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INDONESIA

Industrial Growth and Diversification

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PREFACE

This Industrial Development Review of Indonesia is part of a sales series aimed at strengthening the "country focus" of UNIDO activities. Within the framework of the work programme of the Regional and Country Studies Branch of UNIDO, which monitors the international industrialization process, the Reviews provide a survey and analysis of each country's industrial development achievements. The Reviews are intended to provide a service to those within UNIDO and other international agencies concerned with industrial policy, planning, project development and implementation, and to be a ready source of information for governments, investors, industrialists, entrepreneurs, policy-makers, international organizations, aid agencies, academics, and research institutes.

The Reviews have two separate but interrelated objectives: they are designed to facilitate and promote the activities of UNIDO, as well as to serve as an informative and analytical document for the international industrial community. The analyses contained in the Reviews are intended to support the technical assistance programming for industry by providing industry specific analysis which may serve as an input to programming activities and as a basis for informed discussions. The Reviews are also designed to accommodate the needs of a wide readership in the international community associated with industry, finance, trade, business, research and government, laying the groundwork for undertaking in-depth analyses of specific aspects of industrial development trends, policies and strategies.

This Review comprises three Chapters. Chapter I presents an overview of the economy of Indonesia and analyses the economic policy environment. The structure and performance of the manufacturing sector are analysed in Chapter II with particular reference to growth and structural change, employment, productivity, ownership, location, environmental impact and trade. Chapter III examines the performance and prospects of key industrial branches. Data on macroeconomic and industrial trends are presented in Annex A, and a list of major industry associations in Indonesia is provided in Annex B.

This Review is based on information available as at April 1993.

EXPLANATORY NOTES

References to dollars ($) are to United States dollars, unless otherwise stated.

Dates divided by a slash (1991/92) indicate a fiscal year or a crop year. *Dates* divided by a hyphen (1991-1992) indicate the full period, including the beginning and the end years.

In Tables:

Totals may not add precisely because of rounding.
Two dots (..) indicate that data are not available or not separately reported.
A dash (-) indicates that data are not applicable.

The following *abbreviations* are used in this publication:

AMDAL	Environmental Impact Assessment (Analisa Mengenai Dampak Lingkungan)
BAPEDAL	Environmental Impact Control Board (Badan Pengendalian Dampak Lingkungan)
BKPM	National Investment Coordinating Board (Badan Kordinasi Penanaman Modal)
BLK	Labour Training Centres (Balai Latihan Kerja)
boe	barrels of oil equivalent
BOO	build-own-operate
BPIS	Agency for the Promotion of Strategic Industries (Badan Pengembangan Industri Strategis)
BPPD	Regional Centres to Enhance Labour Productivity (Balai Peningkatan Produktivitas Daerah)
BRO	Company Regulation Law (Bedrijfs Reglementeerings Ordonnantie)
bsd	barrels per stream day
CCO	Crude coconut oil
CGI	Consultative Group for Indonesia
CNG	Compressed natural gas
CPO	Crude palm oil
DAP	Diammonium phosphate
DGI	Indonesian Sugar Council (Dewan Gula Indonesia)
DNI	Negative List (Daftar Negatif Investasi)
DSP	Investment Priority List (Daftar Skala Prioritas)
EC	European Community
EOR	Enhanced oil recovery
FDI	Foreign direct investment
FCDT	Foreign Commercial Debt Team
GATT	General Agreeement on Tariffs and Trade
GDP	Gross domestic product
GNP	Gross national product
GSP	Generalized System of Preferences
HIV	Human immunodeficiency virus
IGGI	Inter-Governmental Group on Indonesia
ITTO	International Tropical Timber Organization
JSE	Jakarta Stock Exchange
LNG	Liquefied natural gas
MFA	Multi-Fibre Arrangement
MFN	Most Favoured Nation

MTUs	Mobile Training Units
MVA	Manufacturing value added
NES	Nucleus estate and smallholder
OECD	Organization for Economic Co-operation and Development
OPEC	Organization of Petroleum Exporting Countries
OPP	Oriented polypropylene
PKO	Palm kernel oil
PLN	National Power Company (Perusahaan Listrik Negara)
PTA	Purified terephthalic acid
PTPM	Technical Committee for Foreign Investment (Panitia Teknis Penanaman Modal)
PU	Polyurethane
PVC	Polyvinyl Cloride
Rp	Rupiahs
RSS	Ribbed smoked sheets
RUP	Economic Urgency Plan (Rencana Urgensi Perekonomian)
SBI	Bank Indonesia Certificates (Sertifikat Bank Indonesia)
SBPU	Money Market Securities (Surat Berharga Pasar Uang)
scf	standard cubic feet
SIR	Standard Indonesian Rubber
TEUs	twenty-foot equivalent units
TRI	Sugarcane Intensification Programme (Tebu Rakyat Intensifikasi)
TSP	Triple super phosphate
UCI	Universal Child Immunization
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Organization
USSR	Union of Soviet Socialist Republics
VCM	Vinyl chloride monomer
YAKINDO	Indonesian Rubber Foundation (Yayasan Karet Indonesia)

BASIC INDICATORS

BASIC INDICATORS I: THE ECONOMY

Population (1992)	:	186.4 million[a/]
Annual growth rate of population (1980-1990)	:	2.0 per cent[b/]
Labour force (1990)	:	58.4 million[b/]
GDP (1992)	:	Rp 257,300 billion[a/]
GDP per capita (1992)	:	$680[a/]

Growth of GDP (Percentage) :

1986	1987	1988	1989	1990	1991[a/]	1992[a/]
5.9	4.9	5.8	7.5	7.4	6.3	5.7

Structure of GDP (Percentage) :

	1985	1990
Agriculture	23.2	21.8
Mining and quarrying	14.0	14.5
Manufacturing	16.0	19.5
Construction	5.5	5.5
Other	41.3	38.8

Exports (1991)	:	$29,142 million
Principal exports ($ million, 1991)	:	Crude oil and products (6,714), natural gas (4,181), textiles and garments (4,074), wood and products (3,660), rubber and products (1,025), shrimps (759)
Imports (1991)	:	$25,869 million
Principal imports ($ million, 1991)	:	Industrial raw materials (9,983), capital goods (7,677), spare parts and accessories (4,217), fuels and lubricants (2,196), consumer goods (958)
Current account deficit (1991)	:	$4.1 billion
International reserves (1991)	:	$9.3 billion[c/]
Outstanding external debt (1991)	:	$73.6 billion
Debt service ratio (1991)	:	32.9 per cent

Consumer price change[d/] (Percentage) :

1988	1989	1990	1991	1992
5.5	6.0	9.5	9.5	4.9

Exchange rate[e/] (Rupiah equivalents to $1) :

1988	1989	1990	1991	1992
1,686	1,770	1,843	1,950	2,030

a/ Preliminary estimate
b/ Census
c/ Excluding gold
d/ Official estimates, derived by summing monthly percentage increases in composite consumer price index for 27 main provincial cities
e/ Annual average

BASIC INDICATORS II: THE MANUFACTURING SECTOR

Manufacturing value added (1990) : $12,900[a/]

MVA per capita (1990) : $70[a]

Manufacturing employment (1990) : 2.7 million persons[b]

Growth of MVA (Percentage) :

1986	1987	1988	1989	1990	1991[c]
9.3	10.6	12.0	9.1	12.3	10.7

Structure of MVA (Percentage)[d] :

	1980	1990
Food, beverages and tobacco	31.6	25.8
Textiles and clothing	12.8	13.8
Wood products	7.2	11.8
Chemicals	16.9	14.9
Metals	6.6	12.0
Machinery and transport equipment	13.3	10.6
Other	11.6	11.1

Share of manufactured exports in total exports (1990) : 53.7 per cent

Structure of industrial exports (1990) (Percentage) : Textile and clothing (25.1), food (20.2), chemicals (14.9), basic metals, iron and steel (6.3 per cent), other (33.5)

Share of manufactured imports in total imports (1990) : 84.6 per cent

Structure of industrial imports (1990) (Percentage) : Machinery and equipment (55.6)
chemicals (24.2)
basic metals and iron (9.4)
textiles and clothing (5.3)
other (5.5)

Wholesale price index by manufactured goods (1983 = 100) :

	1985	1986	1987	1988	1989	1990	1991
Consumer	116	124	141	152	161	170	181
Capital equipment	115	129	149	158	169	178	192
Intermediate materials	112	116	147	162	170	179	198

a/ Current prices.
b/ Excluding employment in establishments employing less than 5 persons.
c/ Preliminary estimate.
d/ Excluding oil and natural gas processing.

