2,700	5,000	0	125	175
1991	2,850	5,200	150	15	125
1992	2,900	5,300	200	50	125

Source : Central Bureau of Statistics and the US Embassy

The improvement in the productivity of corn farming since the 1960s is largely attributable to the introduction of improved varieties of corn and to increased fertilizer use. The latter has apparently increased dramatically in response to the introduction of fertilizer-responsive varieties. Government floor prices for corn, instituted in 1978, have not affected fertilizer use because market prices for corn have been consistently above the floor price.

3.2.4. Cassava Production and Policy Issues

Table 3.12. summarizes area, production and trade of cassava . Production of cassava grew at a rate of only 1.7 percent per year during the period 1970-88 (Kasryno *et al*, 1993). Major producing areas for cassava are East, Central and West Java, and Lampung which total almost 70 percent of national production. Cassava is used in Indonesia for direct human consumption, is dried and milled in a variety of processed food and industrial products, and is exported or retained domestically as an animal feedstuff in either pellet or chip form (Central Bureau of Statistics, 1991). Increased utilization of cassava in Indonesia's compound feed industry is likely if import duties on soybean meal are lowered.

Table 3.12. Cassava : Area, Production and Trade

(Fresh Root Equivalent)

Year	Area	Production	Imports	Exports
	(1,000 Ha)	----------------------------------(1,000MT)-----------------------------		
1989	1,420	17,115	0	3,500
1990	1,310	15,850	0	3,800
1991	1,350	16,500	0	3,600
1992	1,400	17,000	0	3,700

Source : Central Bureau of Statistics and the US Embassy

The government has played only a small role in cassava marketing. No floor or ceiling prices for cassava have been implemented. Previous reports presented by Unnevehr (1984), Timmer(1986), Falcon, Jones and Pearson (1984) cited in Kasryno *et al* (1993) show that price formation in the cassava markets of Java (which still dominate production) is relatively efficient. When domestic wholesale prices are at or below the f.o.b. price, cassava prices on Java are largely determined by f.o.b. export prices in Surabaya port and East Java. When domestic prices rise above the f.o.b. export price because of a crop shortfall or because the exchange rate is highly overvalued, domestic prices are determined by domestic supplies and the price of rice.

3.2.5. Soybean Production and Policy Issues

Trends in area and production of soybeans are shown in Tables 3.13 and 3.14. According to Kasryno *et al* (1993), growth in soybean production averaged 4.6 percent per year over the period of 1970-88. Virtually all of this growth occurred after 1982 as a direct result of government price and production policy incentives.

Table 3.13. Soybeans : Production, Trade and Stocks

Year	Area	Production	Imports	Exports	Ending Stock
	(1,000 ha)	--------------------------(1,000 MT) ---			
1989/90	1205	1315	525	0	132
1990/91	1215	1315	534	0	146
1991/92	1240	1290	500	0	141

Source : Central Bureau of Statistics and the US Embassy

Soybean production in 1991/92 declined slightly from the earlier year. Soybean imports for 1990/91, however, were unchanged from the previous marketing year, as soybean meal imports began to replace imports of beans following the June 1991 trade deregulation measure.

Table 3.14. Soybean Meal : Production, Trade and Stocks

Year	Production	Imports	Exports	Ending Stocks
	--------------------- (1,000 MT) ---			
1989/90	160	16	1	45
1990/91	180	150	1	114
1991/92	125	135	1	73

Source : Central Bureau of Statistics and the US Embassy

The government has attempted to promote soybean production through a number of programs, including breeding and release of improved varieties, production and

distribution of seeds, and provision of extension services through the soybean intensification program. Six improved varieties of soybeans have been released since 1970 with varying degrees of resistance to rust (Rosegrant *et al*, 1987). Although the area under the soybean intensification program has grown rapidly since 1977, these pr ograms have not had a dramatic impact on soybean yields.

3.2.6. Sugar Production and Policies

The annual growth rates in area, and production of sugar is shown in Table 3.15. Prior to 1982, Java accounted for all the growth in sugarcane area. The declining area trend on Java, coupled with the expansion of sugarcane area off-Java in the early 1980s reflect a gradual change in emphasis in government sugar production policy. The objectives of Indonesian sugar policy are to maintain price stability and to guarantee the incomes of sugar cane growers and sugar plants. The Indonesian government has intervened heavily in the sugar industry by shifting the production of sugar in the outer islands, which aimed at increasing employment opportunities through development programs. In addition, the government also has a monopoly on procurement, marketing and distribution of sugar. Although BULOG has the exclusive right to import sugar, actual purchases are made by agents appointed by BULOG. Sugar is one of Indonesia's most regulated commodities. Estimates of nominal protection for the Indonesian sugar industry have ranged 30 to 100 percent over the last twenty years and indicate that the industry has been highly protected. BULOG is the sole purchaser of nearly all domestically-produced sugar and also exercises considerable control over domestic distribution of sugar accross the country.

Table 3.15. Annual Growth Rates in Area, Production of Sugar, 1970-89 (percent).

Period	Area			Production		
	Java	Off Java	Indonesia	Java	Off Java	Indonesia
1970-89	4.30	11.66	5.37	3.21	16.41	4.15
1970-76	7.90	7.34	7.85	4.86	2.82	4.81
1976-82	7.71	12.50	8.20	3.03	24.49	4.00
1982-89	-1.67	12.62	0.98	1.63	16.77	3.50

Source : Kasryno, et al, 1993

3.2.7. Livestock, Dairy and Poultry Production

By the late 1980s the livestock sector in Indonesia was growing at a high rate. The livestock sector played an important role in the national economy in the late 1980s, and contributed about 10.3 percent to the agriculture GDP and provided almost 4 percent of the employment in agriculture (Kasryno, *et al*, 1989). During that period, the rates of growth in production of meat, egg and milk were 7.3 %, 14.8 % and 12.6 % respectively. At current levels of consumption, domestic production of chicken meat and eggs has satisfied domestic demand. Trends in the livestock population during the period of 1985-1991 are shown in Tables 3.16 and 3.17.

Despite gains in total livestock production in 1991, Indonesia's consumption of animal protein is still below the recommended daily nutritional standard of 4.5 grams per capita (US Agricultural situation report, US Embassy,1992). This is mainly due to the comparatively high population, about 186 million in 1990, vis-a-vis livestock numbers, and relatively high prices of livestock products.

Indonesia is a net importer of livestock and dairy products and a net importer of feed grains (especially corn and soybean). Kasryno *et al* (1989) states that with increasing income and population the demand for meat, eggs, milk and other livestock products will increase at a rapid rate.

In recent years, the Government has implemented a set of policies on livestock production, feedgrain production and trade to meet the increasing demand for livestock products. These policies aim to provide incentives to producers, and to protect consumers from international price fluctuations. In general the livestock trade policies are designed to protect domestic industry, farmers and consumers. According to Kasryno *et al* (1990), livestock products markets are among the most heavily controlled by the government. In an attempt to protect domestic consumers, exports of meat and eggs are controlled by the government. Poultry has been the most important source of animal protein in Indonesia. Gunawan *et al* (1992) indicated that in the last five years the average annual growth of poultry meat and egg consumption are 9.7 and 9.4 percent. As indicated in Table 3.18 the production of milk and eggs increased during the period 1985-1991.

Table 3.16. Production, Consumption and Trade in Selected Livestock Products

	Year	Livestock Numbers ('000)	Production ('000) Tonnes	Imports ('000) Tonnes	Exports ('000) Tonnes	Consumption ('000) Tonnes	Per Capita Consumption (Kg)
Broiler meat	1984	11,058	78.5	2	-	80.5	1.1
	1985	14,366	114.5	1	-	115.0	1.2
	1986	17,380	139.2	2	-	141.2	1.4
	1987	21,818	174.6	2	-	176.2	1.4
	1988	27,704	181.7	1	-	182.7	1.4
	1989	26,292	210.4	-	-	210.9	1.5
	1990	27,043	216.0	-	-	216.0	1.5
Eggs	1984	29,559	207.3	-	-	207.0	1.8
	1985	31,785	227.2	-	-	227.0	1.9
	1986	38,688	250.7	-	-	251.0	2.2
	1987	39,969	259.0	-	-	259.0	2.2
	1988	38,413	248.9	-	-	249.0	2.1
	1989	50,922	262.0	-	-	262.0	2.1
	19990	53,375	274.6	-	-	275.0	2.1
Pork	1984	5,112	119.0	-	-	120.0	0.5
	1985	5,530	133.0	-	-	133.0	0.6
	1986	6,216	164.0	-	-	164.0	0.7
	1987	6,339	141.0	-	-	141.0	0.6
	1988	6,424	154.3	-	1.0	153.0	0.6
	1989	6,936	136.3	-	5.6	130.7	0.6
	1990	6.838	134.4	-	14.7	119.7	0.5

Source : Rae, A.N. and F. Kasryno (1993)

Among the components of the Indonesian livestock sector, broilers contribute the largest livestock GNP, about 21.2 percent of the total livestock GNP. This includes native breeds and small-scale village-based production, as well as the modern large-scale commercial enterprises which have developed since the early 1970s. Table 3.19 demonstrates the structure of livestock business in Indonesia. Smallholder broiler farm businesses dominate the poultry industry, especially native broilers. The advancement of poultry industry has also been accelerated by the improvement of breeding farms, research, medicine and vaccine, and the processing industry.

Table 3.17. Livestock Population (million head)

Year	Beef Cattle	Dairy cattle	Goats	Sheep	Swine	Chicken	Layers	Broilers
1985	9.32	0.21	9.63	4.89	5.56	156	32	144
1986	9.43	0.22	10.74	5.28	6.22	163	39	174
1987	9.51	0.23	10.39	6.36	6.32	168	40	218
1988	9.78	0.24	10.61	5.83	6.48	183	38	227
1989	10.09	0.24	11	5.91	6.94	191	41	285
1990	10.40	0.25	11.40	6.00	7.40	200	44	350
1991	10.70	0.25	11.75	6.05	7.90	208	47	420

Source : Directorate General for Livestock

Table 3.18. Milk and Egg Production
(eggs in 1,000 mt, milk in million liters)

| Year | Milk | Eggs | | | Beef | Meat Production (1,000 MT) | | |
		Vill. Chickens	Hybrid Chickens	Ducks		Mutton	Pork	Poultry
1985	192	65	227	77	276	79	133	318
1986	220	70	251	117	277	94	164	343
1987	235	71	259	122	279	92	141	382
1988	265	77	275	118	288	97	154	404
1989	338	80	290	120	296	95	136	442
1990	400	83	305	122	305	97	148	448
1991	490	86	320	124	310	100	160	485

Source : Directorate General for Livestock

Table 3.19. The Structure of Livestock Business in Indonesia, 1991
(percentage)

Type of Livestock	Smallholder	Enterprise
Beef Cattle	99	1
Dairy Cattle	90	10
Buffalo	99	1
Sheep/Goat	99.9	0.1
Pig	86	14
Native Chicken	100	0
Poultry	82	18
Duck	99.9	0.1

Source : Directorate General of Livestock (DGLS), 1991

3.2.8. Indonesia's Agricultural Support

According to Wainio et al (1988) aggregate measures of support quantify the level of government intervention in the market place resulting from a wide range of government policies and programs. Support measures are usually percentages or ratios. Research has focused primarily on three aggregate measures, nominal rates of protection (NRP), effective rates of protection (EFP), production subsidy equivalent (PSE) and consumer subsidy equivalent (CSE). The Producer Subsidy Equivalent (PSE) and its consumer counterpart, the Consumer Subsidy Equivalent (CSE), estimate the value of transfers from government policies to producers (or consumers) of a given commodity (Webb et al ., 1988). The two concepts could be used as an aggregate measure of support, as has been suggested by many GATT proposals. However, the use of the PSE in the negotiations presents a number of technical difficulties and the PSE has been criticized on several grounds. Firstly, it is complex, it is not a fixed number published by government statistical bureaus, and estimates of PSEs can vary considerably depending on who does the calculation. It is not a precise measure of the trade-distorting

effects of agricultural policies which are of concern in GATT negotiations. Secondly, the PSE can vary considerably from year-to-year because of factors that are often beyond the direct control of government policy makers.

Table 3.20 indicates that Indonesia's aggregate PSE averaged 24 percent. Magiera (1989) illustrates that Indonesia's aggregate PSE gradually rose between 1983 and 1985, reflecting declining world prices, but fell sharply, following the two devaluations of the Rupiah in 1983 and 1986. Exchange rates in the Table are yearly averages. Thus the full effects of the devaluation are not reflected in the PSEs until the following year. Due to the devaluation in 1986, the gap between Indonesian prices and world prices narrowed sharply and the aggregate PSE is estimated at only 5 percent in 1987.

Table 3.20 shows Indonesia's estimated PSE for 1986 following liberalisation in the industrialised countries.Due to higher world prices, Indonesia's support level fell dramatically from 24 % to 5 %. World prices rise about 5 percent above Indonesian rice prices. This difference is offset by fertilizer and irrigation subsidies, leaving an overall support level of almost zero (Magiera, 1989).

Table 3.20 Indonesia's Aggregate PSE

Item	Unit	1982	1983	1984	1985	1986	Average 82-86	1987
Value of production	Bil Rp	6703	7936	9373	10139	11056	9057	12112
Policy Transfers:								
State Control	Bil Rp	1612	937	1305	1924	2220	1600	145
Inputs subsidy	Bil Rp	288	306	346	281	177	279	232
Irrigation Subsidy	Bil Rp	391	365	342	375	173	329	219
Total Transfers	Bil Rp	2291	1609	1993	2580	2570	2208	597
PSE (per unit value)	Percentage	34	20	21	25	23	24	5
Exchange Rate	Rp/US$	665	914	1031	1117	1294	1004	1649

Source : Magiera (1989)

3.3. Agricultural Trade Reforms and Policy

Agricultural policy in Indonesia, like that in other countries, attempts to achieve a large number of objectives. These include low and stable food prices, agricultural and rural development, the development of value-added processing industries, and wider macroeconomic objectives such as employment generation, poverty alleviation, and saving foreign exchange (World Bank, 1992).

Evidently, Indonesian agricultural trade has been highly regulated and recently agriculture was also the sector least affected by the trade policy reforms of the past six years. Import licensing requirements, tariffs, and a variety of export regulations are the main trade policy instruments. Exchange rate policy also has a major impact on trade in agricultural products. There were major devaluations of the Indonesian rupiah in 1978, 1983, and 1986. Since 1986, the rupiah has been under a managed float.

3.3.1. The Import Regime

The import regime comprises two policy instruments. First is the restricted good list, which limits the right to import listed commodities to holders of a particular license, thereby creating a non-tariff barrier to trade. And second, the import tariff schedule which fixes the statutory import duty and import surcharge for imported goods (World Bank, 1991). These two policy instruments play dominant roles in shaping the incentive effects of Indonesia's trade regime.

The objectives of import regulations are to protect domestic producers and to provide price stability to consumers. Prices for most staple foods are kept relatively close to world prices, and support to farmers is provided through irrigation investment and various intensification packages which include advanced production technologies and subsidized inputs. As illustrated by Suryana (1992), goals of price policies on food crops are to provide production incentives for farmers, by preventing sharp a drop in prices at harvesting time ; to protect consumers from exceptionally high prices during

the off-season, especially for those who have low purchasing power; and to manage inflation at a desirable level through price stabilization. One of the major objectives of government policy has been the development of domestic processing industries, both import- and export-competing industries. This goal has been pursued primarily through the price system. For imports of processed agricultural products, trade restrictions have given rise to relatively high domestic prices and even higher effective protection.

In practice, therefore, the principal objective of price policy for most commodities has been stability. Prices for a number of important food commodities are regulated through administered price systems. Under these systems, the Indonesian government sets prices at various points of the marketing chain and also restricts marketing of the products to licensed distributors. Most agricultural commodities on the restricted goods list can be imported only by BULOG , the National Logistics Agency. BULOG holds the import rights for many agricultural commodities, the most important of which are rice, wheat flour, sugar, soybeans and soybean meal. These products account for over half the value of Indonesia's food imports.

Some studies have sought to assess the performance of government policies in the agricultural sector including the effects of various policies on prices, supply, demand, incomes, and foreign exchange. Rosegrant et al (1985, 1987), the World Bank (1991, 1992) Tabor (1988), and Kasryno *et al* (1993) evaluated government policies on prices and investment in the case of the food crop sector.

3.3.2. Sequencing of regulatory reforms impacting agricultural imports

A summary of the regulatory reforms affecting agricultural imports over the last decade is shown below :

1986-87

Non-tariff barriers on a few imported goods were eliminated and replaced with tariffs.

1987

Licensing restrictions and local content rules on cotton imports were eliminated in order to promote the rapidly-growing textile sector.

1988

NTBs on a wide range of food items were eliminated and replaced with tariffs. The most important deregulated items were vegetable oils, groundnuts, and fishmeal. Indonesia's largest refiner and importer of vegetable oils was exempted from the 30 percent duty on vegetable oils.