BASIC INDICATORS III: INTER-COUNTRY COMPARISON OF SELECTED INDICATORS

Indicator	Unit	Indonesia	Republic of Korea	Malaysia	Philippines	Thailand
Population (mid-1990)	Million	178.2	42.8	17.9	61.5	55.8
Area	Thousand square km	1,905	99	330	300	513
GNP per capita (1990)	$	570	5,400	2,320	730	1,420
Average annual rate of inflation (1980-1990)	Percentage	8.4	5.1	1.6	14.9	3.4
Private consumption (1990)	Percentage of GDP	54	63	54	75	57
Gross domestic investment (1990)	Percentage of GDP	36	37	34	22	37
Gross domestic savings (1990)	Percentage of GDP	37	37	33	16	34
Exports of goods and services (1990)	Percentage of GDP	26	32	79	28	36
Energy consumption per capita (1990)	Kg of oil equivalent	272	1,898	974	215	352
Food industry (1989)	Percentage of MVA	12[b/]	12	18	41	29
Textile and clothing (1989)	Percentage of MVA	15[b/]	14	7	8	15
Machinery and transport equipment (1989)	Percentage of MVA	12[b/]	30	23	9	13
Chemicals (1989)	Percentage of MVA	15[b/]	9	14	10	7
Other industries (1989)	Percentage of MVA	46[b/]	36	39	32	33
Manufactured exports to OECD countries (1990)	$ million	5,827	40,773	9,703	5,035	10,515
Current account balance (1990)	$ million	-2,369	-2,172	-1,672	-2,695	-7,053
Gross international reserves (1989)	$ million	8,657	14,916	10,659	2,036	14,258
External debt (1989)	$ million	67,908	34,014	19,502	30,456	25,868
Debt service ratio (1989)	Percentage	30.9	10.7	11.7	21.2	17.2

Sources World Bank, *World Development Report 1992* (Washington D.C., 1992)

a/ Data for Indonesia may not correspond to those cited elsewhere in this report because of different sources

b/ National data sources

SUMMARY

The Indonesian economy has experienced a period of dramatic growth and structural change during the 1980s and early 1990s. From being a largely resource-based economy until the mid-1980s, in which the agricultural sector accounted for the bulk of domestic income and employment creation and the mining sector for the greater part of export and budgetary revenues, it now has a much more diversified and balanced structure. This has been due to the introduction of wide ranging policy reforms and extensive deregulation of financial, product and labour markets, which has in turn encouraged a sharp increase in private investment and removed many of the policy-induced distortions which had previously characterized the economy.

As a result of these developments, the economy recorded impressive growth rates averaging more than 6 per cent per annum in the post-1985 period. Particularly strong growth, in excess of 10 per cent per annum, was recorded by the manufacturing sector, with its non-hydrocarbon component growing at an even more rapid rate of approximately 12 per cent per annum. This has resulted in a significant increase in the share of manufacturing value added in gross domestic product (GDP), from some 13 per cent in the early 1980s to almost 20 per cent by 1990. According to preliminary official estimates, this share rose further to approximately 22 per cent in 1991, exceeding that of agriculture for the first time in Indonesia's history and making manufacturing the most important sector in the Indonesian economy in terms of output.

These processes of economic growth and structural change are detailed in Chapter I, which also reviews the policy environment within which they took place. In particular, this chapter shows that the Government of Indonesia has been concerned to strike a judicious balance between macroeconomic growth and stability, exercising a high degree of fiscal and monetary restraint to ensure the achievement of economically sustainable non-inflationary growth. While the domestic resources mobilized to finance this growth have had to be supplemented by substantial inflows of foreign funds, in the form both of investments and borrowing, great care has also been taken to maintain the economy's external equilibrium.

Following this introductory survey of the macroeconomic context and policy environment in Chapter I, a more focused analysis of the dynamics of the manufacturing sector is presented in Chapter II. This discusses the functioning of Indonesia's manufacturing industry in terms of the key issues involved in growth and structural change, employment, productivity, ownership, location, environmental impact, trade, and technical cooperation. In broad terms, this Chapter highlights the ways in which dramatic growth and diversification has been achieved within the manufacturing sector in recent years, identifying new trends and discussing changes that are still under way.

In terms of structure and production patterns, the manufacturing sector is shown to be highly varied in scope and scale. It comprises a wide variety of activities ranging from the production of handicrafts and basic household goods in tiny cottage enterprises to the manufacture of highly sophisticated capital and intermediate goods in vast industrial complexes. Regular monitoring of these industries since the mid-1960s by the Central Bureau of Statistics of the Government of Indonesia reveals that, while cottage and small-scale firms account for the majority of industrial enterprises in numerical terms and in terms of the overall number of workers employed, the medium- and large-scale firms account for more than 80 per cent of value of gross output and manufacturing value added (MVA).

At a more disaggregated level, these data show that the share of food processing (including beverages and tobacco) in non-oil/gas MVA contracted sharply between 1963, when it amounted to 53 per cent, and 1986, when the last industrial census revealed a share of about 30 per cent. By contrast, the share of heavy processing (excluding oil and natural gas) and heavy engineering

industries increased from 9.4 per cent to 24.5 per cent and from 5.8 per cent to 13.3 per cent respectively during the two decades in question. The increasing sophistication of the manufacturing sector implied by these figures has, if anything, accelerated in more recent years, and the next industrial census scheduled for 1995 is bound to reveal an even more dramatic shift in the relative importance of light and heavy industries in Indonesia's manufacturing sector.

The growth in manufacturing output has been accompanied by a corresponding rise in industrial employment, with the national population censuses indicating an increase in the proportion of the active labour force employed in manufacturing activities from 6.5 per cent in 1961 to 11.6 per cent in 1990. The industrial censuses, meanwhile, show that within the non-oil/gas manufacturing sector the proportion of the labour force employed in light industries fell from 87 per cent to 77 per cent between the mid-1960s and the mid-1980s, while the share of manufacturing employment in the heavy processing industries almost doubled from 7.4 per cent to 14.0 per cent and that in the heavy engineering industries rose from 5.6 per cent to 9.0 per cent. As in the case of MVA, the share of manufacturing employment also declined particularly sharply in the food, beverage and tobacco processing industries, from 44.1 per cent in 1963 to 34.3 per cent in 1986.

A further analysis of the productivity and performance of the industrial sector conducted in Chapter II reveals that although the share of value added in the gross output of the manufacturing sector as a whole remained relatively steady in the 1980s at about 30 per cent, this average figure conceals significant inter-branch variations. In particular, the MVA/output ratios in the food processing, leather products and plastics industries are shown to be substantially lower than the overall average, while those of the footwear, furniture, pottery and china, and non-metallic minerals industries tend to be substantially higher. Inter-branch variations in labour productivity, measured as MVA per employee, are even more dramatic, ranging from approximately one-fifth of the average for all non-oil/gas manufacturing activities to 9-10 times that average. By contrast, the share of gross profits in MVA, which increased from 73 per cent in 1983 to almost 80 per cent in 1989, is broadly similar in all forms of manufacturing activity, ranging from 70 per cent to 90 per cent in 1989.

The ownership structure of Indonesian manufacturing industry is highly complex, comprising State-owned enterprises, firms belonging to private Indonesian entrepreneurs, companies wholly owned by foreign investors, and joint ventures between any two or all of these individual categories of owners. Although the domestic private sector has traditionally accounted for the lion's share of all non-oil/gas manufacturing enterprises, and a significant proportion of the employment and MVA that they have generated, the government also plays a significant role in the manufacturing sector, with firms owned wholly or partially by the government accounting for 25.5 per cent of total MVA at the time of the 1986 industrial census. Foreign ownership mostly takes the form of limited joint venture partnerships with Indonesian firms.

As an essentially resource-based economy, Indonesia has long been dependent on imports to satisfy its demand for manufactures. This dependence has been reduced as a result of the industrial development achieved since the mid-1960s, but manufactures still continued to account for almost 85 per cent of total imports in 1990. Increasingly, however, these imports have begun to consist of capital and intermediate goods as the growth of Indonesia's own downstream processing industries has increased the need for these inputs and decreased the need for imports of consumer goods. Meanwhile, the share of manufactured goods in Indonesia's total exports rose only slowly between the mid-1960s and mid-1980s as a result of the essentially import-substituting industrialization strategy adopted at that time, but has risen dramatically since then as the result of a conscious shift to a more export-oriented industrialization policy. From 26.8 per cent in 1985, the share of manufactures in total exports rose to 53.7 per cent in 1990.