1989

BULOG's appointment as the sole importer of maize was revoked.

1990

A consortium of clove traders was given the monopoly right to serve as middlemen between growers and cigarette manufactures in return for operating a floor price system for producers.

1991

(1)   Imports of fresh and frozen poultry, fresh and preserved other meats,   fruits and nuts, were deregulated with tariffs in the range of 10-20 %.

(2)   Palm and coconut oil tariffs were lowered from 30 to 10 percent and from 30 to 5 percent for copra and palm kernel oil.

(3)   Licensing restrictions on tin-plate were eliminated and replaced with a 22.5 percent duty.

3.3.3. The Export Regime

Indonesia's export policies comprise two categories, those designed to regulate export trade and those designed to assist exporters. Export regulations (bans, quotas, taxes, approved exporter and quality controls) are focused on agricultural goods and have recently shown a worrying trend towards encompassing more products. Export assistance measures (the duty exemption/drawback scheme, export credit, and export insurance) are primarily used by producers of manufactured goods. The objectives of these measures are to offset the anti-export bias created by the import regime and to protect exporters from the resulting 'high cost economy' (World Bank, 1991).

The Indonesian government continues its path of economic liberalization. Deregulation measures taken in the past several years on banking, transportation, trade and investment have yielded positive results. Each year has witnessed significant progress toward freer trade. The deregulation package of June 1991 (PAKJUN) liberalized trade in several important agricultural commodities. For example, soybean meal, fresh fruits and some categories of meats may be imported without restriction but at comparatively high rates of duty. Liberalization of trade in soybean meal under PAKJUN illustrates the government's commitment to developing the livestock sector. An earlier government decision removed restrictions on corn trade, a ruling that became increasingly important as growth in the poultry subsector accelerated and prospects for livestock improved.

The reform package of 1991 eliminated licensing restrictions for a large number of important agricultural products and lowered the share of domestic agricultural production covered by NTBs. Within agriculture, most of the remaining NTB coverage is within the food crops sector (Table 3.21). If rice imports alone were liberalized, the agriculture production coverage of NTBs would fall from 30 to 9 percent. NTBs for manufacturing products covered 60 percent of domestic production as there have been few reforms in this subsector in 1991.

Table 3.21 reveals that although the NTB coverage of domestic agricultural and manufacturing production accounts for 30 % and 32 % respectively, which is almost similar, nominal protection for agriculture is half that of manufacturing (6 percent compared with 13 percent).

The net impacts of Indonesia's trade regulations and tariff structure on nominal (NRP) and effective (ERP) rates of protection are summarized in Table 3.22. The protection structure also exhibits significant escalation by degrees of processing.

The nominal rate for processed foods in the food, beverages and tobacco category is 15 percent, compared with 6 percent for primary agricultural products. Recent reforms have reduced barriers to imports of feed stuffs, but import-substituting agricultural products remain protected relative to other agricultural products. At the margin, this structure of protection encourages domestic producers to keep and invest resources in the production of import-substituting crops.

Table 3.21. Production Coverage of Agricultural NTBs in 1991

	Percent of Production by Value
AGRICULTURE	30
Food Crops	56
Estate and other crops	14
Livestock	0.1
Forestry	0
Fishery	0
MANUFACTURING	32
Food, beverages, tobacco	60
Economy-wide	22

Source : World Bank, 1992

Table 3.22. Structure of Protection in 1991

(%)

	Nominal Protection Rate	Effective Protection Rate
Agriculture	6	11
Food crops	11	18
Estate and other crops	5	13
Livestock	17	27
Forestry	-18	-42
Manufacturing	13	57
Food, beverages, tobacco	16	190
Total	8	14
Export competing agriculture	-3	-3
Import competing agriculture	13	23

Source : World Bank, 1992

3.3.4. Sequencing of Regulatory Changes Impacting Agricultural Exports

A summary of the regulatory reforms affecting agricultural exports over the last decade are :

1981-1988

Bans on exports of logs, raw rattan, and semi-processed rattan were phased in.

1986

Export tax on crude palm oil was set at zero.

1987

Local content rules for textile industry were deregulated.

1989

(1)   Exports of low grade rubber were banned.

(2)   Licensing restrictions on pepper exports were eliminated.

(3)   Export quotas for tapioca destined for the European Community were introduced. Quotas allocations were based on exporter's sales to non-EC markets. In the case of corn, formerly controlled by BULOG, this commodity was deregulated in 1989. Imports and exports can now take place without a specific licence from the government. Imports are subject to a 10 % tariff, although this has reportedly been waived for many importers during 1991. Turning to fishmeal and peanut meal, these were deregulated in 1988, and are subject to minor import taxes of 5 to 10 percent. The prepared shrimp feed tariff was reduced to zero in 1989.

1990

(1)   Exports of early pickled vanilla were limited to 50 tonnes for the 1990/91 marketing year and banned thereafter.

(2)   Licensing restrictions on exports of nutmeg/mace, cassia vera, and vegetables were eliminated.

(3)   Export regulations for coffee were amended as a result of the suspension of the International Coffee Agreement and a ban was imposed on low quality coffee exports.

1991

Exports and imports of edible oils (palm and kernel oil, crude palm, and copra oil) were deregulated. The export allocations were determined by the Ministry of Agriculture in collaboration with the Ministry of Trade and were channeled through a few approved exporters. Producers were than free to export their oil directly.

Cassava since 1988 the export quota into the EC has been binding. This quota was allocated by a 2:1 regulation that required a ton of exports to non-EC markets for every 2 tons sent to the EC. This regulation was only enforced in 1989 and lapsed in early 1991. Livestock products (poultry, meat and feeder cattle) were deregulated in 1991 and enter with tariffs of 10 to 20 percent. For vegetable oils, both exports and imports of coconut oil and palm oil were deregulated. Previously there was domestic market allocation for palm oil to maintain low domestic prices.

During the 1980s Indonesia took substantial steps to deregulate international trade and to bring domestic prices closer to world prices. The political economy of deregulation favours the 'demand-driven ' approach. As pointed out by Unnevehr (1992), trade deregulation in agriculture has reduced tariff and barriers to export of tree crop products and to importation of feed stuffs and other products. However, substantial non-tariff barriers remain.

After 1991, trade policies for important commodities other than rice were deregulated. Commodities included in the reform are :

Soybeans   This commodity is still controlled by BULOG to protect domestic producers,and the NPR seems to be above 60 %. In 1991 soybean meal was deregulated, but enters with a 5 % plus 35 % = 40 % tariff. There is some expectation that the 35 % surcharge will be dropped following the introduction of the government's 1991 June Package (i.e. liberalized trade in several important agricultural commodities).

Wheat   Wheat is implicitly taxed by BULOG controls, although the difference from world prices has grown smaller over time. The monopoly on milling reportedly has negative implications for the ability of processed foods' producers to obtained required the quality.

Sugar   Sugar policies are unusual in that they tax both producers and consumers. The World Bank estimation of the NPR in 1991 was 35 %. An additional benefit from reducing sugar production would be growth in the export of processed foods.

Tree Crops   Interventions are few in the tree crops sector and most prices are at or close to export parity. Major deregulations took place to remove quotas on coffee exports and marketing board control of some spices.

The trend towards deregulation of agricultural markets sets the stage for growth during the current planning period, by allowing world market prices to be reflected in domestic prices World market prices provide important signals about the opportunity cost of a product to society. Open agricultural markets will allow those signals to be transmitted to producers and consumers so that they can make cost-efficient use of domestic resources. A more proactive approach would be to reduce remaining protection for agricultural imports in order to improve incentives for higher valued agricultural products.

Chapter 4

SIGNIFICANCE OF THE URUGUAY ROUND
OF GATT NEGOTIATIONS

4.1. The evolution of the GATT Uruguay Round and its Outcome

The General Agreement on Tariffs and Trade has its origins in the Anglo-American grand design for post-war reconstruction. The allies envisaged the creation of three key institutes aimed at overseeing commercial relations, providing an orderly framework for monetary relationship and to mobilise resources for reconstruction and development. The last two of these were dealt with by the Bretton Woods Conference which created the International Monetary Fund (IMF) and International Bank for Reconstruction and Development (IBRD - known as the World Bank). The third institution was planned as the International Trade Organisation (ITO). Negotiations for the ITO culminated in the Havana Charter of 1948 with 53 signatories (Dam, 1970).

However, the Charter was never ratified by the US Congress and the enabling treaty which had been prepared to clear the way for the ITO became the set of rules for the governance of world trade. It was initially signed in Geneva by 23 Contracting Parties (CPs) in 1947 and has since expanded to embrace 105 CPs .

The objective of the GATT is to provide a framework for the orderly conduct of trade, as well as a process within which trade liberalisation can take place. To this end, the key principles which underlie the GATT Charter are non-discrimination, reciprocity and transparency (Greenaway, 1991).

The mechanism instituted by GATT to promote trade liberalisation is the so-called 'Rounds' system. This process periodically brings CPs together to agree on a package of trade measures. Table 4.1. lists the eight Rounds including the Uruguay Round, the number of CPs involved in the negotiations and the value of trade covered.

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Table 4.1. GATT Negotiating Rounds

Round	Dates	Number of countries	Values of Trade Covered
Geneva	1947	23	$10 billion
Annecy	1949	33	Unavailable
Torquay	1950	34	Unavailable
Geneva	1956	22	$2.5 billion
Dilon	1961-62	45	$4.9 billion
Kennedy	1962-67	48	$40 billion
Tokyo	1973-79	99	$155 billion
Uruguay	1986-93	117	$ 200 billion *

Source: Greenaway, 1991

* *Reported at the Evening Standard (December 16th, 1993) following the final agreement of the Uruguay Round in Geneva.*

The Uruguay Round was the eighth Round of Multilateral Trade Negotiations convened under the auspices of GATT. The seeds for the Uruguay Round were sown at a Ministerial Meeting in November 1982, in Punta del Este in Uruguay. At that meeting it was agreed that a further Round of MTNs should take place, although a timescale was not specified. After several years of negotiations and preparatory work, the Round was finally launched in 1986. It was hoped that it would take four years to complete, ending in December 1990. To keep the pressure on negotiators, it was agreed to hold a mid-term review in December 1988.

The announced objective of the GATT Uruguay Round, as stated in the Punta del Este Declaration, was no less than to achieve a greater liberalization of agricultural trade. In the Uruguay Round, agriculture has taken a high profile among contracting parties due to rising protectionism in the EU, the United States and Japan. In extending the results to conclusions about the potential impacts of a successful Uruguay Round outcome, very little attention has been paid to developing countries' interest (Oxley, 1990).

Goldin *et al.,* (1992) observed that there has been a growing juxtaposition between falling world prices and rising domestic prices, implying both an increase in costs to consumers and a rise in public expenditures on agricultural subsidies. These problems convinced the GATT's contracting parties of the need to bring more discipline and predictability to world agricultural trade by correcting and preventing restrictions and distortions and instability in world agricultural markets.

Table 4.2. sets out the full range of issues on the Uruguay Round agenda - fifteen negotiating groups in all, fourteen of which were concerned with services.

Table 4.2. Uruguay Round Negotiating Groups

Trade Barriers

* Tariffs

* Non-Tariff Measures

Sectors

* Natural Resource based Products

* Tropical Products

* Textiles and Clothing

* Agriculture

GAAT System

* Safeguards

* Subsidies and Countervailing Measures

* GATT Articles

* MTN Agreements and Arrangements

* Fuctioning of the GATT System

* Dispute Settlement

* Trade-Related Intellectual Property Rights

* Trade-Related Investment Measures

* Services

Source: Greenaway,1991

In general, contracting parties of the GATT Uruguay Round are classified into two categories, the proponents of reform and the proponents of restraint (Guyomardi *et al*,(1993)). The first group led by the US, the Cairns Group, and supported by some developing countries, have tangible terms-of trade gains to expect from a multilateral approach to trade liberalization. Common interests of this group are in achieving greater liberalization of trade in agriculture and the bringing together of all measures affecting import access and export competition under strengthened and more operationally effective GATT discipline rules. The second group is composed of Japan, the EU, Nordic countries, and importer developing countries. These countries do not have trade gains to expect and their government's position is highly influenced by the political clout of farmers.

Figure 4.1. shows how agricultural reform obstacles face these contracting parties of the Uruguay Round.

Figure 4.1. Agricultural reform obstacles in the Uruguay Round

Source : Dillon, 1992
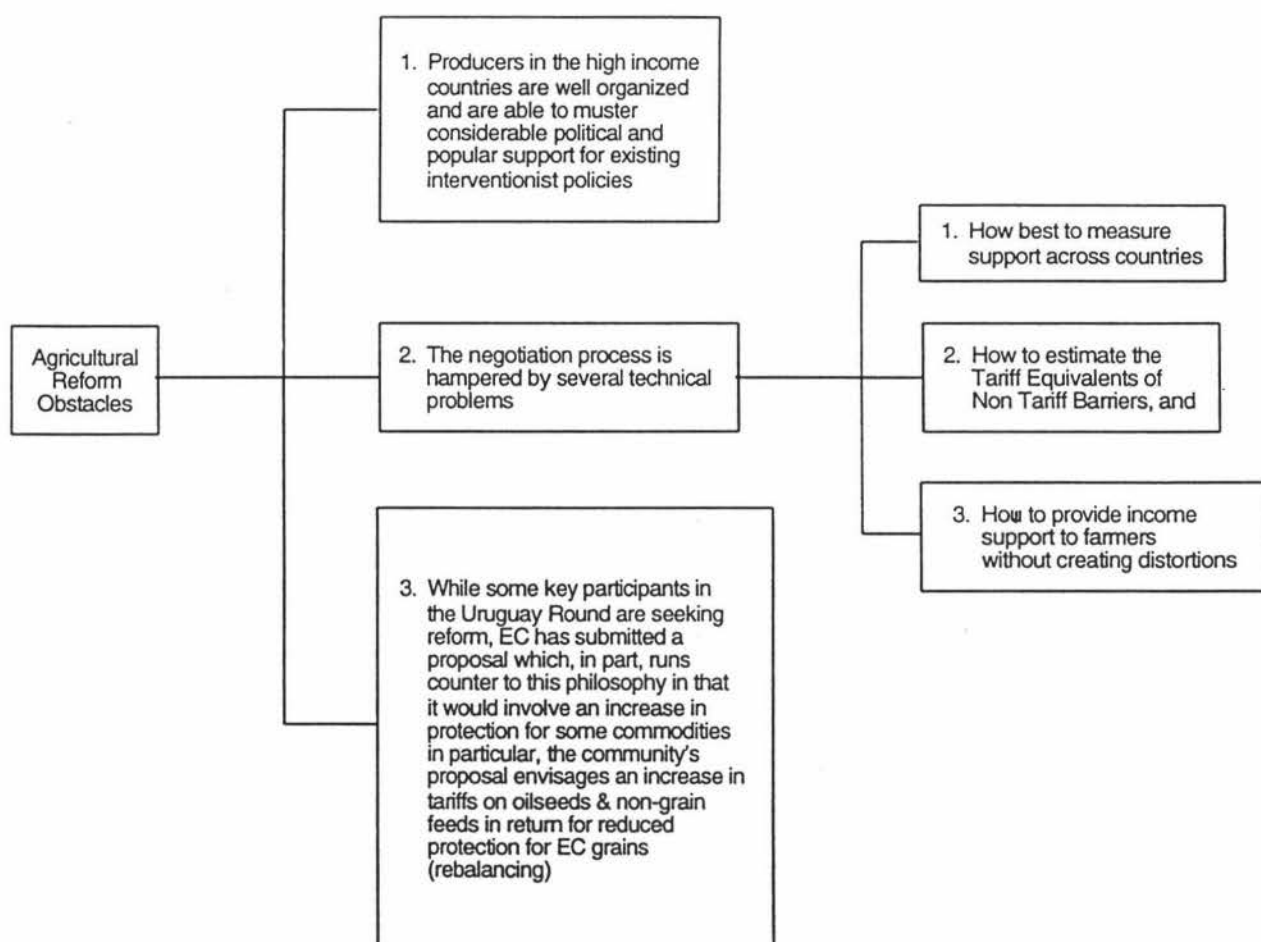
Finally, after seven years of acrimonious bargaining which dragged on to within hours of a final deadline on 15 December 1993, envoys from 117 states approved a pact aimed at boosting economic growth and ensured mutual advantage to all participants (Evening Standard, 16 December 1993). While the rest of the world was cheering the announcement of a new GATT agreement, some developing countries envoys were reacting by saying " *when the dust settles after the big elephants fight, the real losers will be the poorest countries. With attitudes like these, no wonder it took seven long years to get an agreement*" (Far Eastern Economic Review, 30 December 1993 - 6 January 1994).

The outcomes of the GATT Uruguay Round are summarized in Figure 1.1. (Chapter 1). A summary of the agreement on agriculture of the GATT Uruguay Round is attached in Appendix A.