The analysis of the manufacturing sector at an aggregated level in Chapter II is followed by more specific analyses of its various branches and industries in Chapter III. For ease of reference, each of these analyses follows a standardized pattern, assessing first the resource base, then the recent development trends, and finally the constraints and prospects of each branch. All of the major manufacturing branches, and many individual industries, are covered in detail in this chapter, which forms the core of the present Review.

In view of Indonesia's strong agricultural base, which includes its ability to produce a wide range of annual and perennial crops, its considerable scope for animal husbandry, and its extensive marine and freshwater fisheries resources, agricultural processing industries naturally play a significant role in the manufacturing sector. Their development has also been consciously promoted in recent years as part of more general attempt to add domestic value to Indonesia's exports of primary commodities. Substantial increases in production, much of it intended for export, have consequently been achieved across a wide spectrum of agro-processing activities, including cereal milling, fruit and vegetable conserving, vegetable oil refining, rubber processing, cigarette manufacturing, slaughtering and dairying, and fish canning. With still vast untapped agricultural resources, the future growth of the Indonesian agro-processing industries faces few supply constraints, although shifts in international demand patterns and competition from other producers may render such growth unviable in certain cases.

The textile industry, based mainly on the production of fabrics made entirely or partially of cotton, has grown rapidly in recent years. It has now acquired a highly integrated structure, comprising spinning, weaving, dyeing, finishing, knitting and sewing, and is aimed mainly at export markets. The prospects for the industry appear generally bright in view of the high levels of investment in modern machinery and equipment that have taken place in the late 1980s and early 1990s, supported by an increasing relocation of manufacturing capacity from the newly industrializing countries. This broadly favourable outlook is clouded, however, by the restrictions on Indonesia's exports imposed by a number of leading importers under the Multi-Fibre Arrangement, and by the possibility of a gradual erosion of the industry's low labour costs, which constitute the main source of its international competitiveness.

Indonesia's footwear industry has recorded a remarkable growth performance since the mid-1980s. Like the textile industry, it has also benefited from the relocation of production facilities from East Asia. Similarly its future growth is to a considerable extent dependent on whether an adequate balance can be found between the need to maintain a competitive cost structure and the demands of the industry's workers for adequate remuneration.

Indonesia's vast forestry resources have spawned the growth of a large and diversified wood processing industry, covering such activities as sawmilling and the manufacture of plywood, wood and rattan furniture, building materials, household goods of various kinds, handicrafts, chopsticks and safety matches. Many of these products are produced for export, and shipments have increased significantly since the mid-1980s despite some year-to-year fluctuations. The future growth of wood processing is threatened by increasing environmentalist and conservationist pressures, both inside and outside Indonesia, which has resulted in Indonesia accepting a decision by the International Tropical Timber Organization (ITTO) to phase out the trade in timber and wood products from natural forests by 2000. To overcome this restraint, the government is promoting the planting of industrial forests and timber estates.

Since the mid 1980s Indonesia has also emerged as a leading producer of pulp and paper, with the output of both having increased approximately threefold between 1985 and 1991. This industry is also based on Indonesia's extensive forestry resources, although the exploitation of natural forests for the manufacture of pulp and paper is gradually being phased out as vast industrial

timber estates producing more suitable fast-growing species of trees are being developed. As with the wood products industries, the main constraints inhibiting the further growth of the industry are environmental. Considerable public concern has thus been aroused in recent years over the potential ecological damage caused by the planting of monocultural timber estates, and over the air and water pollution caused by the pulp and paper production plants.

Hydrocarbon processing industries play a considerable role in Indonesia's manufacturing sector, and comprise eight oil refineries with installed capacities ranging from two million barrels per day to 300 million barrels per day, two large natural gas liquefaction complexes with a combined capacity of 23 million tonnes per year of liquefied natural gas (LNG), two extraction plants for liquefied petroleum gas (LPG) with a total capacity of 2.25 million tonnes per annum, and a large and rapidly growing number of petrochemical plants producing a wide range of upstream and downstream products. The growth of these industries has been a major objective of government policy since the mid-1970s, but the implementation of the many ambitious plans drawn up in pursuit of this objective has frequently had be postponed because of the heavy investment costs involved. The increasing efforts to attract private investments into the industry since the mid-1980s have helped to ease some of these financial constraints.

Indonesia has an extensive agrochemicals industry producing both fertilizers and pesticides. The fertilizer industry consists of six major plants with a combined production capacity of 5 million tonnes of urea and 1.8 million tonnes of triple superphosphate (TSP), diammonium phosphate (DAP) and ammonium sulphate. The bulk of Indonesia's output of chemical fertilizer has traditionally been utilized by the domestic agricultural sector, although the development of a plywood adhesive industry during the 1980s has provided an additional market for locally produced urea. The pesticide industry, meanwhile, comprises two components involved with production of active ingredients and the formulation of end-use products respectively. These industries expanded rapidly in the early 1980s, but have contracted since 1986 following the introduction of an integrated pest management scheme relying more on natural predation than on chemical pesticides.

The building materials industry is dominated by the manufacture of cement, which is produced by nine companies with a total number of 27 production units and an overall capacity of 20.4 million tonnes. In addition, Indonesia is rapidly developing a ceramics industry producing a variety of tiles and sanitary fittings, as well as a glass industry producing both sheet glass and other glassware. The output of all of these building materials industries has surged since the mid-1980s in line with the acceleration of Indonesia's industrial and economic growth during this period, which has stimulated a strong expansion of the construction industry. With demand likely to remain strong in the short to medium term and abundant supplies of raw materials being available within Indonesia, the continuing growth of the building materials industry seems assured for the foreseeable future.

An integrated State-owned steelworks, PT Krakatau Steel, forms the basis of Indonesia's iron and steel industry. Established in 1983 at Cilegon in West Java, the capacity of this plant has been expanded on several occasions since then, and it now produces a variety of upstream and downstream products including sponge iron, steel slabs, steel billets, steel ingots and hot rolled coil. In addition, the industry consists of a large number of smaller privately owned firms producing steel billets and ingots as well as a variety of flat and long downstream products such as steel sheet, galvanized iron sheet, pipes, beams, profiles, wire and nails. A cold rolling mill was established in the mid-1980s as a joint venture between PT Krakatau Steel and several local and foreign investors, but has so far proved unable to operate profitably. With demand for iron and steel products expected to increase sharply in the coming years as Indonesia's economic

development proceeds, the government is assessing the feasibility of establishing a second integrated steel plant.

Apart from the iron and steel industry, Indonesia has, and is continuing to develop, a diversified industry based on the processing of its large and varied resources of non-ferrous metals, of which tin, aluminium, copper and nickel are the most significant. The tin-based industries include a smelter at Mentok on the island of Bangka, a tinplate manufacturing enterprise near the PT Krakatau Steel complex at Cilegon, and a number of industries producing solder, pewter ware and babbitts. The aluminium industry consists of a large smelter on the Asahan river in North Sumatra with a capacity of 225,000 tonnes of aluminium ingot per year and a broad-based downstream aluminium products industry producing an extensive range of intermediate and end-use products, including extruded goods, sheet, foil, wire rods, castings and slugs. Indonesia's output of copper continues to be exported in unprocessed form, but negotiations with foreign investors on the proposed establishment of a smelter are under way. The nickel processing industry, meanwhile, produces both ferro-nickel and nickel matte, the bulk of which is exported.

Indonesia's machinery industry is still comparatively small and unsophisticated, and for the most part produces only relatively simple equipment. The most important products of this industry are machine tools, diesel engines and generators, agricultural machinery and processing equipment, construction machinery and textile machinery. The future growth of the industry will be hampered by the relatively weak, and progressively weakening, demand for the simple conventional machines it is able to produce, and the high investment cost of establishing a manufacturing capacity for the more advanced machinery that is increasingly being demanded both inside and outside Indonesia.

Considerable government support has been given to the establishment and further development of a domestic transport equipment industry, with special emphasis being given to the automotive, shipbuilding and aeronautical engineering industries. Having been established as heavily protected import-substituting industries, they remain highly inefficient and uncompetitive by international standards. All available indicators suggest, however, that they will continue to receive the continuing patronage of the government, which regards their development as a strategic imperative.