4.2. Indonesia's Participation in the GATT Uruguay Round

In order to formulate a country plan under the framework of the agricultural negotiations of the Uruguay Round, Indonesia had been urged to lay out the policy changes required to meet its own domestic policy objectives.

Markets for agricultural products are more distorted than industrial markets. Liberalization of agricultural trade would tend to raise prices of many commodities and to improve the terms of trade for agriculture in world markets. This would benefit a country like Indonesia which is an agricultural exporter and has a large share of GNP in agriculture. As a member of the Cairns group, Indonesia has supported liberalization of agricultural trade in the current Uruguay Round of negotiations.

The final agreement of the Uruguay Round of GATT negotiations would place disciplines on agricultural policies in three areas, import access, export competition and internal support. Under special and differential treatment, developing countries such as Indonesia would be allowed more flexibility in implementing reforms. Unnhevehr (1992) predicted that Indonesia would benefit from better access to markets for labour-intensive manufactured goods, like textiles and shoes. Liberalisation would allow Indonesia to develop new export markets and the opportunity to diversify its exports.

In agriculture, world prices of several Indonesian imports would rise, including cotton, wheat, sugar, and rice. This would reduce the implicit protection given to sugar and wheat, and increase domestic incentives to produce cotton and rice. On the export side, Indonesia would benefit from increased access to the EU palm oil market. In regards to the cost to Indonesia of participating in the agricultural negotiations, Dillon (1992) pointed out that agricultural negotiations may seem small, and so are the short run gains. However, liberalisation is likely to lead to higher prices and Indonesia, as a net food importing country would lose in the short-run. Using Indonesia's AMS, in general, the argument is that Indonesia would appear to have a little to lose from full participation in the international trade negotiations. Skully (1988) indicated that Indonesia's aggregate PSE (24.4 %) is generally lower than those in developed countries (average 34 %). New Zealand's overall PSE was 25.4 percent. The only developed country with a lower PSE was Australia (11.1 %) . Furthermore, Magiera (1989) found that Indonesia's Aggregate Measure of Support was small relative to those in developed countries, in other developing countries and in the newly industrialized states if commodities that are taxed are eliminated from the measure. This reflects that in comparison to Indonesia, many developing countries tax their agricultural sectors. Developing country consumers spend a much greater proportion of their income on food than those in developed countries and farm lobby groups are less well organized or non-existent.

The GATT Uruguay Round would bring agricultural policies worldwide under GATT rules and disciplines and reduce the role of government in determining agricultural trade. The Round is particularly important to a country like Indonesia with considerable agricultural potential. Under special and differential treatment, developing countries such as Indonesia would be allowed more flexibility in implementing reforms. For Indonesia smaller reductions in support would be required, a longer implementation period would be permitted, and some agricultural policies would be exempt from GATT discipline. The basic disciplines agreed on in the GATT Uruguay Round would involve policy reforms on Indonesian agricultural policies in the three areas of internal support, market access, and export competition.

Internal Support

Internal support programs for Indonesia that are subject to GATT disciplines would likely be reduced by two-thirds of 20 percent over a ten-year period beginning in 1995. Internal support would be measured by an Aggregate Measure of Support (AMS). Domestic food subsidies, public stockholding for food security, input subsidies and administered prices would be allowed greater flexibility and would be subject to GATT disciplines. A de minimus standard of 10 percent would apply to developing countries. If the Aggregate Measure of Support for a particular product is below 10 percent of the value of production, no reduction would be required. With the exception of sugar, this standard would apply for most commodities in Indonesia. As a result no changes in internal support would be required for commodities other than sugar.

Market Access

With respect to market access, tariffs would be placed on products such as rice, soybeans, sugar, wheat and wheat flour and processed foods subject to state licensing controls or other non-tariff import barriers beginning in 1993. Tariffication would eliminate the monopolies of BULOG and state trading corporations over imports of these products. In addition, by 1995 Indonesia would also have to guarantee 3 percent of its domestic market at zero or low duty for each of the above products. All tariffs and tariff surcharges would be reduced by 24 percent over a ten-year period and guaranteed market access would increase from 3 to 5 percent of domestic consumption over the same period.

Export competition

As far as the commitment on export competition is concerned, it will basically limit the possibilities to subsidise exports of agricultural products. Indonesia's programs for export credit, export credit insurance and pre-shipment export finance would classified as export subsidies. Export subsidies would be subject to commitments on budgetary outlays and the quantity receiving subsidies. These percentages shall be 36 and 21 percent, respectively, for deversed countries, but 24% and 19% for developing countries.

Under the mercantilistic philosophy of the GATT, reciprocity is expected by Members for policy changes that would be in their own interest. Hence, Indonesia may expect to receive credit for the policy changes that it has unilaterally made since 1986. In formulating the country plan, Indonesia could include policy changes that reduce support to these commodities based upon its own interest. As indicated by the studies of Kasryno *et al* (1987), Indonesia does not have comparative advantage in the production of either soybean or sugar as import-competing crops. Thus, Indonesia's country plan could include policy changes that reduce support to these commodoties and transfer resources into those commodities in which Indonesia does have a comparative advantage. This would require relaxing Indonesia's import licensing requirements and expanding imports of highly protected products. In fulfilling its commitments to the GATT Uruguay Round, Indonesia could argue for a longer adjustment period for making changes. For rice, Indonesia would be able to fulfil its commitments since imports and domestic prices are controlled by BULOG, while for other imported commodities, an improvement in the efficiency of its licencing system would be required. As noted by Magiera (1989), this could be done, for example, by offering licenses under competetive bids and would be viewed as a concession by other countries.

4.3. Relevance of Trade Liberalisation Modeling Studies

Various agricultural trade liberalization models have been reviewed by several analysts. Given the differences which exist in the structure of the models, the base period used, the country and commodity scope and how liberalisation is defined, there is a common perception that most of the technical analysis in support of the GATT negotiations has been directed towards the policies of chief protagonists on the part of the OECD countries (McClatchy *et al.*, 1992).

The past decade has seen a range of modelling activity seeking to predict the effects of agricultural trade liberalization. An increasing awareness and documentation of distortions in world markets emerged during this period. Many studies of agricultural protectionism, for example, Anderson and Hayami, (1986), Parikh *et al.*,(1987) and Webb *et al.*, (1988) , have revealed a fairly consistent pattern of protection across countries and time. Model results differ for a wide variety of reasons. Some models adopt a partial equilibrium approach, limiting their consideration of the effects of agricultural support to agricultural markets alone. Others adopt a wider, general equilibrium perspective and take into account the feedback effects of agricultural trade liberalization on other sectors of the economy.

The basic approach taken in the first major studies of Zietz and Valdes (1980), Anderson and Tyers (1991), the OECD (1987), IIASA (Parikh, *et al.*, 1986), USDA-ERS (Roningen, *et al.*, 1987) was to link country-specific supply-demand models of the main agricultural commodities into a many-country generalization of the simple two-country diagrams as in any neo-classical trade model. The equilibrating principle is to find a price vector such that worldwide excess demands are zero ; then the quantities consumed, produced and traded in each country can be calculated and the welfare implications of price quantity changes for each commodity can be estimated.

In modelling trade liberalization, Gardner (1989) has classified some of the most important contentious modelling choices as : (1) bringing in general equilibrium considerations; (2) incorporating dynamics of liberalization or the time path of effects; (3) recognition of imperfect competition and multiple contemporaneous prices for the same commodity, and (4) endogenising each country's economic policy choices. In addition, Gardner says that for specific modelling choices, simulated outcomes are

characterized by the choice of countries to model, which to aggregate into regional entities and which commodities to include.

Equally important for this is how to measure initial protection levels, the base time period and how to obtain the parameter values for the equations of the model.

Conclusions include those of Guyomardi *et al.*, (1993) which are : (i) In general, rich industrialised countries provide more support for agriculture relative to other sectors than do poor countries, (ii) Importers of agricultural commodities tend to be more protectionist than exporters, (iii) Exporting developing countries often tax their agricultural sector, both directly by interventions within the sector and indirectly by protecting their urban industrial sectors. Hence, newly industrialised countries tend to shift from taxing to protecting their farm sector. This situation creates major tensions between exporters of primary products from developing world and protectionist industrial countries, and among the latter themselves.

Several studies have attempted to evaluate the implications of trade liberalisation in the industrial countries on the economies of the developing countries. Work in this area include Parikh *et al.*, (1987), Zietz and Valdes (1980, 1990), Anderson and Tyers (1990), Gardner (1989), Goldin *et al.*, (1992), Schwartz *et al.*, (1988) and Roningen (1992). It has generally been found that liberalisation in the developed countries causes general price increases.

Table 4.3 summarizes some of the modelling choices made in recent studies. All the models determine world prices by finding competitive market clearing prices after existing trade distortions are removed.

Table 4.3. Approaches to Modeling Trade Liberalisation

Element of Model	Tyers and Anderson	IIASA	OECD	USDA-ERS
Supply	econometric equations	optimization and estimated	elasticities	elasticities
Demand	,,	demand system	,,	,,
Market Clearing	multi-market partial	general equilibrium	multi-market partial	multi-market partial
Competition assumed	yes	yes	yes	yes
No. of countries	30	20	11	7
No. of agricultural commodities	7	9	14	6
Reference level of protection	1980-82	1980	1979-81	1984
Date of simulated results	1980-82	1980-2000		1989

Source : Gardner, B. (1989)

These studies also differ in their degree of commodity coverage, base years and different assumptions about protection levels. Researchers have also assumed different reactions of producers to price changes as summarized in the demand and supply elasticities used in the models. They also make different assumptions about the likely reactions of other governments to the change in world prices that would occur if some or all industrialized countries liberalized simultaneously. A comparison of published model results of OECD agricultural trade liberalization (total liberalisation) is shown in Table 4.4. The economic models generally confirm that lower protection in the industrialised countries will tend to raise world prices, although there can be substantial disagreement on the magnitudes involved.

Table 4.4. Simulated Results of OECD Agricultural Trade Liberalisation
(Percentage change in selected world prices)

	Tyers and Anderson	IIASA	OECD[1]	USDA-ERS
Wheat	10	18	-1	29
Rice	11	21	1	32
Coarse grains	3	11	-3	23
Beef	27	17	15	17
Dairy products	61	31	44	53

Source : Gardner, B. (1989)

Note : [1]Results for 10 percent ad valorem liberalization multiplied by 10.

Economic modellers have devoted considerable effort to quantifying the effects of EU agricultural policy on developing countries. Many of these studies broaden their scope to include the impact of reforms to agricultural policies in all industrial countries. In examining the consequences of removing or reducing agricultural support, adopting a multilateral approach makes sense given the attempt in the Uruguay Round of GATT negotiations to implement a multilateral reduction in support. In addition, various models of trade liberalisation lie within the four groups of studies, namely complete and partial liberalisation by the EU, liberalisation which focuses on the GATT outcome and those that are focused on Indonesia. The selected studies are displayed in Table 4.5. As shown in columns 4 and 5, most studies have been conducted with the aim at evaluating the impact of trade liberalisation in the industrialised countries (the European Union, the US, and Japan), particularly the implementation of the Dunkel and CAP reform on certain countries, such as Australia, New Zealand and Japan. Table 4.5 also reveals that in recent years, the SWOPSIM model has been used quite frequently by six analysts.

Turning to Indonesia, Table 4.5. (column 6) indicates that most of the technical analyses have been directed at the Indonesian government's policies in the agricultural sector, including the effects of various policies on prices, supply, demand, effective and nominal rate of protection, incomes and foreign exchange. Work in these areas include

the studies of Papageorgiou *et al* (1991), Fane (1987), Wymenga (1991), Kasryno *et al* (1989), Rosegrant *et al* (1987), Rosegrant (1989), Baharsjah *et al* (1989) Tabor *et al* (1988), Altemeir (1992) and the World Bank (1991, 1992).

Using a multi-market and multi-sector model Altemeir (1992) developed a theoretical model which enables policy makers to analyze food policy impacts on major sector targets and on macroeconomic growth. The model has been further developed by Fletcher and Altemeier (1991) to quantify the policy planning approach on agriculture introduced during the past five year plan (REPELITA).

Even though many approaches have been used to assess the impacts of trade liberalisation, most of these studies assessed the impact of trade liberalization on Indonesian crops using different methods of estimation such as a multimarket foodcrop supply and demand model.

Detailed analyses of the implications of GATT liberalization for Indonesia are not available. However, a preliminary study by Magiera (1989) indicated that a liberalization is likely to lead to higher food prices and Indonesia, as a net food importing country would lose in the short-run. Using an Aggregate Measure of Support such as the PSE Magiera found that Indonesia could minimize its loses by preventing its own domestic prices from rising with world prices. Several studies were also conducted by Djiwandono (1991), Dillon (1992), Unnevehr (1992a, 1992b) and Papageorgiou *et al* (1991) which descriptively evaluated the components of liberalization episodes, and the unilateral policy reforms that Indonesia and many other developing countries have made in recent years.

The SWOPSIM model developed at the USDA will be used as a basis of this study to assess the impacts of trade liberalisation on the Indonesian food crop sector. This is relevant particularly to Indonesia as no SWOPSIM models have been adopted to assess the impact of Indonesian trade liberalisation (apart from the 1989 USDA data base).

Table 4.5. Selected Modelling Studies on Trade Liberalisation

Modelling Framework	Author	Items			
		Total Liberalisation	EU Liberalisation (Unilateral)	GATT Outcome-oriented	Liberalisation on Indonesia
World market model	Valdes and Ziets (1980)		Liberalisation of import restrictions (50% covering agricultural products by OECD countries		
The GLS model	Anderson and Tyers (1990, 1993)	Total Liberalisation in OECD and developing countries	Food Trade liberalisation by OECD vs Developing Countries		
The BLS model	IIASA (1990)	Total liberalisation of all OECD countries	Impact of Trade Liberalisation by OECD on developuing countries (3 scenarios, all OECD countries, EC alone and US alone.		
SWOPSIM	Roningen et al (1988)	Developed countries' liberalisation and its effects on world prices in the Pacific Basin.			
SWOPSIM	Sriramaratman (1992)		CAP reform and its importance to New Zealand	The Dunkel Package was modelled	

Modelling Framework	Author	Items			
		Total Liberalisation	EU Liberalisation (Unilateral)	GATT Outcome-oriented	Liberalisation on Indonesia
SWOPSIM	Roningen (1992)		Reduce support to agriculture in the EU and other member countries, focusing on EU implementation of the Macsharry CAP reform proposal	Including the anlysis of the Dunkel proposal	
SWOPSIM	Roningen and Dixit (1992)	Elimination of Japanese agricultural support			
SWOPSIM	Andrews and Roberts (1993)			Modelling the Dunkel Package and its impacts on Australia	
SWOPSIM	Rae and Nixon (1993)	Liberalisation of agricultural in the industrialised world	CAP reform	Evaluation of a GATT outcome and its impacts on New Zealand	
The RUNS model	OECD (1993)		30% liberalisation by OECD countries	Involving GATT outcome scenario	

Modelling Framework	Author	Items			
		Total Liberalisation	EU Liberalisation (Unilateral)	GATT Outcome-oriented	Liberalisation on Indonesia
Aggregate Measure of Support	Magiera (1989)	Total liberalisation by OECD countries	Liberalised PSE in the industrialised countries	Preliminary PSE estimation in response to the GATT Uruguay Round	Liberalised PSE for Indonesia focusing Rice, Corn, Cassava, and Sugar.
Multimarket food-crop demand/supply model	Rosegrant (1989)				Focus on the impact of food liberalisation for foodcrops (20% import tariff)
Multimarket model	Baharsjah *et al* (1989)				Forcasting the static equilibrium effects of trade liberalisation for seven commodities
BAPAGMOD	Fletcher and Altemeier (1992)				Agricultural Projections for the year 1988-2000.
BAPAGMOD	Altemeier (1991)				Analysis of multisector involving four subsectors(foodcrops, livestock, pareenial crops and fisheries).
CGE model	Erwin *et al* (1994)				Integration of models at various levels of agricultural policies

4.4. Gains from the GATT Uruguay Round

Some studies have sought to assess the annual gains from a successful Uruguay Round. According to official estimates, the new GATT treaty will boost global income between $US 200 billion and $US 300 billion (Evening Standard, December 16, 1993). While their numerical results may be open to debate, one interesting point is that Asian countries will gain more than other regions.