An industry with considerably brighter prospects is the electronics and electrical appliances industry, which is still in its infancy but has begun to expand rapidly since the mid-1980s. It produces a wide and growing range of products, including household appliances, audio and video equipment, cameras and telecommunications equipment. Following the introduction of a number of deregulatory reforms in recent years and a shift in its orientation from import substitution towards export markets it is expected to continue to attract substantial new investments from companies in north-east Asia seeking to relocate their production to low-cost sites.

Indonesia has a long-standing technical cooperation relationship with the specialized agencies of the United Nations. Reflecting the structure of its overall development programme, however, the government has focused its technical cooperation priorities on infrastructural, agricultural, human resources and regional development. Although the development of manufacturing industry is therefore expected to be funded and executed primarily by the private sector, UNIDO has played an active role in providing technical assistance in a variety of fields. The individual programmes and projects executed by UNIDO are aimed at helping the government achieve its principal development objectives and have been determined in close collaboration with the government. They include projects to assist the implementation of industrial standards in small- and medium-scale industries, to introduce preventive maintenance systems in manufacturing industries, and to rehabilitate industries under the control of local authorities.

I. THE MACROECONOMIC AND INDUSTRIAL POLICY ENVIRONMENT

A. RECENT ECONOMIC TRENDS

Developments to 1990 - external shocks and structural adjustment

The Indonesian economy has experienced a period of dramatic economic growth and structural change since the mid-1980s. Until then it was dominated by the extractive sectors, with agriculture accounting for the bulk of gross domestic product (GDP) and employment, while mining and energy (predominantly crude oil and natural gas) accounted for the bulk of export earnings and the government's domestic budgetary revenues.[1/] The manufacturing sector played a relatively modest role in the economy during this period, and consisted primarily of large State-owned enterprises producing heavy industrial goods on the one hand, and small-scale and cottage industries producing handicrafts and traditional consumer goods on the other.

This structure was supported by a policy framework based on a high degree of government control over the economy. With the exception of subsistence agriculture, almost all sectors of the economy were dominated by State-owned companies, and a large number of goods and services were subject to administered prices. Industrial development was oriented mainly towards import substitution, with many industries heavily protected and subsidized, and private investment subject to rigid direction and control.

The resource constraints triggered by the accelerating decline in international energy prices in the first half of the 1980s, and the eventual oil price collapse of early 1986, prompted an extensive re-evaluation by the Government of Indonesia of its economic policies. This resulted in a progressive deregulation of the economy aimed at encouraging increased private investment, mobilizing domestic capital resources and promoting the growth of non-hydrocarbon exports. A succession of economic reforms was introduced from 1983, which included a comprehensive overhaul of the tax system, liberalization of the regulations governing investment and the operation of financial institutions, and a number of measures to increase the international competitiveness of Indonesia's agricultural and manufactured exports.

The results of these policies have been spectacular. After expanding by 2.5 per cent in real terms in 1985, GDP increased on average by about 5.5 per cent in 1986-1988 and 7.5 per cent in 1989-1990. The value of non-hydrocarbon exports rose from $5.87 million to $14.6 million during the same period, while their share of total exports rose from 31.6 per cent to 56.9 per cent. Private investment also increased substantially, with the value of approved foreign investment projects outside the oil/gas and financial sectors rising from $859 million in 1985 to $8.75 billion in 1990, and the value of approved domestic investment projects rising from Rp 3,750 billion to Rp 59,878 billion. Meanwhile, the number of new production sharing contracts signed with foreign oil companies rose from 4 to 14, and the number of commercial banks increased from 81 to 139.

Particularly strong growth was recorded in the manufacturing sector. Between 1985 and 1990 this sector expanded at an annual average rate of approximately 10.7 per cent in real terms, well in excess of the rate of overall GDP growth. Its share in total GDP consequently increased from 15.8 per cent to 19.3 per cent in constant 1983 market prices and from 16.0 per cent to 19.5 per cent in current market prices. Much of this growth was generated by the non-hydrocarbon component of manufacturing activity, moreover, which increased at an annual average rate of almost 12 per cent.

Though impressive, these developments were not entirely beneficial. The high levels of capital investment have prompted a significant increase in imports of capital and intermediate goods with the annual value of the former rising steadily from $8.2 billion in 1985 to $14.9 billion and the annual value of the latter rising from $1.7 billion to $6.1 billion during the same period. The deficit on current account consequently remained relatively large despite the substantial increase in export earnings, especially since the growth in foreign trade also caused a substantial increase in Indonesia's demand for imports of trade-related services.

Heavy domestic and overseas borrowing to help finance the increased levels of investment has also placed considerable strains on the Indonesian economy's internal and external stability. Outstanding bank credits in Indonesian rupiahs and foreign exchange increased from Rp 22,157 billion in 1985 to Rp 97,696 billion in 1990, and Indonesia's total external debt increased from $36.7 billion to $67.9 billion during the same period, with private debt (including short term debt) rising particularly sharply from $9.9 billion to $22.4 billion. At the same time, the vast inflow of capital generated by the liberalization of economic policies strained the absorptive capacity of the Indonesian economy, and resulted in the persistence of relatively high rates of inflation averaging almost 8 per cent per annum during 1985-1990 and rising to a seven year high of 9.5 per cent in 1990.

Developments since 1990 - monetary restraint for sustainable non-inflationary growth

Faced with these signs of economic overheating, the Government of Indonesia took a variety of measures in 1990-1991 to restrain the growth of economic activity to more sustainable levels. After pursuing a relatively relaxed monetary policy between mid-1989 and mid-1990, during which time domestic liquidity increased from Rp 47,600 billion to Rp 78,477 billion, the government began to adopt a much firmer monetary stance from June 1990 onwards. This new approach culminated on 27 February 1991 in an officially inspired withdrawal by 12 large State-owned corporations of some Rp 7,000 billion to Rp 8,000 billion from their bank deposits, and the conversion of these funds into Treasury bills known as Bank Indonesia Certificates (Sertifikat Bank Indonesia, SBI). With the total volume of money in circulation and in demand deposits amounting to some Rp 24,000 billion at the time, this measure caused a severe contraction of liquidity, which was only partially offset by the subsequent purchase of promissory notes by the central bank, Bank Indonesia, from commercial banks and other financial institutions.

This tight monetary policy triggered a sharp rise in domestic interest rates, with 12-month deposit rates in the commercial banks peaking at 27-30 per cent per annum, and prime lending rates at about 35 per cent per annum, in the first half of 1991. For a time, however, the effectiveness of this policy was diluted by the ability of Indonesian corporate borrowers to obtain loans from offshore lenders on relatively favourable terms. But as private foreign debt soared with official estimates suggesting an increase of $6 billion to $7 billion in commercial medium- and long-term debt during the 1990/91 fiscal year alone, the government took action on this front as well. On 4 September 1991 the government issued a decree requiring all offshore commercial loans contracted by State-owned enterprises, or consortia or joint ventures involving State-owned enterprises, to be vetted by a newly established inter-ministerial Foreign Commercial Debt Team

(FCDT). This was followed in November 1991 by the imposition of several restrictions on foreign borrowing by private banks and corporations.

With these measures in place, the Indonesian monetary authorities were in a far stronger position to regulate monetary expansion than at any time in the past. While maintaining an essentially conservative monetary stance, however, the Government of Indonesia began to encourage a measured reduction of interest rates from the beginning of 1992 onwards in order to prevent a serious economic recession. Several reductions in Bank Indonesia's discount rate were announced in the first few months of the year, and government spokesmen also began to exercise a degree of moral suasion over the banking sector in this regard. This has resulted in a modest decline in commercial interest rates, with the 12 month deposit rate ranging between 16 per cent and 20 per cent at the end of 1992.

The effects of the tight monetary policy on the growth of liquidity have been dramatic. Money supply data for 1992 released by Bank Indonesia show that M1, defined to include currency in circulation plus demand deposits, increased by 9.3 per cent in 1992 after having grown by 10.6 per cent in 1991, 18.4 per cent in 1990 and 39.8 per cent in 1989. At the same time, the growth of M2, comprising M1 and quasi money, was held at 20.2 per cent in 1992 after having been reduced to 17.0 per cent in 1991 from 44.2 per cent in 1990 and 39.8 per cent in 1989. The impact on inflation, though lagged, was also dramatic. The officially estimated rate of inflation thus fell to 4.9 per cent in 1992 after having remained steady at 9.5 per cent per year in 1990 and 1991.