Table 4.6 indicates the country share in world trade in goods in 1992. The benefit of the Uruguay Round as reported by Waller (FEER, April 28, 1994) is that Asia's developing nations account for approximately 15 percent of world trade, estimated at US$ 3.6 trillion in 1993. Japan, one of Asia's biggest industrial countries has about 9 percent whereas Indonesia as a developing nation accounts for 0.8 percent. The pro-rata shares of the US$ 755 billion a year boost to global trade in goods that GATT projects by 2005 would be US$116 billion for Asia's developing nations and US$ 69 for Japan and US$ 6 for Indonesia. . Furthermore, World Bank and OECD studies have suggested that most of the overall economic benefit will accrue to developing Asia, with less for Latin America and virtually no benefit for Africa (Waller, Andrew, 1994). One of the reasons to believe Asia will fare proportionally better than other regions is that Asia's share of world trade is increasing rapidly by 15 percent per year, whereas a decade ago such growth was under 11 percent. Moreover, the increased investment from the rest of the world indicates that Asia is the region of most buoyant economic growth.

Table 4.6. Country Shares in World Trade in Goods. (1992)

	Exports (US$ billion)	Share of Trade (%)	Pro-rata share of UR trade gain (US$ billion)
World	3,731.0	100	755.0
Developing Asia	357.2	15.4	116.3
Japan	340.0	9.1	68.7
Hongkong	119.5	3.2	24.2
China	85.0	2.3	17.4
Taiwan	81.5	2.2	16.6
South Korea	76.6	2.1	15.9
Singapore	63.5	1.7	12.8
Malaysia	40.6	1.1	8.3
Thailand	32.5	0.9	6.8
Indonesia	29.3	0.8	6.0
India	19.6	0.5	3.8
Philippines	9.7	0.3	2.3
Pakistan	7.3	0.2	1.5
Srilanka	2.6	0.06	0.5
Bangladesh	2.1	0.06	0.5

Source : Adapted from Far Eastern Economic Review,(28 April, 1994)

Tables 4.7 to 4.10 indicate the gains from trade liberlisation estimated by various authors. Works in this area include Goldin and Knudsen (1990) and Goldin *et al* (1992). These studies indicated that the overall gains in terms of increasing world income range $195 billion to $477 billion per annum respectively.

There have been a number of recent studies on the implications of multilateral agricultural reform, for example World Development Report (1986), Anderson and Tyers (1989, 1991 and 1993), and Krissoff *et al* (1988). These studies cover those products that are of primary interest to the industrialized countries and that were covered by the agricultural negotiations of the Uruguay Round.

In terms of reducing agricultural support and protection, many studies of agricultural reform have concluded that the policies of the industrialised countries have depressed world agricultural prices and lowered the volume of world trade in many agricultural products. Hoekman (1989) pointed out that agricultural policies affect world markets in two ways ; firstly, by limiting access to domestic markets directly and secondly, by encouraging domestic production indirectly and thus limiting market access for foreign producers. The main result of agricultural support policies is that world prices tend to be lower and more unstable than they otherwise would be.

Anderson and Tyers (1990) stressed that reforms of agricultural policies should benefit developing countries as a whole if they also deregulated their own agricultural sectors, and if at the same time industrial countries liberalised non-agricultural trade. The common assumption is that food-importing developing countries would be harmed by a liberalization of world food trade following the Uruguay Round of negotiations. and early empirical works on the subject (Roningen and Dixit, 1989; Tyers and Anderson, 1988) supported this view.

Several analysts have addressed the question of what difference it could make if the LDCs as well as the OECD countries liberalized. One of the most comprehensive studies is Anderson and Tyers (1993). Using a model of world food markets, they found that a food-exporting developing economy would gain from the increase in the international price of food that would follow from food trade liberalization in industrial markets. At least the developing countries which export agricultural commodities competing with temperate-zone products will almost surely benefit from the agricultural trade liberalisation in rich countries.

Table 4.7 contains summary indicators of the impacts of agricultural reform. Developing country producers gain from liberalization by the industrialized countries ($18 billion). Welfare gains for the industrialized countries are $33 billion, while for the developing countries net welfare declines (4.5 billion) as the higher world and domestic prices that result from liberalization lead to higher consumer cost.

Table 4.7. Summary Implications of Multilateral Agricultural Liberalisation

	Producer Welfare	Net Welfare	Value Trade
	------- $ Billion --		
Industrialized Countries (IC's)	-65.6	33.3	-8.8
Developing Countries (IC's)	18.4	-4.5	6.2
Developing Countries (Global)	22	3	15

Source : Magiera, 1989

IC's = Reform by the Industrial Countries (partial liberalisation)

Global = Reform by all countries (total liberalisation)

Multilateral liberalization, however, leads to gains to both groups, as can be seen from Table 4.8. As a result, multilateral trade reform by the industrialized countries would raise world prices for most agricultural products. All studies of agricultural reform conclude that the policies of the industrialised countries have depressed world agricultural prices and lowered world trade in many agricultural products. These policies, although benefitting the consumers in developing countries, also tax their agricultural sectors. Consequently, multilateral trade reform by the industrialised countries would raise world prices for most agricultural products.

Table 4.8. Gains from Liberalisation of Support Policies (US$ Billion)

Country/Region	Unilateral Liberalization By Industrial Nations	Unilateral Liberalization by Developing Countries	Global (Multilateral) Liberalization
Developing Countries	-11.8	28.2	18.3
Industrial Market Economies	48.5	-10.2	45.9
European Non-Market Economies	-11.1	-13.1	-23.1
World	25.6	4.9	41.1

Source : World Bank (1986)

Table 4.9. indicates the implications of more responsive domestic markets on world price instability. Many countries insulate their domestic markets from conditions on world markets. This increases world market price instability and transfers the burden of world market adjustment onto other countries. The commodities with the greatest price instability are wheat, rice and sugar, with coefficients of variation in annual prices of 0.45, 0.30 and 0.20 respectively. Column 2 indicates if the industrialized countries were to allow full transmission of world prices onto their domestic markets, these coefficients would drop to 0.30, 0.27 and 0.17 respectively. Column 3 shows the coefficients of variation if the developing countries were also to participate in this process. In its report, the World Bank (1996) stated that, given the risk a verse nature of many farmers and consumers, a reduction in world price instability could lead to significant welfare gains worldwide.

Table 4.9. Impact of Full Price Transmission on World Price Stability

Commodity	Without Reform	With Reform By Industrialized Country	With Global Reform
Coefficient of Annual Variation in World Prices			
Wheat	.45	.30	.10
Coarse Grains	.19	.17	.08
Rice	.31	.25	.08
Beef & Lamb	.06	.04	.03
Pork & Poultry	.09	.07	.04
Dairy Products	.16	.07	.04
Sugar	.20	.17	.04

Source : World Development Report, 1986

The increased world prices calculated by Roningen (1992) are presented in Table 4.10. In an attempt to evaluate the impact of the Dunkel proposal using the SWOPSIM model based upon 1989 data, the model reduces support levels to estimate the impact of an EU implementation of the Dunkel proposal. The results are of expected sign and magnitudes. World prices rise 2 percent while EU supply declines over 3 percent. EU producer incomes would decline significantly (almost $12 billion) if support was removed with no compensation. EU gains $ 4 billion of economic welfare, and production and producer incomes in the US rise in response to the partial EU liberalisation. The EU's net trade position in agriculture would deteriorate by about $6 billion.

Table 4.10. Impact of EU Implementation of the Dunkel Proposal in the GATT

Product	World Prices (%)	EU Supply (%)	US Supply (%)	EU Producer Income (Bn.US$)	US Producer Income (Bn.US$)	EU Net Trade (Bn.US$)
Meat, Eggs	3.1	-6.4	2.4	-7.8	2.3	-4.8
Dairy Products	8.2	-2	.8	-2.5	.7	-.7
Cereals	-4	1	0	-.2	.0	.5
Oilseeds	3	-7.9	.4	-1.2	.3	-1.4
All model Products	2.1	-3.6	1.1	-11.8	3.4	-6.4

Source : Roningen (1992)

Chapter 5

APPLICATION OF THE SWOPSIM
MODEL FRAMEWORK

5.1. The SWOPSIM Model Framework

5.1.1. Overview

The SWOPSIM model framework was developed in the Economic Research Service of the United States Department of Agriculture. The models created by the SWOPSIM framework have an economic structure and are based on constant elasticity supply and demand equations, and some summary policy measures.

An overview of the SWOPSIM framework has been presented by a number of authors, including Webb, Roningen and Dixit (1987), Roningen and Dixit (1989), SriRamaratman (1992), and Rae and Nixon (1993).

Models that are developed using the SWOPSIM framework are based on the assumption that world prices are determined so as to balance supply and demand in international and all domestic markets, taking into account protective arrangements and other policies which distort prices facing producers and consumers in each country or region included in the model. The models are designed to simulate the medium run effects of changes in agricultural policies on production, consumption, trade and prices. In the process of deriving a solution, world and domestic prices are adjusted in the model until world total exports equal total imports for each commodity (Andrews and Roberts, 1993). As in any standard neo-classical net trade model, trade is the difference between supply and demand.

Linkages across products can occur via cross-price relationships and technological parameters that describe input-output specifications, while linkages across countries and regions take place through world trade (Webb *et al*, (1987). In the SWOPSIM model, various government policies that affect production, consumption, exports and imports are introduced as 'wedges', between producer, consumer and trade

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prices derived from estimates of producer subsidy equivalents (PSEs) and consumer subsidy equivalents (CSEs). These price wedges are intended to capture the effects of market intervention by governments on producers, consumers and taxpayers, as well as on exports and imports. Policy changes can be introduced into the SWOPSIM model as changes to these price wedges (Andrews and Roberts, 1992).

5.1.2. Characteristics of SWOPSIM Models

The SWOPSIM model framework has certain characteristics. It follows the logic of a non-spatial price equilibrium model, and assumes that domestic and traded goods are perfect substitutes in consumption. It is a computer simulation model based on electronic spreadsheet software. Its characteristics are as follows:

- Static: The implications of policy reform after full model adjustment are calculated over a medium term of about 5 years, but the path of adjustment is not given. Stocks are assumed unchanged.

- Non-spatial: Information on the net trade flows of a country or region are provided, but trade flows among countries are not detailed.

- Multi-product, multi-region: The SWOPSIM framework can accomodate as many commodities as the analyst requires. The general world model used here recognises 22 commodities and 33 regions with all remaining countries represented in a 'rest of the world' aggregate.

- Partial equilibrium: SWOPSIM is a world agricultural trade model. It does not examine resource shifts between agriculture and other sectors in each economy.

- Synthetic: All technical coefficients such as supply and demand elasticities are not estimated with the SWOPSIM framework. Rather, they are obtained from the literature but can be changed by the analyst.

- Policy oriented: SWOPSIM is designed to assess the global economic implications of unilateral or multilateral liberalization, either partial or total. In addition, projections can be based on supply growth rates, income elasticities of demand and population growth rates.

5.2. Model Description

The economic structure of the SWOPSIM model is based on a set of simple supply, demand and trade equations. Figure 5.1. shows the economic structure in terms of information flows between m products and m countries. The world market clearing mechanism searchs for a world price that equates global net trade in each commodity to zero. This price then feeds back into the domestic prices which determine, along with the policy wedges, domestic supply, demand and net trade.

Figure 5.1. Economic Structure of SWOPSIM world models

Figure 5.1. Economic Structure of SWOPSIM

Source : Roningen, Sullivan and Dixit (1991)
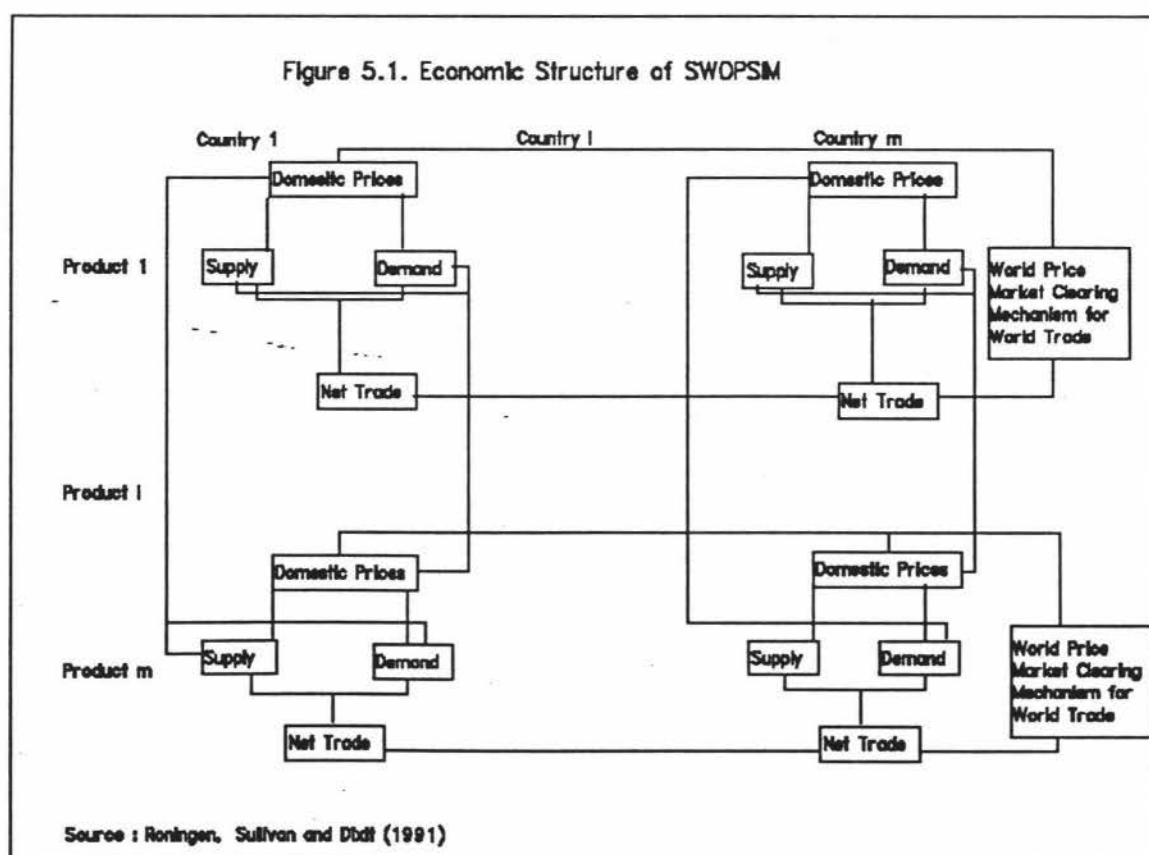
For each region i and each commodity j in the world model, demand and supply functions are modelled as follows:

$$D_{ij} = D_{ij}(CP_{ij}, CP_{ik}, S_{ih})$$ (5.1)

$$S_{ij} = S_{ij}(PP_{ij}, PP_{ik} \text{ or } CP_{ik})$$ (5.2)

Where:

CP_{ij} and PP_{ij} are domestic incentive prices facing consumers and producers, respectively, of commodity j in country i. CP_{ik} and PP_{ik} are consumer and producer prices of commodities closely related to commodity j in either consumption or production respectively.

CP_{ik} in the demand function accounts for substitution possibilities in consumption, while CP_{ik} in the supply function accounts for the use of commodity k as an intermediate input in the production of commodity j. PP_{ik} in the supply function represents substitution possibilities in production. S_{ih} in the demand function accounts for the derived demand for the product as an intermediate input for the production of S_{ih}. It is typically a livestock quantity which enters into the demand function for feed.

Net trade is the difference between domestic supply and demand:

$$T_{ij} = S_{ij} - D_{ij}$$ (5.3)

Domestic incentive prices depend on the level of consumer and producer support (modelled in terms of price wedges CS_{ij}, and PS_{ij}), the world-to-domestic price transmission elasticities, and on world prices denominated in local currency:

$$CP_{ij} = CS_{ij} + F(E_i * WP_j)$$ (5.4)

$$PP_{ij} = PS_{ij} + G(E_i * WP_j)$$ (5.5)

Where:

CS_{ij} = Producer support wedge for commodity i in country j

PS_{ij} = Consumer support wedge for commodity i in country j

E_i is the exchange rate of country i with respect to the US dollar;

WP_j is the world reference price of j measured in US dollars;

The producer and consumer support wedges comprise both domestic and border policy measures:

$$CS = DPSW + MSW + ESW$$
$$PS = CSW + MSW + ESW$$

where   (omitting the country/commodity subscripts):

DPSW =   Domestic support/tax

CSW   =   Consumer support/tax

MSW   =   Tariff equivalent of border protection

ESW   =   Export subsidy

Functional relationships F() and G() allow a specification of world-to-domestic price transmission to be less than pewrfect. If perfect, then 100% of a world price change is transmitted domestically, otherwise the government intervenes to cushion domestic producers and/or consumers from experiencing the full world price change.

The world markets clear when net trade of a commodity across all regions sums to zero:

$$\sum_{i=1}^{n} T_{ij} = \sum_{i=1}^{n} S_{ij} - \sum_{i=1}^{n} D_{ij} = 0 \tag{5.8}$$

Data for a typical country model requires information to be assembled into three spreadsheets, distinguished by a small letter in the middle of the spreadsheet name; the country model spreadsheet (b), the base data spreadsheet (t), and country support spreadsheet (s) (Roningen, Sullivan and Dixit, 1991).