There has been a distinct deceleration of economic activity, however, and preliminary national accounts estimates suggest that the rate of GDP growth slowed to approximately 6.6 per cent in 1991 and about 6 per cent in 1992. The slowdown in investment growth has been particularly noticeable. Data compiled by the National Investment Coordinating Board (Badan Kordinasi Penanaman Modal, BKPM), which is responsible for licensing all major investments outside the hydrocarbon industry and the financial sector, show that the value of approved foreign investment projects rose marginally from its 1990 level of $8.7 billion to $8.8 billion in 1991, while the value of approved domestic investments fell sharply from Rp 55,300 billion to Rp 41,100 billion during the same period. Additional data released at the end of 1992 indicate that this slowdown persisted into that year, with the value of approved domestic investment dropping to Rp 29,350 billion, and the value of approved foreign investment rising only modestly to $10.3 billion.

Within the context of the overall slowdown in economic growth recorded in 1991 and 1992, the manufacturing sector continued to perform relatively well. Preliminary estimates provided by the Government of Indonesia indicate that manufacturing value added grew by approximately 11 per cent in real terms in 1991, only slightly below the 12.2 per cent recorded in 1990. As a result the manufacturing's share in GDP increased from 19.5 per cent in 1990 to 22.2 per cent in 1991. By contrast, agricultural output expanded by only 1 per cent in 1991, as against 2.5 per cent in 1990, resulting in a decline in the share of agricultural production from 21.5 per cent to 20.3 per cent during the same period. If these figures are confirmed, they would mark a significant shift in the structure of the Indonesian economy, with the contribution of the manufacturing sector to GDP exceeding that of agriculture for the first time.

Indonesia's export performance remained impressive in 1991, with customs-based data showing an increase in total value of export earnings to more than $29.1 billion from approximately $25.7 billion in 1990, and in the value of non-hydrocarbon exports from $14.6 billion to about $18.2 billion. Manufactured exports (including processed and semi-processed raw materials) performed particularly well, with their value increasing from $11.9 billion to $15.1 billion between 1990 and 1991. In view of the high import intensity of these exports and the still relatively high levels of investment, however, imports also rose sharply during this period. Total imports increased from

Fig. I.A. Growth of gross domestic product (GDP) and manufacturing value added (MVA), 1986-1991