Figure 5.2. Spreadsheet data structure for a SWOPSIM country/region

Base Data

Base Data Spreadsheet t
INPUT DATA
base period production,
consumption, and trade.

Country Support Spreadsheet

INPUT DATA
Mardet prices, support data,
and exchange rates.

OUTPUT DATA, INFORMATION
Producer and consumer incentive
prices, support data summarized
as price wedges, ratios of
budget expenditures to output,
sets of support measures such
as producer, consumer subsidy
equivalents and measures of
trade distorted by support.

Base data

Country Model Spreadsheet b

INPUT DATA
World refernce prices, supply
and demand elasticities (with
any technical constraints on
the elasticities), price
transmession elasticities,
input-output relationships for
derived demand, and macro-
economic data such as supply
growth rates, income, and
populations and their growth
rates (for demand shifters if a
model is used for projections).

OUTPUT DATA, INFORMATION
Model equations with constant
terms initialized to the base
data and economic indicators.

Prices, support and budget rates

The letters t, s, and b are codes used in the names
of the three types of spreadsheets.

Source: Roningen, Sullivan and Dixit (1991)

The data requirements for modelling agricultural trade with the SWOPSIM modelling framework depend on the number of countries and commodities which are to be included in the model, as well as the policy detail desired. Figure 5.2. gives a pictorial overview of these spreadsheets.

5.3. Using SWOPSIM to Model the Uruguay Round Outcome

5.3.1. The SWOPSIM Model

The version of SWOPSIM used for this study includes 33 countries or regions and is based on 1989 marketing year data. Included in the model are 22 agricultural commodities (beef, pork, lamb, milk and milk products, wheat, corn, other course grains, rice, soybeans and products, other oilseeds and products, sugar, cotton and tobacco).

Modelling trade liberalisation scenarios with SWOPSIM can be done as each component of the producer and consumer support wedges (CS and PS in equations 5.6. and 5.7.) can be separately changed. In SWOPSIM, the demand and supply equations express quantities consumed or produced as a function of consumer or producer incentive prices. Changes in these prices from their the base period values will occur in response to changes in the components of the support wedges and changes in world prices

Change in Consumer Price = Change in Consumer Support Wedge + Change in world prices.
and
Change in Producer Price = Change in Producer Support Wedge + Change in world prices.

These changes may occur in either direction. Given the notion that agricultural trade is liberalised due to the reduction in producer and consumer support, world price may be expected to rise. The net effect of the changes in world prices and internal support will determine whether or not domestic consumer and producer incentive prices rise or fall.

Parallel shifts of the demand and supply curves are also allowed in SWOPSIM. This permits the analyst to incorporate supply management policies, by shifting the relevant supply curves to the left.

5.3.2. Modelling the Scenarios

Analyses of the likely impacts of trade liberalisation are conducted under three scenarios as detailed in table 5.1. The degree of actual liberalisation on the Indonesian agricultural commodities is analysed through a series of adjustments.

In each scenario, liberalisation was assumed to occur in seven industrialised countries or regions (the United States, Canada, the European Union, Western Europe, and Japan) and Indonesia. Such a focus on the industrialised nations is reasonable since these countries policies distort world prices and production more than any other group of nations. Scenario B (total liberalisation) is included to reveal the extent to which these countries agricultural policies influence world agricultural trade, and the extent to which the GATT agreement reactifies this situation.

SCENARIO A.1. (The GATT Uruguay Round Outcome)

The GATT final agreement requires member countries to modify agricultural policies in the areas of domestic support, tariff reductions, export subsidies and market access. How these commitments were modelled in SWOPSIM is described below.

Domestic support to any commodity can be modelled in SWOPSIM as the product of the per unit domestic support wedge and the volume of production. As the solution algorithm proceeds, the domestic support wedges are gradually reduced for selected commodities until the target reduction has been achieved. This condition was not imposed where domestic support in the base period was less than 5 percent of the value of commodity output.

Table 5.1. Summary of Liberalisation Scenarios

Scenario	Description
A	**The GATT Uruguay Round Outcome** This involves modelling policy reforms in the three areas of domestic support, export subsidies, and market access: - Tariff equivalents for each commodity are reduced by 36 percent. For importing countries, minimum access opportunities are established at 5 percent of the level of domestic consumption. - No adjustment are made to take into account the unrepresentative nature of base periods, particularly for tarrif equivalents. - The value of internal support is reduced by 20 percent. - The volume of subsidised exports is reduced by 21 percent and budgetary expenditure on export subsidies is reduced by 36 percent. **Sub-Scenario A.1.** With original SWOPSIM database elasticities for Indonesia. **Sub-Scenario A.2.** With modified demand, supply and transmission elasticities for Indonesia.
B	**Total Liberalisation of Agriculture** In this scenario, all producer and consumer support wedges are reduced to zero. This means 100 percent reduction of all support wedges for all countries in the model.

The GATT outcome requires tariff equivalents to be computed for each commodity and then reduced by an average 36 % of their 1986-88 base values. Tariffication is already incorporated into SWOPSIM through calculation of import subsidy wedges (MSW) as the tariff equivalents of border policies. This requirement was modelled by reducing these wedges by 36 %. This almost certainly overestimates actual reductions, since considerable 'fat' seems to exist in some countries estimates of tariff equivalents, the EU's estimated tariffs include a 10 % 'community preference', and for 'sensitive' products the reduction can be as low as 15 % of the computed base tariff.

For importing countries, minimum access opportunities are established at 5 percent of the level of domestic consumption. Figure 5.3 illustrates how this market access requirement is modelled in SWOPSIM. The domestic demand and supply curves are shown as S and D. The world price level (Pw) is below the domestic price (Pd). Total consumption is represented by Ob and imports by ab. In order to fulfil the commitment of 5 percent of the level of domestic consumption at the end of the six years, an importing country could shift its supply curve through a supply management program until its net trade is at least 5 % of total consumption. As the supply curve shifts to the left (S'), total imports increase to a'b. This procedure is triggered in the model only if changes to world prices and/or domestic prices do not result in at least the minimum level of access.

Figure 5.3. Minimum Market Access for Importing Country
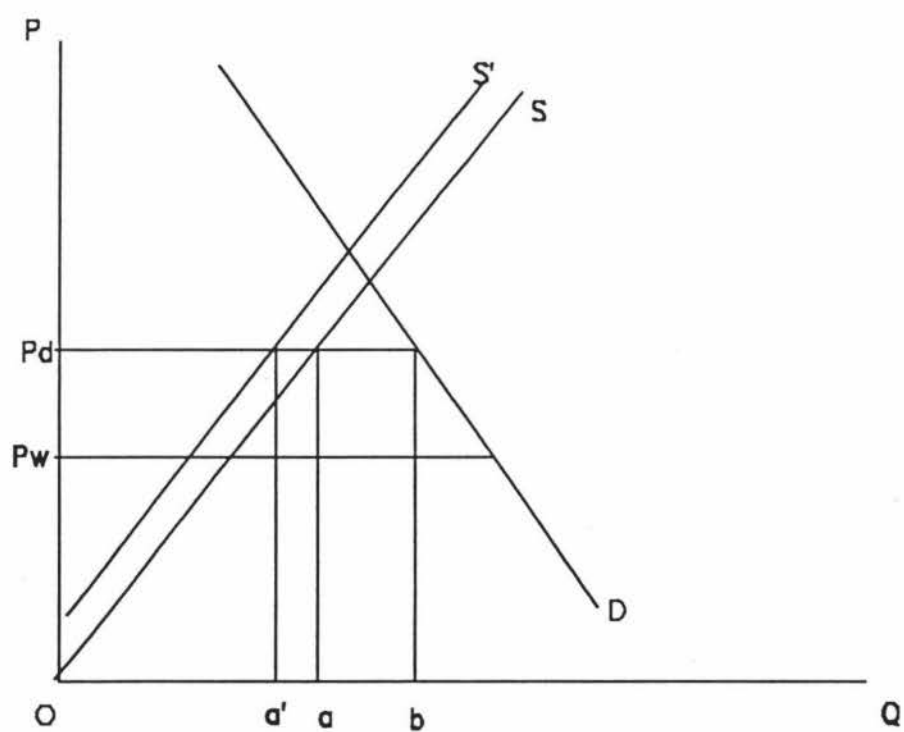
The GATT agreement requires that both total subsidy expenditures and the volume of subsidised exports be reduced. As pointed out by Rae and Nixon (1993), since total expenditure on export subsidies is given by the product of the per unit subsidy and the export volume, the required 36 % in total expenditure may not result in at least a 21 percent reduction in the volume of subsidised exports. Therefore a degree of supply reduction is also likely to be required.

Figure 5.4. shows the two-stage process, of price reductions and supply management, chosen to model the reductions in export subsidy commitments within SWOPSIM. First, internal prices represented by Pd are reduced (to Pd1) until the expenditure commitment is met. Second, if reduction in exports (from ab to cd) is less than the required 21 %, then the supply curve is shifted progressively to the left until the export volume ce is 21 % less than the volume ab.

The EU's announced reforms to its Common Agricultural Policy go some way to meeting its commitments under the GATT Uruguay Round outcome. The CAP reforms' 50 % cuts in the oil seeds sector, when aggregated with reductions of about 10 % in domestic support to milk and sheepmeat would meet the required 20 % reduction in aggregate domestic support. The CAP reform also includes significant reduction in support in the cereals sector, coupled with set-asides and compensatory payments (which are not required to be reduced under the Uruguay Round agreement). As Rae and Nixon (1993) noted :" when applied to prices in the SWOPSIM data-base, the EU's proposed reductions in wheat and coarse grains (except maize) intervention prices result in new prices that are actually below the base border prices". The assumption made here is that the EU would produce these crops at world prices and therefore export subsidies would not be required. The set-asides are modelled by leftward shifts of the supply curves for wheat, maize, other coarse grains and oilseeds by 7, 9, and 12 % respectively (Haley, 1993 cited in Rae and Nixon (1993). The compensation payments, while excluded from the GATT's domestic support reduction requirement, are assumed to be not decoupled, and therefore reflected in the producer incentive prices.

Figure 5.4. Export Subsidy Commitment
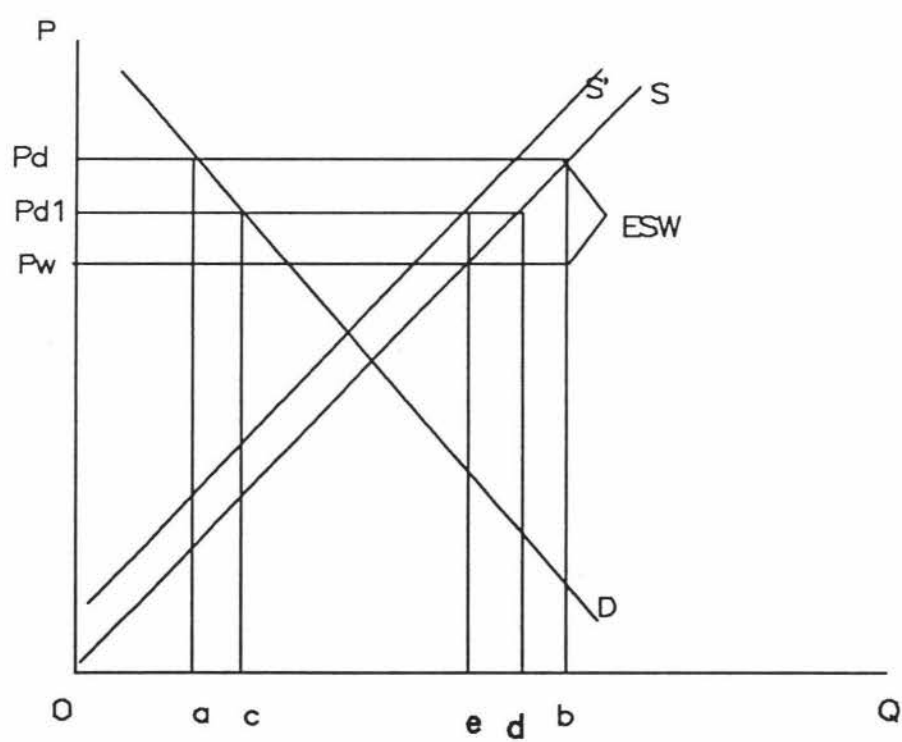
Modeling Indonesia's policies in scenario A (the Uruguay Round Outcome), required adjustments to PSEs to be considered for Indonesian four major food crops (rice, corn, soybean and sugar) in accordance with the GATT Uruguay Round outcome.

With reference to Table 5.2, it would appear that estimated levels of support for these four commodities varies considerably. The first column gives the PSE estimates from the SWOPSIM database. The second column indicates Indonesian PSE updates by the Ministry of Agriculture for the calender year 1988 (Muchtar, 1990), while the Ministry's estimates of the average 1986-88 PSEs are found in the third column.

Table 5.2. Estimated PSEs

Commodity	SWOPSIM PSE (US$/MT) in 1989	PSE estimates in 1988 (US$/MT)	Average PSE (1986-88) (US$/MT)	Percentage difference between 1988 and the (1986-88) average
	(a)	(b)	(b)	
Corn	-12	-31.36	10.04	..
Rice	-26	49.64	33.06	+ 50 %
Soybean	78	124.34	148.47	- 16.3 %
Sugar	155	193.12	182.12	+ 60 %

Sources:

(a) SWOPSIM data base (1989)

(b) The Indonesian Ministry of Agriculture (1990).

As described earlier in Chapter 4, the reuired reduction in internal support for Indonesia as developing that are subject to GATT disciplines would likely be reduced by two thirds of 20 percent over a ten year-period beginning in 1995. All of the support reductions are to be calculated from a 1986-88 base.

The data in the second column of Table 5.2 are directly comparable to those in the third column and refer to year closest to the SWOPSIM base period (of 1989) for which these data were available. Comparing the PSEs of the second and third columns, no reduction in support to corn production is required since that crop was taxed in 1988. For rice, support was actually 50 % above the 1986-88 average in 1988. However, no support reductions were modelled for this crop also, since the SWOPSIM data base for 1989 showed negative protection. By, 1988, subsidies paid to soybean producers were over 16 % less than the 1986-88 average, which has already met Indonesia's GATT commitment. Furthermore, it needs to be recognised that both corn and soybeans were deregulated in 1989 and 1991 respectively (as described in Chapter 3) as part of liberalisation of Indonesia's trade policies following the introduction of the government's June Package. It was assumed that the remaining distortions on soybeans will be unilaterally reduced during before 1999. This is not the case for sugar however, where support in 1988 had increased 6 % above its 1986-88 value. A de minimus standard of 10 percent would apply to Indonesia if the AMS for sugar is below 10 percent of the value of production. Given the fact that the AMS (or PSE here) for Indonesia's sugar production is over 10 percent, the reduction commitments for Indonesia as a developing country are not less than two-thirds of the value of the reduction commitments. The SWOPSIM model only recognises a medium-term for five or six years, while the reduction commitments of a two-thirds of internal support over a ten-year period would fall to 10 %. The net effect of reduced internal support in the SWOPSIM database, the value of internal support would be 15.5 US$.MT in 1989.

. SCENARIO A.2

The impact of the Uruguay Round outcome on the Indonesian economy will depend in part on the extent to which Indonesian prices and therefore supply and demand respond to changes in international markets. These responses are modelled within SWOPSIM with the transmission, supply and demand elasticities. Scenario A.2 changes these elasticities from their base values to assess the sensitivity of the Indonesian results to changes in these parameters.

As briefly described in section 5.2, the transmission elasticity allows the transmission of world-to-domestic price changes to be less than perfect. If the transmission elasticity is equal to 0.5 (as in the SWOPSIM) database for all Indonesian crops) then a 10 % change in a world price would produce a 5 % in the domestic price. Only if the transmission elasticity is equal to unity would the domestic price change also be 10%. That is a government may intervene to cushion domestic producers and consumers from experiencing the full world price change.

Changes in transmission elasticities towards unity in the Indonesian sub-model would be in line with the liberalisation measures that the Indonesian government has already taken to open the economy to international market forces and to bring domestic prices closer to world prices, as described in Chapter 4. Therefore, in this scenario all Indonesian transmission elasticities are changed to unity to examine how sensitive are the results to alternative elasticity estimates.

Selected supply and demand elasticities for the Indonesian food crops have also been changed in this scenario. Medium-run price elasticities of demand and supply for rice, corn, and soybean, as estimated by various authors are listed in Appendix C (Tables C. 7 and C. 8).

For the purpose of this study, the elasticities of BAPAGMOD model (Bappenas Agricultural Model) developed by Altemeir (1992) were adopted to include in the SWOPSIM Indonesian sub-model. The BAPAGMOD model was used because of its estimates demand and supply parameters were based on the almost ideal demand system approach using (time-series food balance sheet data). The BAPAGMOD model also provides more detailed information on supply and demand parameters than any other available studies.