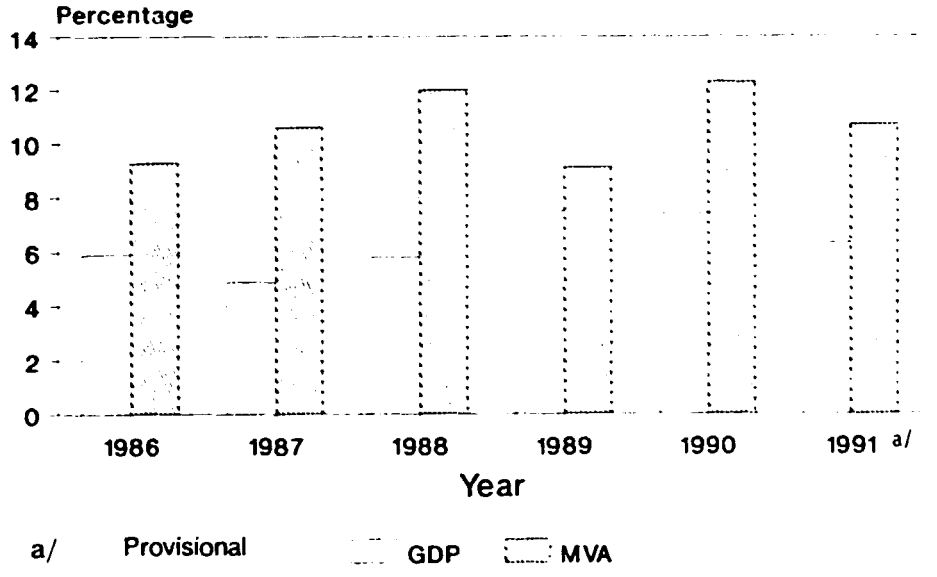


Fig. I B. Structure of GDP, 1983-1990

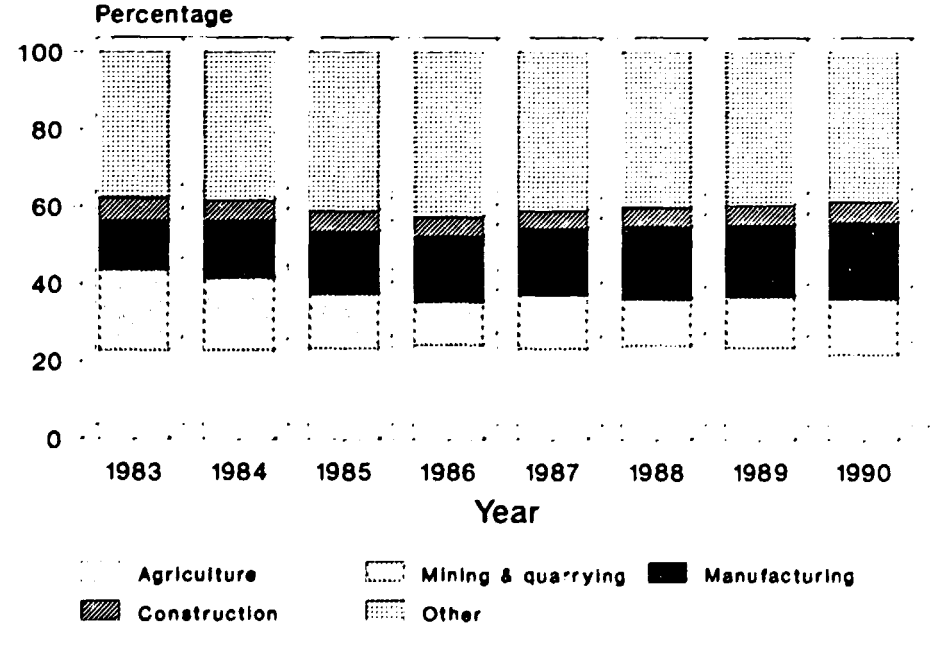


Fig. I.C. Exports, imports and trade balance, 1981-1991

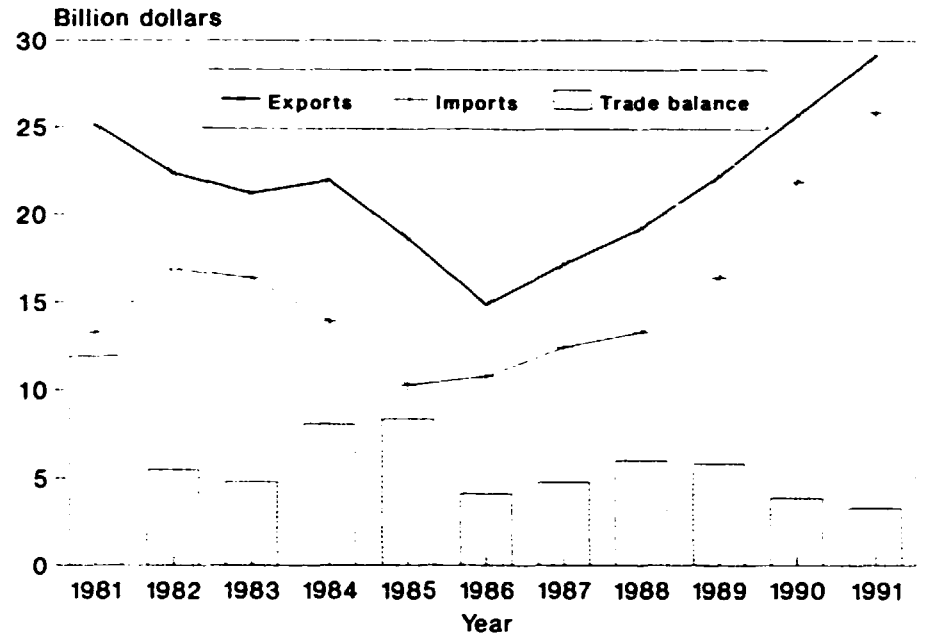


Fig. I.D. Current account balance, 1985-1991

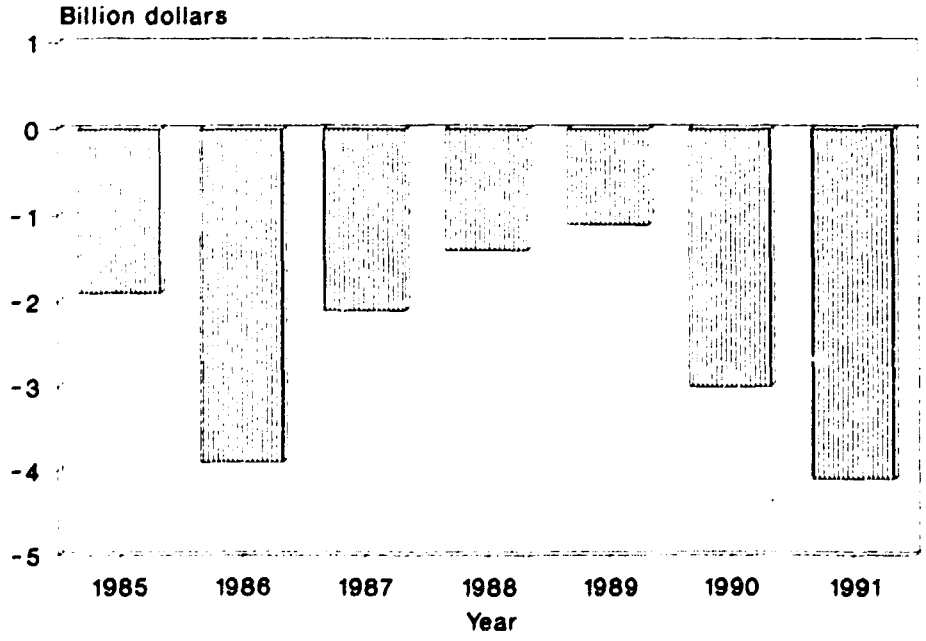


Fig. I.E. External debt and debt service, 1985-1990

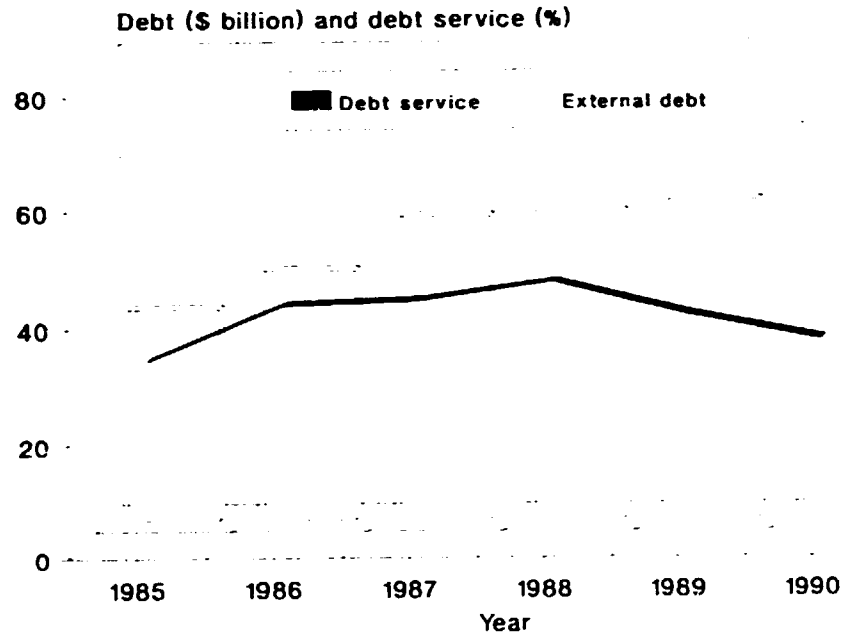
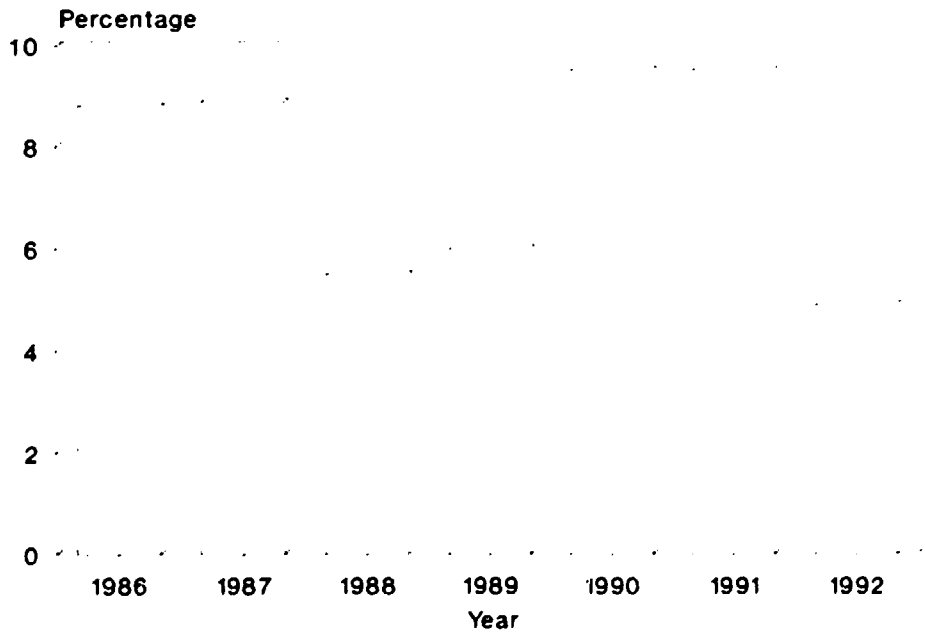


Fig. I.F. Percentage change of consumer prices, 1986-1992



$21.8 billion in 1990 to $25.9 billion in 1991, and imports of capital and intermediate goods increased from $6.1 billion to $7.7 billion, and from $14.9 billion to $17.2 billion, respectively. The trends observed in 1991 were maintained in 1992, with exports rising to $34.0 billion and imports to $27.3 billion.

The surge in import expenditures in 1991 caused Indonesia's trade surplus to fall to $4.7 billion from $5.3 billion in the previous year despite the rise in export earnings. With the combined net outflow on the services and income accounts also continuing to rise, from $8.8 billion to $9.3 billion, the deficit on the current account widened from $3.2 billion to $4.5 billion between 1990 and 1991. Although this deficit was more than offset by large inflows on capital account, so that Indonesia was able to post an increase of $1.8 billion in its external reserves (excluding gold) in 1991, the bulk of these capital inflows consisted of foreign loans. The country's external debt is consequently estimated to have risen by approximately $10 billion to some $78 billion in 1991, with private liabilities accounting for much of this increase.

Thus, the Government of Indonesia still faces the challenge of finding an appropriate balance between the objectives of growth and stability in formulating macroeconomic policy. The need is for a judicious mix of monetary and fiscal restraint on the one hand, and the ongoing promotion of private investment on the other. Experience suggests that balance will be achieved and the country's economy returned to a path of sustainable development.

B. ECONOMIC STRUCTURE

The physical environment

Indonesia is an archipelagic country straddling the equator and stretching for more than 5,100 kilometres between continental Asia and Australia. It consists of 13,667 islands and islets of varying size, of which fewer than 1,000 are inhabited and more than half are still unnamed. These islands have a combined land area of more than 1.9 million square kilometres, and are surrounded and separated by approximately 6 million square kilometres of territorial waters. The principal islands in terms of size and economic importance are Sumatra, Java, Bali, Kalimantan (which Indonesia shares with East Malaysia and Brunei), Sulawesi and Irian Jaya (the western half of the island of New Guinea).

As a result of its size, location and geographical structure, the country has been endowed with a wide range of natural resources. It has the capacity to produce a variety of agricultural products, and has substantial forestry and fisheries resources. It also has significant reserves of a large number of minerals, the range and extent of which have not yet been fully quantified, let alone developed. The availability of these natural resources makes Indonesia, which at present has a *per capita* income of some $600, a potentially very prosperous country, and much emphasis has been given during the past two and a half decades to the development of these resources as a basis for the broader economic and social development of the country.

The demographic base

Indonesia is the fourth most populous country in the world, with the census of 1990 indicating a total population of 179.3 million. The geographical distribution of the population is very uneven, however, and the 1990 data show that 61.5 per cent of Indonesia's inhabitants live in the two islands of Java and Bali, which together account for only slightly more than 7 per cent of the country's total land area. This imbalance reflects the considerable differences in agricultural fertility between these islands, where rich volcanic soils have permitted the emergence of highly

intensive forms of sedentary cultivation, and most of the country's other islands, which are often only able to support low-yielding forms of agriculture, such as slash-and-burn methods of shifting cultivation, and therefore have a far more limited carrying capacity.