Food crops in the BAPAGMOD model are represented by four commodities, rice (divided into wetland and dryland rice), corn , cassava and soybean. Supply is defined as the product of area harvested and yield per hectare. Furthermore, a regional distinction was made in the BAPAGMOD model by dividing Indonesia into two region, Java and Off-Java. Since the regions within any country are not recognised in SWOPSIM, the aggregate supply elasticities for both Java and off-Java were calculated as weighted sums of the required elasticities.(The formula for the derivation of supply elasticities is shown in appendix E). Since the BAPAGMOD model does not include supply and demand elasticities for sugar, the estimates of Rosegrant *et al* (1987) were used. The new supply and demand elasticities for corn, rice, soybean and sugar, to be used in Scenario A.2, are presented in Table 5.3.

Rather than run the complete 33-region SWOPSIM model again, this scenario was analyzed on the assumption that Indonesia is a 'small country' with regard to the selected crops. In 1989 for example, Indonesia's share of world trade was :

Rice   = 1.84 %
Corn   = 0.05 %
Soybean = 1.64 %
Sugar   = 1.18 %

Source : FAO Agrostat

Table 5.3. Selected Elasticities of Supply and Demand

	Base Elasticities		New Elasticities	
Commodity	Supply	Demand	Supply	Demand
Corn	0.35	-0.30	1.03	-0.21
Rice	0.30	-0.38	.84	-0.08
Soybean	0.23	-0.28	.56	-0.66
Sugar	0.45	-0.80	.10	-0.37

Note : All changes in supply and demand elasticities were adapted from the BAPAGMOD study, except sugar. Elasticities for sugar were taken from Rosegrant et al, 1987.

The Indonesian sub-model of SWOPSIM was isolated, and the appropriate changes made to the elasticities. Then the world price changes from scenario A.1 were inputs to this sub-model, and responses were computed. The complete set of price, supply and demand equations that was used is found in appendix D.

SCENARIO B (Total Liberalisation)

Modelling the total liberalisation scenario is straightforward; all producer and consumer support wedges are reduced to zero.

Chapter 6

RESULTS AND DISCUSSION

6.1. Impacts on World Prices

This chapter reports the results of experiments using the SWOPSIM trade model from which new equilibrium solutions were obtained by imposing various liberalisation scenarios.[1] The new solutions represent an approximation of the resulting adjustments in production, consumption, trade and prices of agricultural commodities expected over a medium term of around five years, with the important assumption that all other conditions remain the same as in the base year 1989. This permits the analysis to isolate and identify the differences between the new solutions and the initial or reference solutions and to attribute them to the removal of distortionary agricultural and trade policies.

The results of agricultural reform on world commodity prices are shown in Table 6.1. The analysis shows that world prices for most commodities would rise due to the reduction or elimination of subsidies and price supports in high support countries, in particular the European Union and the United Sates. In scenario A.1, the largest increases in world price are for coarse grains (17 %), sheepmeat (16%), and sugar (6 %). This reflects the high level of assistance given to these commodities in the industrialised nations. By contrast world prices for beef, pork, poultry meat and other oilseeds would increase only modestly (between 2 to 4 %), reflecting the generally lower levels of assistance to these commodities.

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[1]The Uruguay Round agreement simulated here is that of the Draft Final Act of December 991. At the time this research was conducted, the final 1993 agreement and accompanying ountry schedules of commitments were unavailable.

Table 6.1. Changes in World Prices
(percent changes)

	Scenario A.1 The Uruguay Round Outcome	Scenario B Total Liberalisation
Beef and Veal	4	22
Pork	4	3
Sheep meat	16	50
Poultry Meat	4	4
Poultry, Eggs	2	-3
Corn	3	4
Other Coarse Grains	17	14
Rice	2	8
Soybeans	-0.5	-2
Other Oil seeds	4	10
Sugar	6	21

From Table 6.1, it is seen that under the total liberalisation scenario, the largest increases in world prices are for sheepmeat (50%), beef and veal (22%), sugar (21%) and other coarse grains (14%), while the increases for corn, poultry meat and other crops are between 3 to 8 percent.

6.2. Impacts on Domestic Prices and Net Trade

Increases in world prices, when considered together with decreases in domestic subsidies, could either raise or lower domestic producer and consumer prices. For example, if reductions in subsidies are absolutely greater than increases in world prices, then domestic prices may on balance fall. Following sections summarise the consequent adjustments to consumption, production and net trade in selected countries.

6.2.1. Scenario A (The Uruguay Round Agreement)

The domestic price impacts faced by producers and consumers in two regions (the EU and Japan), and their supply and demand adjustments are shown in Table 6.2. The net impact of reduced producer support wedges and increased border prices in the EU is a reduction in both producer and consumer prices for livestock products. These lower prices lead to a decrease in EU production and increased consumption. These price changes for poultry meat and eggs have the affect of switching the EU from a net exporter to a net importer. The model indicates that the volume of beef and pork exports from the EU could fall by 31 % and 21 % respectively.

In the case of coarse grains, producer prices increase only moderately but consumer prices fall more substantially resulting in the EU changing from a net exporter to net importer. For sugar, reductions in internal support lead to price decreases, and EU exports of sugar could fall by 22 %. For corn, soybean and other oilseeds, EU consumption decreases by 1% and production falls by between 5% and 12% resulting in expansion of imports. In the case of rice, the world price increase is relatively small (2%) and following the reform of agricultural policies, the EU producer and consumer prices of rice decrease. These lower prices could lead to a decreased supply (6 %) and a small (2%) rise in demand.. As a result, EU rice imports rise by 43 %.

In Japan, the net effect of reduced domestic support and increased world prices leads to a reduction in domestic producer and consumer prices of beef, pork, coarse grains, rice and sugar. This leads to a reduction in production and increased consumption. As a result, Japan imports more of all these commodities, with rice imports showing be far the largest percentage increase, but from a very small base (i.e. from 18,000 MT to 706,000 MT). Model results indicate that Japan would become a net exporter (instead of being a net importer) of poultry meat and eggs, due largely to an expansion in supplies in response to cheaper feed costs. With respect to sugar, producer and consumer prices fall by 9% and 4%, leading to a decrease in sugar production, and an increase in demand and imports.

Table 6.2. Domestic Price and Volume Impacts
Scenario A.1. (The Uruguay Round Outcome)

	Price Changes (%)		Volume Changes (%)		Change in Net Trade (%)
	Producer	Consumer	Supply	Demand	
Europen Union					
Beef and veal	-5	-3	-2	0	- 31 (X)
Pork	-2	-1	-2	0	- 21 (X)
Sheep meat	-13	-8	-9	11	+ 124 (M)
Poultry meat	-2	-1	-10	0	.. (S2)
Poultry Eggs	-3	-2	-6	0	.. (S2)
Corn	10	-10	-5	-1	+ 46 (M)
Other coarse grains	5	-16	-11	5	.. (S2)
Rice	-15	-8	-6	2	+ 43 (M)
Soybeans	8	0	-9	-1	+ 0 (M)
Other Oilseeds	2	4	-12	-1	+ 43 (M)
Sugar	-9	-4	-2	2	- 22 (X)
Japan					
Beef and veal	-9	-5	-2	4	+ 10 (M)
Pork	-8	-4	0	2	+ 9 (M)
Sheep meat	16	8	0	-3	- 3 (M)
Poultry Meat	0	0	18	-3	.. (S1)
Poultry Eggs	2	1	12	1	.. (S1)
Corn	3	3	0	-4	- 4 (M)
Other coarse grains	-22	-21	-10	28	+ 30 (M)
Rice	-11	-6	-6	1	+ 3821 (M)
Soybeans	-12	0	-5	-1	- 0.4 (M)
Other Oilseeds	4	4	8	-2	- 2 (M)
Sugar	-9	-4	-4	2	+ 5 (M)

Note : (S1) = the country switched from net importer to net exporter

(S2) = the country switched from net exporter to net importer

(M) = net importer

(X) = net exporter

6.3 Impacts on the Indonesian Food Crop Sector

6.3.1 Price and Volume Impacts

World prices for commodities that are of importance to Indonesia (corn, rice and sugar) increase moderately by 3%, 2% and 6% respectively (see Table 6.1). An exception is soybean, where the world price decreases by 0.5%. Except for sugar, internal producer and consumer prices move in the same direction (Table 6.3). In the case of sugar, Indonesia's reduction in subsidy payments results in domestic producer and consumer prices falling, despite the moderate increase in the world price for sugar. It should also be noted[2] that under Scenario A.2 (with transmission elasticities increased to unity), the domestic price changes in response to world price movements are magnified relative to those that result under Scenario A.1.

The changes in the volume of production, consumption and net trade that occur in Indonesia as a result of the domestic price changes are shown in Table 6.4, while Table 6.5 summarises the differences between Scenarios A.1 and A.2. Increased producer prices for corn and rice lead to increased production of 19,000MT and 112,000MT respectively under Scenario A.1 (increases in each case of just 0.4%). The increases in production are considerably greater under Scenario A.2 since not only are the domestic price increases larger, but the supply elasticities are also greater (see Table 5.3). In this situation, Indonesian corn and rice production would rise by 3% and 2.5% respectively. The decline in the producer price of sugar under Scenario A.1 results in

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[2]Because of Indonesia's recent market opening policy changes, and because Scenario A.2 ncorporates, in the writer's opinion, the best available elasticity estimates, that Scenario is onsidered the more likely of the two.

Table 6.3. Producer and Consumer Prices for Indonesian Food Crops

Scenario and Product	Base Values (US$/MT)		Simulated Prices (US$/MT)		Percent Changes (%)	
	Producer	Consumer	Producer	Consumer	Producer	Consumer
SCENARIO A.1.						
Corn	74	82	75	84	1.9	2
Rice	219	439	222	442	1.6	0.7
Soybean	193	203	193	203	-0.2	-0.1
Sugar	433	866	425	858	-1.8	-0.9
SCENARIO A.2.						
Corn	74	82	77	85	3.5	3.5
Rice	219	439	226	446	3.3	1.5
Soybean	193	203	193	203	-0.2	-0.1
Sugar	433	866	432	865	-0.2	-0.1

Table 6.4. : Production, Consumption and Net Trade for Indonesian Food Crops (Scenario A.1 and A.2)

	Production ('000 MT)				Consumption ('000 MT)				Net Trade (000 MT)			
	Base	Simulated value	Difference	(%)	Base	Simulated value	Difference	(%)	Base	Simulated value	Difference	(%)
SCENARIO A.1												
Corn	5000	5019	19	0.4	4900	4882	-18	-0.4	100	138	38	38
Rice	29072	29184	112	0.4	29380	29307	-73	-0.2	-308	-123	185	-60
Soybean	1100	1100	0	0	1598	1596	-2	-0.1	-498	-496	2	0
Sugar	1889	1874	-15	-0.8	2171	2189	18	0.8	-282	-315	-33	12
SCENARIO A.2												
Corn	5000	5149	149	3	4900	4877	-23	-0.5	100	271	171	171
Rice	29072	29810	738	2.5	29380	29358	-22	-0.1	-308	452	760	.. (S1)
Soybean	1100	1100	0	0	1598	1593	-5	-0.3	-498	-493	5	0
Sugar	1889	1889	0	0	2171	2177	6	0.3	-282	-288	-6	2

Note : S1 = The country switched from net importer to net exporter

a downward adjustment in production of 15,000MT, or 0.8%. Under Scenario A.2, more of the world price increase is allowed to be transmitted domestically, almost offsetting the reduced subsidisation of sugar so little change in output occurs.

On the demand side, domestic consumption of both rice and corn decline in response to higher prices. Note that under Scenario A.2, the decrease in rice consumption is less than occurs under the other scenario despite the higher consumer price. The reason for this is that under the second scenario rice demand is more inelastic than is the case in Scenario A.1 (see Table 5.3). The decreased consumer price for sugar lead to slight upward adjustments in consumption, of less than 1%.

The net effect of the above demand and supply responses is that Indonesia expands her exports of corn under either scenario, but especially in Scenario A.2. Imports of rice decline in Scenario A.1, but the large production boost that results under Scenario A.2 means that in this case Indonesia switches from an importer to an exporter of rice. In either Scenario, the country expands imports of sugar.

6.3.2 Welfare Impacts

One measure of the impacts of the Uruguay Round agreement on food crop producers in Indonesia is simply the impact on producer gross revenues. This is shown in Table 6.6. To iron out the effects of any one base year being "unusual", these calculations are based on actual production volumes averaged over the period 1987 to 1989. Likewise, domestic prices (at the wholesale level) have also been averaged over that three year period. As a result, Table 6.6 shows that the (wholesale) value of Indonesian corn, rice, soybean and sugar production was US$62.4 billion on average over 1987-1989. To estimate how this value would change under either of the Uruguay Round scenarios, the production and unit value data of the Table were adjusted by the estimated percentage changes in production (from Table 6.4) and producer price (from Table 6.3). The results given in Table 6.6 show that gross revenues (at the wholesale level) could rise by between 2% and 6%.

Table 6.5. A Comparison of Scenarios A.1 and A.2.

| | Simulated Values Of: | | | | | | | | |
| | Production ('000 MT) | | | Consumption ('000 MT) | | | Net Trade ('000 MT) | | |
	A.1	A.2	Difference	A.1	A.2	Difference	A.1	A.2	Difference
Corn	5019	5149	130	4882	4877	-5	138	271	133
Rice	29184	29810	626	29307	29358	51	-123	452	..(S1)
Soybean	1100	1100	0	1596	1593	-3	-496	-493	3
Sugar	1874	1889	15	2189	2177	-12	-315	-288	27

Note : S1 = The country switched from net importer to net exporter

The impacts of the Uruguay Round agreement on both producer and consumer surplus in Indonesia are given in Table 6.7. These measures have been calculated with the SWOPSIM procedures as given in Roningen, Sullivan and Dixit (1991, p. 127). Producer surplus increases under both scenarios, but particularly under the second where world price increases are more fully transmitted into the domestic agricultural sector. As expected, these world price rises lead to a reduction in consumer surplus again especially under Scenario A.2. Importantly, the change in net welfare, as given by the sum of the changes in both producer and consumer surplus, is positive for both scenarios. Thus producers could compensate consumers for the latter group's decline in welfare and the economy would still show positive benefit from the Uruguay Round agreement.

One concern of food-importing developing countries when faced with trade liberalisation is that higher world prices will increase their foreign exchange expenditures on those imports. Table 6.8 shows that this will not be the case with Indonesia, at least for the four major food crops studied. Export earnings from corn increase under both scenarios, due to the expansion in export surpluses (Table 6.4). Expenditures on imports of sugar do increase for each scenario, but there is little change in the cost of soybean imports due to there being very little change in either world or domestic prices for this commodity (see Tables 6.1 and 6.3). Indonesia's modelled expansion in rice production especially with the higher supply elasticity of Scenario A.2, has the major impact on the trade balance. The cost of rice imports would be more than halved under Scenario A.1, while under the second scenario the country would become an exporter of rice, adding (at 1989 values) US$114 million to foreign exchange earnings. The result is that under either scenario, Indonesia's trade balance for these four food crops would improve. Under Scenario A.2 (which is considered the most likely of the two), the value of corn and rice exports would almost exactly balance the cost of imports of soybean and sugar.

Finally, the Indonesian government's subsidy expenditures would fall, since the modelled solutions have assumed a reduction in the level of the sugar subsidy. Based on the 1989 SWOPSIM data, the producer subsidy wedge was US$155/MT paid on a

Table 6.6. Measuring Impacts on Indonesian Producer Revenue

	Base production			New Production		
	(a)	(a)	(a)			
	Volume ('000 MT)	Value ('000 US$)	Unit Value (US$/MT)	Volume ('000 MT)	Value ('000 US$)	Unit Value (US$/MT)
SCENARIO A.1.						
Corn	6,006	1,069,068	178	6,030	1,091,430	181
Rice	176,340	59,779,260	339	177,045	60,903,480	344
Soybeans	1,244	612,048	492	1,244	610,804	491
Sugar (b)	2,065	911,700	442	2,048	888,832	434
TOTAL		62,372,076			63,494,546	
Change in Producer Revenue					1,122,470 (1.8%)	
SCENARIO A.2						
Corn	6,006	1,069,068	178	6,186	1,138,224	184
Rice	176,340	59,779,260	339	180,749	63,262,150	350
Soybeans	1,244	612,048	492	1,244	610,804	491
Sugar (b)	2,065	911,700	442	2,065	910,665	441
TOTAL		62,372,076			65,921,843	
Change in Producer Revenue					3,549,767 (5.7%)	

Note : All base values are computed at their 1987 - 1989 averages.