The Indonesian population is predominantly rural, with the latest census data showing that almost 70 per cent of the total population lived in rural areas in 1990. At the same time, however, the process of urbanization has been very rapid, as both "push" and "pull" factors have contributed to high rates of rural-urban migration. Comparative data from the 1980 census indicate that the proportion of the rural population amounted to almost 78 per cent in that year, and that during the 1980-1990 period the urban population grew by 5.36 per cent per annum while the rural population increased by only 0.79 per cent per year.

The age distribution of the Indonesian population is heavily biased towards the younger age groups. Almost 37 per cent of the population were found to be below the age of 15 by the 1990 census; this has obvious implications for the rate of population growth, which amounted to approximately 2 per cent per annum during the 1980s.

A very effective family planning programme is in place, however, and has resulted in a steady decline in the population growth rate, from 2.4 per cent per year between the 1971 and 1980 censuses to 1.8 per cent per year in the latter half of the 1980s. The slowdown in population growth has been particularly impressive in the more densely populated islands of Java and Bali, where the annual rate of population growth declined from 2.0 per cent to 1.5 per cent and from 1.7 per cent to 1.0 per cent, respectively, between the 1971-1980 and the 1980-1990 intercensal periods. An officially supported programme of population resettlement known as transmigration has played a supplementary part in the achievement of this reduction in population growth in Java and Bali, with some 555,700 families having been resettled between the 1986/87 and 1990/91 fiscal years alone.

Agriculture, forestry and fishing

Agriculture, defined to include animal husbandry, forestry and fishing, has traditionally been the most important sector of the Indonesian economy in terms of production and employment. Although its share of GDP has declined gradually over time, it continues to play an important role. The latest available official estimates show that it accounted for 21.5 per cent of GDP (at current market prices) in 1990, making it the single most important contributor apart from the somewhat amorphous and all-inclusive services sector. While early indications suggest that agriculture lost this primacy to the manufacturing sector in 1991, it remains a very important source of national output.

Moreover, with the bulk of Indonesia's population concentrated in rural areas, agriculture also plays a pre-eminent role in employment creation. Although the share of the labour force engaged principally in agricultural activities has fallen steadily in recent decades, from 64.2 per cent at the time of the 1971 census, it still remains very high and was measured at 50.1 per cent in 1990. In view of the substantial increase in the total labour force from 41.3 million in 1971 to 70.8 million in 1990, this decline in the relative share of the labour force employed in agriculture also masks a substantial increase in the absolute numbers engaged in the sector, which rose from 26.5 million to 35.5 million during these two decades.

Mining and energy

Indonesia is extremely well endowed with a wide range of minerals, and mining has traditionally made a significant contribution to the country's economy. Since Indonesian law stipulates that

ownership of the country's mineral resources is vested in the Indonesian people as a whole, and that the exploitation of these resources must be administered on their behalf by the State, the mining sector is dominated by a number of large State-owned enterprises. In order to overcome the financial, technical, and manpower constraints facing these State-owned enterprises, private investment, both domestic and foreign, has been permitted in the exploration and exploitation of most minerals. Private investors engaged in these activities must liaise closely with the official enterprise, however, and often operate under production sharing contracts with these enterprises.

Hydrocarbons, primarily crude oil and natural gas, account for the bulk of mining output, with their share amounting to 88-94 per cent during the 1980s. These two products have also been important sources of export earnings and domestic budgetary revenues, providing some 70 per cent of both between the mid-1970s and mid-1980s. Although the government's efforts to diversify the economy since the oil price collapse of 1986 have resulted in a significant reduction in this share during the past five years, it remains disproportionately large. Oil/gas exports thus accounted for about 31 per cent of total export earnings in 1992, and the government's budget for the 1992/93 fiscal year calls for oil/gas revenues to provide approximately 30 per cent of total domestic revenues.

In addition to oil and natural gas, Indonesia has substantial reserves of coal. These are estimated at almost 32 billion tonnes, of which some 4.2 billion tonnes are proven and the remainder are inferred or hypothetical. A major effort to diversify Indonesia's energy consumption patterns towards coal launched in the mid-1980s resulted in a production surge from 1.5 million tonnes in 1985 to 13.7 million tonnes in 1991, and in the associated construction or conversion of a number of coal fired industrial and power plants. Furthermore, Indonesia also has a considerable potential for the development of hydroelectric and geothermal power, which is only beginning to be tapped. According to the latest available estimates, the country's hydropower resources could potentially generate about 75,000 MW of electricity, while the geothermal resources could produce an additional 16,000 MW. At present Indonesia can generate only about 3,000 MW of hydroelectric power and 142 MW of geothermal power.

While Indonesia has a large and diversified potential electricity generating capacity, actual capacity remains low, and in 1991 was estimated at only about 16,400 MW. Of this total, approximately 8,500 MW was generated by the State-owned power company Perusahaan Listrik Negara (PLN), which is granted sole distribution rights for electricity throughout Indonesia. The remainder was produced by a number of other generators. The power generated by these enterprises is intended principally for their own use, though some sell their surplus to PLN for more general distribution.

The rapid growth of economic activity during the late 1980s and early 1990s has resulted in a sharp rise in demand for power, which has only partially been met and has forced the supply of electricity to some end users to be rationed from time to time. The problems arising from this imbalance in the growth of demand and supply have been exacerbated by weaknesses in the transmission and distribution systems, resulting in frequent power cuts and "brownouts". The government has responded to these shortcomings by devoting an average of almost 12 per cent of public capital expenditure to the development of the electric power industry between the 1988/89 and 1992/93 fiscal years, and in mid-1992 permitted private companies to establish large commercial power plants on a "build-own-operate" (BOO) basis.

The non-energy component of the mining and energy sector is devoted primarily to the mining of metallic minerals, of which tin has historically been particularly important. In addition to tin, Indonesia also has large known deposits of copper, nickel, bauxite, gold and silver. Non-metallic minerals of various kinds, including kaolin, marble, granite, limestone and pumice stone are found widely throughout Indonesia, and support a substantial and growing building materials industry.

Manufacturing

Indonesia's manufacturing industry has emerged as an important economic sector only during the past two decades. The best available estimates indicate that it accounted for only 8.5 per cent of domestic output in 1953, and that it grew by only about 2 per cent per annum in real terms during the following decade, approximately in line with the overall growth of GDP.[2] Consequently, its share in domestic output was no higher in the mid-1960s than in 1953.

Considerable priority has been given to the promotion of industrial development by the "New Order" Government of President Suharto, which assumed office in 1965-1966. By 1991, as noted above (see Recent Economic Trends), the manufacturing sector was believed to have dislodged agriculture to become the single most important source of gross domestic product, and had also become a leading generator of export revenues and provider of employment opportunities. The extent and nature of this transformation will be discussed in detail in Chapter II, while the policies which facilitated it will be analysed in the latter part of the current Chapter.

Transport and communications

Indonesia's highly complex geographical structure and regional diversity render adequate transport and communications facilities indispensable for economic integration but also difficult and costly. While high priority has been given to the development of transport and communications infrastructure over the past two and a half decades, and significant achievements have been recorded, much still needs to be done to improve both inter-island and intra-island links.

Railways have only been established in Java and Sumatra. Java has a comprehensive network connecting most major cities and towns, which has been subject to a major upgrading and modernization programme since the early 1980s. Three relatively small and unconnected rail networks also exist in Sumatra, centred around Medan in North Sumatra, Padang in West Sumatra and Palembang in South Sumatra.

In spite the existence of these railways, however, most overland transportation is accomplished by road, in Java and Sumatra as elsewhere in Indonesia, and considerable efforts have been made over the past two decades to expand and improve the country's roads. The latest available official statistics thus indicate that the total road length increased from 95,463 kilometres in 1972 to 266,326 kilometres in 1989, with the length of asphalted roads increasing from 26,712 kilometres to 116,464 kilometres. With few exceptions, consisting primarily of a number of recently built multiple lane motorways linking major population and industrial centres in West and East Java and North Sumatra, the road network nevertheless remains rudimentary both in terms of coverage and quality.