Sources:
a. The World Bank, 1992, Indonesia : Agricultural Transformation Challenges and Opportunities (Vol. II)
b. Fletcher, L.B, and K. Altemeier, 1991

Table 6.7   Changes in Producer and Consumer Welfare Due to the Uruguay Round (US$million)

	Change in Producer Welfare	Change in Consumer Welfare	Change in Net Welfare
SCENARIO A.1			
Corn	6.6	-7.8	
Rice	97.1	-85.1	
Soybean	-0.4	0.5	
Sugar	-14.6	16.7	
TOTALS	88.7	-75.7	13
SCENARIO A.2			
Corn	12.6	-13.7	
Rice	208.1	-196.7	
Soybean	-0.3	0.2	
Sugar	-2.1	2.2	
TOTALS	218.3	-208	10.3

Table 6.8 Impacts on Net Trade Balance

	BASE VALUES			SCENARIO A.1			SCENARIO A.2		
	net trade ('000MT)	Unit value (US$/MT)	Value of trade (US$ million)	net trade ('000MT)	Unit value (US$/MT)	Value of trade (US$ million)	net trade ('000MT)	Unit value (US$/MT)	Value of trade (US$ million)
Corn	100.0	87.0	8.7	137.6	87.8	12.1	271.4	89.1	24.2
Rice	-308.0	246.0	-75.8	-123.4	248.5	-30.7	451.8	252.3	114.0
Soybean	-498.0	115.0	-57.3	-496.1	114.8	-57.0	-493.4	115.0	-56.7
Sugar	-282.0	278.0	-78.4	-314.7	285.4	-89.8	-288.2	292.0	-84.2
Net trade balance			-202.7			-165.4			-2.7
Change from base value						37.4			200.0

production volume of 1.889 million tonnes, giving a total subsidy payment of US$293 million. Making a similar calculation but using the prices, per unit subsidy reductions and production volumes estimated for both scenarios, shows that government sugar subsidy expenditures would fall by US$31 million (10.6%) under Scenario A.1, and by US$29 million (9.9%) under Scenario A.2.

To summarise, implementation of the Uruguay Round agreement would, over the medium term and in regard to four major food crops only, increase Indonesian net welfare, reduce government subsidy expenditures and improve the food trade balance.

Chapter 7

CONCLUSIONS

This study has attempted to provide a quantitative assessment of the implications of trade liberalisation in the industrialised countries on the Indonesian food crops sector. More specifically, the current GATT Uruguay Round outcome was modelled in order to assess the implications of trade reform on production, consumption and trade in the industrialised countries as well as in Indonesia. The analysis was carried out through the Static World Policy Simulation (SWOPSIM) model framework.

The results of the model clearly showed that liberalisation in the industrialised countries in likely to lead to higher food prices. Consequently, Indonesia as a net-importer of food would be affected in the medium-run by the increased world prices.

The results from Scenario A.1 suggest that Indonesian producers would benefit from increased exports of corn. Indonesia would continue, however, to be a net importer of rice, soybean and sugar. In Scenario A.2., (perhaps the more likely), changes to the supply, demand and transmission elasticities were shown to result in even further increases in corn exports, and the country switching from an importer to an exporter of rice.

The results also indicated that under either scenario the increase in Indonesian producer surplus would more than compensate for the reduction in consumers surplus. Furthermore, in both scenarios, foreign exchange earnings from trade would increase and Indonesian government subsidy expenditures would fall.

Despite recent import liberalisation measures, the Indonesian government continues to isolate domestic farm markets from international price fluctuations, primarily though trade licensing and state trading. Trade in rice is not seriously distorted by these measures because domestic and world prices are in rough parity, but production, consumption and trade of soybeans are affected by restrictive trade practices that protect domestic production and tax consumption.

This study concludes that Indonesia should reduce protective trade barriers for food crops especially sugar and soybeans and continue towards trade liberalisation. Continuing liberalisation in the non-farm sectors of the economy and reforms to policies

affecting agricultural production and consumption would allow Indonesia to develop new markets and the opportunity to diversify its exports.

The commodities focused on in this study comprised corn, rice, soybean and sugar. Due to the inadequate data on livestock products, it proved impossible to include livestock products in the Indonesian model. Deregulation of the livestock industry and corn trade, and tariffication of soybean meal have contributed to growth in meat production (Rae and Kasryno, 1993). In recent years, Indonesia has already been entering the first phases of a rapid transformation in the feed-livestock sector. As Indonesia enters the middle income category, demand for livestock products will rise rapidly and bring about changes in the structure of agricultural production. Therefore further study to investigate the effects of demand and consumption of livestock products, particularly in the context of international trade liberalisation may be particularly relevant.

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SUMMARY OF THE AGREEMENT ON AGRICULTURE OF THE GATT URUGUAY ROUND

The final act embodying the results of the Uruguay Round of Multilateral Trade Negotiations on Agriculture agreed on 15 December 1993 in Geneva has four elements: a basic agreement supplemented by an agreement on the modalities for establishing specific binding commitments under the reform programme, a decision on the application of sanitary and photosanitary measures and a declaration on measures to assist net food-importing developing countries.

In market access, the proposals envisage the tariffication of all non-tariff measures. The resulting tariffs together with all existing customs duties, would be subject to a 36 percent reduction between the years 1995 and 2000, with a minimum cut of 15 percent reduction for each individual tariff line. All agricultural customs would be bound in the GATT. In case of an import surge or shipments at prices below a certain reference level, importing countries could impose additional duties under a special safeguard clause. Current access opportunities would be maintained. Where there are currently no significant imports, minimum market access opportunities of 3 percent of domestic consumption would be established, expanding to 5 percent by 1999.

Domestic support measures would be divided into trade-distorting support ('amber policies') and policies which have at most a minimal impact on trade ('green policies' or policies in the ('Green Box'). The Green Box covers a wide range of support measures including general government services, for example in the areas of research, disease control, infrastructure, environment protection and food security; it also includes direct payments to producers, for example certain ('decoupled') forms of income support, structural adjustment assistance, direct payments under environmental programmes and under regional assistance programmes. Only amber policies would be

subject to reduction commitments. The agreement thus provides incentives to switch to forms of support which are non-trade distortive.

The commitments to reduce amber policies would be expressed in the form of an aggregate Measurement of Support (AMS), in which for each basic agricultural product a single figure for the value of all forms of support to reduction would be calculated. Amber support would be reduced by 20 percent between 1995 and 2000. Where the calculation of an AMS figure is not practicable, but where trade-distorting support exists, equivalent commitments would be undertaken on a product-specific basis.

The final agreement contains a listing of export subsidies subject to reduction commitments. The reductions would take place between the years 1995 and 2000 and would amount to 36 percent in terms of budgetary outlays and 21 percent in terms of quantities of subsidised exports. There would also be an undertaking not to introduce or re-introduce export subsidies on products on which export subsidies had not been granted during the 1986-1990 base period. Further, the agreement contains provisions aimed at preventing the circumvention of the export competition commitments, for example by setting out criteria for international food aid donations.

In keeping with the recognition that differential and more favourable treatment for developing country Members is an integral part of the negotiation, special and differential treatment in respect of commitments shall be provided as set out in the relevant provisions of the final agreement and embodied in the Schedules of concessions and commitments. The least-developed nations would be exempt from all reduction commitments. Developing countries shall have the flexibility to implement reduction commitments over a period of up to 10 years, specifically not less than two-thirds of the reductions mentioned above. In recognising their need to encourage agricultural and rural development, developing countries are exempted from reduction commitments with respect to generally available input subsidies and investment aids.

Experience during the implementation period of the Uruguay Round agreement would be monitored and evaluated by a newly created Agriculture Committee. Certain 'peace' provisions are designed to contribute to a smooth implementation of the reform programme.

The final part of the agreement concerns the application of sanitary and photosanitary measures - in other words food safety and animal and plant health regulations. The agreement recognises that governments have the right to take sanitary and photosanitary measures but they should be applied only to the extent necessary to protect human, animal or plant life and should not arbitrarily or unjustifiably discriminate between country Members where identical or similar conditions prevail. It is expected that Members would accept the sanitary an photosanitary measures of others as equivalent if the exporting country demonstrates to the importing country that its measures to achieve the importing country's appropriate level of protection. The agreement includes provision on control, inspection and approval procedures.

APPENDIX B.
FIGURES

FIGURE 1. GATT. STRUCTURE OF THE NEGOTIATIONS
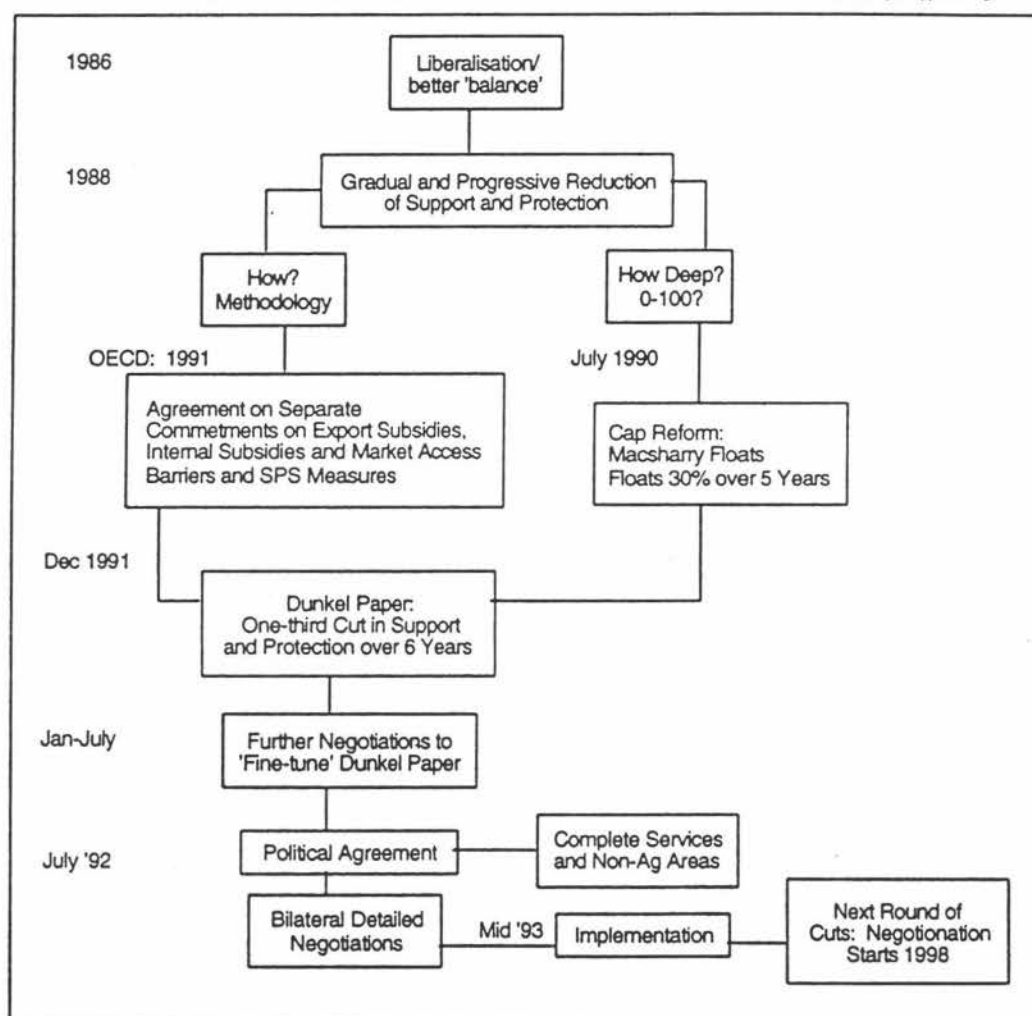
SOURCE : MAF, 1992

FIGURE 2. GATT Tree

Structure of the Uruguay Round negotiations

The first figure in brackets is the 1987 volume of imports covered by each negotiations; the second figure is the estimated expenditure in trade that would follow complete liberalization.

Trade Negotiations Commettee

Survelliance body on standstill and rollback

Group of negotiations on goods ($2,500 bn: 5,400 bn)

Group of : negotiations on services ($500: 50)

Tariffs ... ($2,000 bn: 140 bn)
Non-tariff
measures ... ($700 bn: 330 bn)

- Safeguards
- Subsidies and countervalling measures
- GATT articles
- MTN agreements and arrangements
- GATT functioning (FOGS)
- Settlement of disputes

- Natural resource
  products .... ($130 bn: small)
- Textiles and clothing ... ($160 bn: 550 bn)
- Tropical prducts .... ($40 bn: 52 bn)
- Agricultural products .. 330 bn: 100 bn)

- Trade-related intellectual
  property rights   (TRIPs)
- Trade-related investment
  measures   (TRIMs)

Source: Dillon (1992)

APPENDIX C.
TABLES

Table C.1. Indonesian Macroeconomic Data (1987 - 1992)

Country and Item	Units	1987	1988	1989	1990	1991	1992(e)	1993(f)
Population	Million	172.0	175.6	179.1	179.3	187.8	-	-
Exchange rate	Rupiah/US$	1,644	1,686	1,770	1,843	1,950	2,030	-
GDP	Bil. Rup	124,817	142,105	167,495	197,721	216,403	-	-
Real GDP	Bil. Rup (1985)	113,455	113,982	122,581	131,614	139,889	-	-
Real per capita GDP (US$)	US$/person	439	438	446	469	471	-	-
Value of farm production	Bil. $	-	-	-	-	-	-	
Real GDP growth (local currency)	Percent	10.5	0.5	7.5	7.4	6.3	-	-
Change in CPI	Percent	9.2	8.0	6.4	7.5	9.3	7.5	-
Unemployment Rate	Percent	-	-	-	-	-	-	
Current account balance	Mil. US$	-2,098	-1,397	-1,108	-2,988	-4,080	-	-
Merchandise export, f.o.b.	Mil. US$	17,206	19,509	22,974	26,807	29,430	-	-
Merchandise import, c.i.f.	Mil. US$	12,532	13,831	16,310	21,455	24,626	-	-
Balance	Mil. US$	4,674	5,678	6,664	5,352	4,804	-	-
Agricultural exports, f.o.b.	Mil. US$	2,781	3,337	2,940	2,813	3,139	-	-
Agricultural imports, c.i.f.	Mil. US$	1,149	1,335	1,649	1,629	2,096	-	-
Balance	Mil. US$	1,631	2,001	1,291	1,184	1,043	-	-
Foreign exchange reserves	Mil. US$	5,483	4,948	5,357	7,353	9,151	-	-
Trade with U.S.:								
Total exports	Mil. US$	759	1,051	1,248	1,881	1,868	2,732	-
Total imports	Mil. US$	3,328	3,145	3,478	3,341	3,465	4,426	-
Agricultural exports	Mil. US$	238	216	277	279	353	224	-
Agricultural imports	Mil. US$	839	864	683	658	789	583	-

(e) = estimates. (f)= forecast

-- = not available

Source : International Agricultural and Trade Reports, Asia and Pacifi Outlook, September 1993.

Table 2. Indonesia's Agricultural PSE for five commodities

Item	Unit	Rice				Corn				Soybean				Cassava				Sugar			
		1986	1987	1988	Average	1986	1987	1988	Average	1986	1987	1988	Average	1986	1987	1988	Average	1986	1987	1988	Average
Production	Mil mt	37.74	37.74	38.39	38.34	5.92	5.16	6.65	5.91	1.23	1.16	1.27	1.22	13.31	14.36	15.47	14.38	2.02	2.13	1.91	2.02
Producer Rice	Rp/Kg	285.00	285.00	344.00	314.00	120.00	120.00	135.00	125.00	313.00	313.00	340.00	322.00	45.95	45.95	45.95	45.95	622.02	663.00	730.00	671.67
Value to Producers	Bil Rp	10,755.62	10,755.62	13,524.7	12,039.18	710.52	618.72	898.02	738.71	384.05	363.39	431.80	692.63	611.67	659.64	710.88	660.73	1,258.93	1,410.2	1,393.57	1,356.77
Price Difference	Rp/kg	43.28	43.28	42.06	20.67	1.57	11.62	59.07	24.09	124.76	111.20	120.60	118.85	0.00	0.00	0.00	0.00	199.26	308.34	312.04	273.21
Policy Transfers :																					
State Control	Bil Rp	1,633.22	885.34	1,653.47	792.58	9.30	59.90	392.94	154.05	153.09	129.10	153.16	144.92	0.00	0.00	0.00	0.00	403.31	655.84	595.68	551.89
Inputs subsidy	Bil Rp	163.77	179.84	121.59	146.07	22.77	29.94	20.24	24.32	8.08	10.36	7.19	8.63	9.14	12.02	8.13	9.76	0.00	0.00	0.00	0.00
Irrigation Subsidy	Bil Rp	127.54	161.70	195.86	161.70	9.11	11.55	13.99	11.55	18.22	23.10	27.98	23.10	0.00	0.00	0.00	0.00	18.22	23.10	27.98	23.10
Land Utilization-Reforming Su	Bil Rp	31.24	31.24	31.24	31.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Seed Subsidy	Bil Rp	354.23	733.72	1,241.98	29.78	0.00	0.00	0.00	0.00	129.99	76.82	77.23	94.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Agricultural credit	Bil Rp	6.14	30.18	53.03	29.78	0.41	1.57	3.52	1.83	0.22	0.92	1.69	0.95	0.01	1.68	2.79	1.49	0.00	0.00	0.00	0.00
Intensification Program of Agri	Bil Rp	9.92	6.90	5.48	7.43	0.66	0.36	0.36	0.46	0.35	0.21	0.17	0.25	0.01	0.01	0.01	0.01	1.16	0.82	0.56	0.85
Training and Extension	Bil Rp	3.64	2.43	2.56	2.88	0.24	0.13	0.17	0.18	0.13	0.07	0.08	0.10	0.00	0.00	0.00	0.00	0.43	0.29	0.26	0.33
Research & Development	Bil Rp	4.63	1.14	1.19	2.32	0.31	0.06	1.19	0.52	0.17	0.03	0.04	0.08	0.01	0.00	0.00	0.00	0.54	0.13	0.12	0.27
Forest, Water and Soil Conserv	Bil Rp	0.16	0.04	0.09	0.10	0.01	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.01	0.01
Environmental & Natural resou	Bil Rp	0.20	0.05	0.08	0.11	0.01	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.01	0.01
Total Transfers	Bil Rp	2,307.69	261.89	3,306.57	1,958.72	24.21	16.29	363.45	1151.8	309.86	240.89	267.55	272.76	9.17	13.70	10.92	11.27	423.70	680.19	624.63	576.17
PSE (per unit value)	Percentage	21.46	2.20	24.45	16.04	3.41	2.63	39.34	12.86	80.68	66.29	61.96	69.64	1.50	2.08	1.54	1.70	33.70	48.23	44.82	42.24
PSE (per unit quantity)	Rp/Kg	61.15	6.90	84.10	51.09	4.09	3.16	53.13	17.40	252.53	207.48	210.67	223.54	0.69	0.95	0.71	0.78	209.34	319.98	327.20	285.44
	US$/mt	47.27	4.48	49.64	33.06	3.16	1.92	31.36	10.04	195.23	125.85	124.34	148.47	0.53	0.58	0.42	0.51	161.83	193.98	193.12	182.98
Exchange rate	Rp/US$	1,293.54	1,648.6	1,694.25	1,545.46	1,293.54	1,648.6	1,694.25	1,545.46	1,293.54	1,648.6	1,694.25	1,545.46	1,293.54	1,648.6	1,694.25	1,545.46	1,293.54	1,648.6	1,694.25	1,545.46

Source : Adapted from Magiera (1989) and Muchtar (1990)

TABLE 3 : AGRICULTURAL BALANCE OF TRADE (US$ 000)

COMMODITY GROUP	74-76 Average	79-81 Average	84-86 Average	88-89 Average
A. EXPORTS				
Rubber	446.404	591.921	794.598	1039.452
Fish and Shelfish	103.762	141.415	263.503	796.859
Palm Oil, others oils and products	160.803	127.590	253.776	473.217
Coffee	168.676	540.206	650.401	474.015
Tea	54.058	98.965	158.153	.156.468
Pepper and Spices	46.422	71.130	148.900	185.586
Cocoa and Chocolate	3.019	27.668	59.525	98.644
Cassava, maize and feedstuffs	60.202	93.510	74.877	110.908
Fruits and vegetables (fresh and processed)	22.591	58.904	70.037	199.269
Other processed foods	2.200	˙5.594	8.015	30.387
Rice		1.521	32.735	4.194
Tobacco and products	37.733	56.947	53.304	99.325
Animals and animal products	9.130	8.039	11.444	939.938
Others	8.781	21.074	33.206	40.371
TOTAL EXPORTS	**1123.781**	**1844.484**	**2612.474**	**3748.632**
B. IMPORTS				
Rice	383.576	497.705	48.938	32.899
Wheat and flour	78.217	141.587	271.951	269.575
Soybeans, other oil seeds	7.747	35.391	118.146	160.887
Vegetable oils and and products	3.994	22.312	33.951	114.044
Other cereals	9.082	15.154	25.277	21.225
Animals and animal products	3.566	20.127	21.145	30.400
Milk and dairy products	32.015	76.513	63.544	75.333
Fish and shelfish	4.699	3.431	4.683	5.117
Sugar	56.661	292.493	10.379	97.827
Fruits and vegetables	12.659	75.271	27.190	55.540
Processed foods and beverages	60.734	107.014	40.662	39.539
Animals feedstuffs	0.658	42.871	105.956	177.934
Tobacco	12.802	26.207	14.526	34.626
Cotton	72.608	167.906	188.656	387.962
Others	2.910	5.367	0.405	1.103
TOTAL IMPORTS	**741.928**	**1529.349**	**975.409**	**1504.011**
C. NET BALANCE				
TOTAL EXPORTS	1123.781	1844.484	2612.474	3748.632
TOTAL IMPORTS	741.928	1529.349	975.409	1504.011
NET BALANCE	**381.853**	**315.135**	**1637.065**	**2244.621**

Source : Central Bureau of Statitics
Note : A summary of net trade is presented in table 3.5. (chapter 3).

Appendix C

Table 4 : INVESTMENT IN AGRICULTURE
(Rp Billion, Current Prices)

Year	Central Government Development Expenditure			Estimated Central Government Investment			Other Government	Public Enterprises	Private	Agricultural Investment Total	Share of total %	Investment Agriculture %
	Agriculture	Fertilizer Subsidy	Irrigation	Food Crops	Other	Total						
1977	110	32	238	175	17	191						
1978	104	83	264	216	15	231		87				
1979	126	125	258	218	17	235		176				
1980	283	284	363	282	35	318		246				
1981	232	371	351	297	36	333		244	1,894	2,441	16	16
1982	222	420	289	256	33	288		244	1,541	1,845	12	12
1983	316	324	273	233	42	275	21	175	795	1,091	6	6
1984	503	732	465	350	66	416	24	410	780	1,220	6	6
1985	174	477	487	404	37	441	40	319	1,073	1,555	7	7
1986	184	467	239	253	26	279	40	225	2,321	2,520	11	11
1987	778	736	403	304	91	395	31	788	5,016	5,412	18	19
1988	932	200	482	388	130	517		204	6,475	7,034	19	21
1989	1.261	155	578	465	171	636						
1990	1.539	155	698	561	213	774						

Source : Bappenas, 1991

Scenario A.1 (THe Uruguay Round Outcome)

Table C.5. Percentage Change in Producer, Consumer price, production, consumption and net trade

European Union

	Base Period					Solution					Percent Changes				
		CNPRICE	SUPPLY	DEMAND	NTRADE		LPRPRICE	LCNPRICE	SUPPLYE	DEMANDE	NTRADEE		LPRPRICE	LCNPRICE	SUPPLYE	DEMANDE NTRADEE
BF	3843	6856	7878	7304	574	3649	6662.6	7704	7307	397	-5.04814	-2.82089	-2.20868	0.041073	-30.8362
PK	1726	3451	13786	12995	791	1690.1	3415.8	13562	12938	624	-2.07995	-1.01999	-1.62484	-0.43863	-21.1125
ML	5744	8559	1131	1330	-199	5007.4	7852.1	1033	1479	-446	-12.8238	-8.25914	-8.6649	11.20301	124.1206
PM	1340	2437	6280	5926	354	1309.8	2406.4	5634	5935	-301	-2.25373	-1.25564	-10.2866	0.151873	-185.028
PE	1160	1933	5212	5144	69	1130.5	1903.6	4899	5159	-260	-2.5431	-1.52095	-6.00537	0.291602	-476.812
CN	188	205	26876	29326	-2450	207	184.3	25533	29117	-3584	10.10638	-10.0976	-4.99702	-0.71268	46.28571
CG	174	197	62748	56603	6145	182.5	165.9	55956	59339	-3383	4.885057	-15.7868	-10.8242	4.833666	-155.053
RI	407	779	1386	1654	-268	348	720.3	1312	1694	-382	-14.4963	-7.5353	-5.33911	2.41838	42.53731
SB	478	297	1969	15014	-13045	516.5	295.5	1785	14869	-13084	8.054393	-0.50505	-9.34485	-0.96577	0.298965
OS	488	232	9509	11891	-2383	494.7	240.3	8325	11739	-3414	1.372951	3.577586	-12.4514	-1.27828	43.26479
SU	340	748	15344	12739	2605	310.9	719.1	15035	12990	2045	-8.55882	-3.86364	-2.01382	1.970327	-21.4971

Table C.6. Percentage Change in Producer, Consumer price, production, consumption and net trade

Japan

	Base Period					Solution					Percent Changes				
	PRPRICE	CNPRICE	SUPPLY	DEMAND	NTRADE	LPRPRICE	LCNPRICE	SUPPLYE	DEMANDE	NTRADEE	LPRPRICE	LCNPRICE	SUPPLYE	DEMANDE	NTRADEE
BF	11259	20470	548	1046	-498	10295.7	19506.9	536	1086	-549.9	-8.55582	-4.70493	-2.18978	3.824092	10.42169
PK	3138	6275	1594	2085	-491	2886	6023.5	1587	2124	-536.4	-8.03059	-4.00797	-0.43915	1.870504	9.246436
ML	2321	4642		139	-139	2691.2	5012.1		135	-135.3	15.95002	7.972857		-2.8777	-2.66187
PM	1551	2819	1482	1763	-281	1556.1	2824.8	1745	1709	36.8	0.32882	0.205747	17.74629	-3.06296	-113.096
PE	1696	2827	2444	2677	-232	1725.8	2856.4	2735	2692	66.4	1.757075	1.039972	11.90671	0.560329	-128.621
CN	111	123	2	16202	-16200	114.2	126.5	2	15589	-15587.2	2.882883	2.845528	0	-3.78348	-3.78272
CG	1084	1025	377	5986	-5609	846.4	808.4	339	7634	-7294.8	-21.9188	-21.1317	-10.0796	27.53091	30.05527
RI	2095	4044	9416	9434	-18	1844.4	3793.1	8858	9564	-705.9	-11.9618	-6.20425	-5.92608	1.377994	3821.667
SB	1882	655	272	4939	-4667	1666.4	652.9	257	4907	-4649.7	-11.4559	-0.32061	-5.51471	-0.6479	-0.37069
OS	551	612	39	2344	-2305	571.2	632.4	42	2303	-2261	3.666062	3.333333	7.692308	-1.74915	-1.90889
SU	1529	3259	984	2830	-1846	1397.3	3126.4	945	2894	-1942.2	-8.61347	-4.06873	-3.96341	2.261484	5.211268

	Corn					Soybean					Cassava					Sugar
	Corn Price		Fertilizer	Exogenous Changes (		Soybean Price		Fertilizer	Exogenous Changes (% p.a.)		Cassava Price		Fertilizer	Exogenous Changes (% p		Exogenous Changes
	Yield	Area	Price	Productivity Expansion	Area Trend	Yield	Area	Price	Productivity Expansion	Area Trend	Yield	Area	Price	Productivity Expansion	Area Trend	Productivity Expansion
JAVA																
BAPAGMOD	0.60	0.49	-0.16	5.96	0.15	0.21	0.40	-0.04	3.76	0.34	0.30	0.08	-0.05	2.76		0.59
ADB-BAPPENAS	0.60	0.49	-0.16	5.96	0.15	0.21	0.40	-0.04	3.76	0.34	0.30	0.08	-0.05	4.55	-1.19	0.59
IFFPRI	0.07	0.13	-0.05	0.29		0.09	0.32	-0.03	0.10		0.14	0.16	-0.03	0.04	-1.19	
PEARSON																
OFF JAVA																
BAPAGMOD	0.54	0.43	-0.07	3.07	2.57	0.19	0.34	-0.03	3.02	5.89	0.04	0.40	0.00	2.76		
ADB-BAPPENAS	0.54	0.43	-0.07	3.07	1.88	0.19	0.34	-0.03	3.02	5.89	0.04	0.40	0.00	2.76	0.98	3.51
IFFPRI	0.19	0.13	-0.08	0.20		0.16	0.28	-0.03	0.11		0.09	0.12	-0.01	0.04	0.98	3.51

Source :

BAPAGMOD, Klaus Altemeier, Bappenas Agricultural Model. Consultancy report, January 1992

ADB-BAPPENAs, Kesavan, T. et al, Supply and Demand Parameters for Food Crop Sector Model. Model and Estimation, ADB-Bappenas, April 1992

IFFPRI, Rosegrant and Kasryno, Food Crop Supply Response in Indonesia. A system Approach, February 1991

PEARSON, Pearson, Scott et al. Rice Policy in Indonesia, Cornell University Press, 1991

	Y-elas	P-elas	Y-elas	P-elas	Y-elas	P-elas	Y-elas	P-elas	Y-elas	P-elas	Y-elas	P-elas	Y-elas	P-elas
BAPPENAS MODELS	0.26	-0.08	0.38	-0.21	0.54	-0.66	0.02	-0.17	0.33	-0.37	0.84	-0.65	0.80	-0.52
ADB-BAPPENAS	0.31	-0.06	0.88	-0.22	0.96	-0.22	0.10	-0.02	0.79	-0.72	0.84	-0.65	0.80	-0.52
CWFS	0.17		0.05		0.63		0.05		0.36					
PEARSON	0.40	-0.14												
WORLD BANK	0.15		-0.13		0.38		-0.48		0.85		0.77		0.77	

Note : Y-elas : Expenditure Elasticity ; P-elas : Price elasticity

Source :

BAPPENAS MODELS, Klaus Altemeier, Bappenas Agricultural Model, Consultancy Report, January 1922

ADB-BAPPENAS, Kesavan, T. et al, Supply and Demand Parameters for Food Crop Sector Model. Model and Estimation, ADB-BAPPENAS, April 1992

APPENDIX D.

APPENDIX D.
SUPPLY AND DEMAND EQUATIONS FOR THE INDONESIAN FOOD CROPS IN SWOPSIM

Supply equations

$$X_{CN} = 126.05 * PP_{CN}^{1.03} * PP_{RI}^{-0.14}$$

$$X_{RI} = 327.63 * PP_{RI}^{0.84} * PP_{CN}^{-0.01}$$

$$X_{SB} = 57.77 * PP_{SB}^{0.56}$$

$$X_{SU} = 1029.39 * PP_{SU}^{0.80}$$

$$X_{SU} = 127.8 * PC_{SB}^{-0.38} * PP_{SO}^{0.13} * PP_{SM}^{0.30}$$

$$X_{SO} = 30.04 * PV_{SB}^{-0.38} * PC_{SM}^{0.3} * PP_{SO}^{0.13}$$

Demand equations

$$Q_{CN} = 6734.22 * PC_{CN}^{-0.21} * PC_{RI}^{0.10}$$

$$Q_{RI} = 39524.66 * PC_{RI}^{-0.08} * PC_{WH}^{0.01} * PC_{SU}^{0.02}$$

$$Q_{SB} = 9720.22 * PC_{SB}^{-0.66} * PP_{SM}^{0.06} * PP_{SO}^{0.02} * X_{SU}^{0.20} * X_{SO}^{0.05}$$

$$Q_{SU} = 11314.01 * PC_{SU}^{-0.37} * PC_{RI}^{0.14}$$

where PW   =   world price

PP   =   producer price

PC   =   consumer price

X   =   supply

Q   =   demand

Δ PRSUBW = change in producer support wedge

Δ CNSUBW = change in consumer support wedge

CN   =   corn

RI   =   rice

SB   =   soybeans

SU   =   sugar

WH   =   wheat

SM   =   soymeal

SO   =   soyoil

Note that the above equations incorporate the new elasticity parameters of scenario A.2.

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APPENDIX E.

APPENDIX E.
THE DEIVATION OF SUPPLY ELASTICITIES FOR FOUR MAJOR FOOD CROPS

The following equations were derivated and the results were inputs to the Indonesian sub-model (Scenario A.2). Estimates of supply elasticities for rice in Appendix C, Table 13 were substituted to these equations for rice irrigated and dryland), corn and soybean respectively. The aggregate supply elasticities for both Java and Off-Java were calculated as weighted sums of the regional elasticities.

$$J_y = X_j \, Y_j$$

$$OJ_y = X_{oj} + Y_{oj}$$

$$T = X_j Y_j + X_{oj} \, Y_{oj}$$

$$\frac{dT}{dp} \cdot \frac{P}{T} = \frac{X_j dY_j}{dp} + \frac{Y_j dx}{dp} + X_{oj} \frac{dY_{oj}}{dp} + Y_{oj} \frac{dXoj}{dp} \cdot PT$$

$$N_T = \frac{X_j Y_j}{T} (N_Y^J + N_x^J) + \frac{X_{oj} Y_{oj}}{T} (N_y^{oj} + N_x^{oj})$$

where:

Y	=	yield (ton
X	=	Area (ha)
T	=	Total yield
P	=	Price
N_T	=	Elasticity of Supply for Indonesia (aggregated)
OJ	▪	Off Java
J	▪	Java

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