The latest available data show that, excluding the Special Capital Territory of Jakarta, which has a very well developed and rapidly expanding road network, the average road density in Indonesia amounted to a mere 139 metres per square kilometre in 1989. The regional variation in road density was also extremely large, ranging from almost 2.2 kilometres per square kilometre in the largely urban Special Territory of Yogyakarta to only 19 metres per square kilometre in Irian Jaya. On average, only 44 per cent of the road network was asphalted in 1989, with this proportion being much higher in Java and Bali and much lower in the islands of eastern Indonesia. Only 31 per cent of the road network was classified as being in good condition, with a further 31 per cent in moderate condition and the remainder damaged or badly damaged.

The maritime transport infrastructure is gradually being developed. Indonesia has some 350 ports and harbours, of which 127 are equipped to handle ocean going vessels. The most important port

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[2] United Nations Industrial Development Organization

is Tanjung Priok in Jakarta, which in 1990 had a container handling capacity of 1.3 million twenty-foot equivalent units (TEUs), and the ports of Belawan at Medan in North Sumatra, Tanjung Perak at Surabaya in East Java, and Ujung Pandang in South Sulawesi are also equipped to handle containers. Indonesia's merchant fleet has expanded gradually over the past five years, with the number of vessels engaged in domestic trade having increased particularly rapidly. River, lake and ferry transport also plays an important role, especially in the more remote areas. Between 1986/87 and 1990/91 the number of passengers using these services rose from 37,800 to 46,100, while the volume of cargo carried increased from 6,100 tonnes to 11,950 tonnes.

Air transport is becoming increasingly important, especially for passenger travel and as an agent for the promotion of tourism. The national airline, Garuda Indonesia, serves a variety of cities in Asia, Europe and America, and several important centres within Indonesia. Most domestic flights are carried out by Garuda's subsidiary, Merpati Nusantara, and by a number of private airlines, of which the most important are Bouraq, Mandala and Sempati. Considerable investments are being made in airport development, and the country has approximately 40 airports capable of handling Fokker F-28 or larger aircraft.

Though relatively well advanced by the standard of many developing countries, Indonesia's telecommunications facilities are beginning to be strained by the rapid growth of the economy over recent years. A significant development, well ahead of its time, was the establishment of domestic satellite communications system in 1976. This system, known as Palapa, has been continuously upgraded since its inception, and has made a vital contribution to the social and economic integration of the country. In recognition of the crucial role played by telecommunications in the development of an efficient modern economy and in bridging the vast distances in the country, the government continues to give high priority to expanding the existing system and the services it offers.

Banking and finance

Indonesia's banking system comprises a central bank, a variety of State and privately owned commercial, savings and development banks, numerous rural and village banks, and a number of non-bank financial institutions. The central bank, Bank Indonesia, fulfils most of the standard central banking functions, including the issue of currency, the implementation of monetary policy, and the supervision of the banking system. Commercial banking has traditionally been dominated by five State-owned banks, but their role has suffered some diminution since the introduction of series of deregulatory reforms in the late 1980s, which resulted in a dramatic expansion in the number and branch structure of domestic, foreign and joint-venture commercial banks. The savings and development banks are concerned primarily with the mobilization of funds for long term investments, while the rural and village banks are small localized institutions serving the needs of the rural population. The non-bank financial institutions, finally, perform a variety of merchant banking functions.

Although a stock exchange was established in Jakarta as early as 1976, the development of a capital market proceeded only slowly, with only 24 companies having issued shares on the Jakarta Stock Exchange (JSE) until the late 1980s. The wide ranging reforms of the financial sector introduced since then have resulted in a surge in the number of companies going public, which by the end of June 1992 had risen to 147. The liberalization of the capital markets in the late 1980s was accompanied by a boom in investor interest, both domestic and foreign, which drove the composite JSE share price index from well below 100 in mid-1988 to a peak of 682 in April 1990. Although the subsequent tight money policy and concern over the lack of an adequate regulatory framework prompted a significant weakening of the market from April 1990 onwards, the more

recent relaxation of the government's monetary restraints and the introduction since that time of numerous measures to strengthen the market's institutional base augur well for its evolution as a major source of long term investment capital in the coming years.

Trade, tourism and other services

Trade and tourism play an important role in the Indonesian economy, with their combined share of GDP having increased from 14.9 per cent in 1983 to 17.4 per cent in 1990. The wholesale and retail trade sector, which accounted for 14.7 per cent of GDP in 1990, is highly diversified and comprises a variety of large State-owned and privately owned corporations and agencies, many of which enjoy officially sanctioned monopoly privileges, as well as a plethora of smaller formal and informal undertakings. A long standing prohibition against foreign involvement in the retail trade has permitted the emergence of several large Indonesian trading firms, which dominate the local market but are now beginning to enter into franchising arrangements and joint ventures with foreign partners.

Tourism, proxied in the Indonesian national accounts data by the line item "hotels and restaurants", accounted for 2.7 per cent of GDP in 1990. This relatively modest share in national income belies the tourist industry's growing importance to the Indonesian economy, since it fails to take into account the many indirect effects of the industry on other sectors, such as transport, manufacturing and construction, and on foreign exchange earnings, employment creation and human resource development. With its location, culture, history and natural beauty, Indonesia has vast tourist potential, which only began to be developed in the mid-1980s when visa restrictions on foreign visitors from 31 countries were lifted and large investments were undertaken in the establishment of an appropriate infrastructure. Since that time the industry has surged, with the number of arrivals increasing from approximately 750,000 in 1985 to slightly more than 1 million in 1987 and an estimated 2.56 million in 1991. Tourist expenditure, meanwhile, has risen from $525.3 million to almost $2.5 billion during the same period.

Other services contribute to about 12-15 per cent of GDP, with public administration and defence accounting for slightly more than half of this total. To a considerable extent, this reflects the still pervasive, albeit declining, role of the State in business and commerce as well as administration and politics. Many of the largest manufacturing and trading corporations in Indonesia are owned by the State or foundations connected to the military and civil service. The public sector, defined to include these agencies and enterprises, is also a major source of employment creation, and accounted for 13.7 per cent of the employed labour force at the time of the 1990 census in September-October 1990.

Demand structure of GDP

A breakdown of Indonesia's national accounts by expenditure categories reveals that private consumption predominates by a large margin. This margin has narrowed significantly during the past decade, however, primarily as a result of a substantial increase in the role of investment. Public consumption, by contrast, plays only a comparatively modest role in the economy, and has exhibited a declining trend in recent years. External trade, on the other hand, is a very important determinant of aggregate demand, and its share in GDP has consistently exceeded 40 per cent since the mid-1970s.

External trade and payments

As suggested by the strong contribution of external trade to GDP, Indonesia is a relatively open economy closely integrated into the global trading system. The bulk of the country's trade is

conducted with the countries of the Organisation for Economic Co-operation and Development (OECD), and particularly with Japan, the United States, and some of the northern countries of the European Community (EC). Singapore has traditionally also played an important role as a destination of Indonesia's exports and a source of its imports, but this is primarily a reflection of Singapore's position as a regional transshipment centre.

The commodity composition of Indonesia's external trade has changed significantly during the past 15 years. Between the mid-1970s and early 1980s Indonesia's exports were dominated overwhelmingly by crude oil and to a lesser, but increasing, extent by natural gas. The collapse of international energy prices in the mid-1980s and the subsequent structural adjustments undertaken by the Government of Indonesia resulted in a much greater diversification in the composition of the country's exports. This initially manifested itself in a sharp increase in the export of other primary commodities, which themselves have increasingly been replaced by manufactured products, including processed raw materials, as industrial development has accelerated over the past few years.

While the value of Indonesia's merchandise exports has usually exceeded that of its merchandise imports, the country's balance on invisibles account has traditionally been in deficit. This is partly due to the fact that Indonesia depends heavily on foreign purveyors of trade related services, and partly because of heavy net outflows of factor payments, including interest on the country's overseas debt and repatriation of profits and income by foreign investors. The magnitude of the invisibles deficit has normally exceeded that of the surplus on merchandise account, so that the current account has usually recorded substantial deficits.

The current account deficits have commonly been funded by large inflows on capital account. Indonesia has attracted considerable volumes of overseas development assistance since the mid-1960s. Most of these funds have been disbursed through the Inter-Governmental Group on Indonesia (IGGI), a consortium of major multilateral and bilateral donors chaired by the Netherlands, which was replaced in March 1992 by the Consultative Group for Indonesia (CGI) under the auspices of the World Bank.

Until the late 1980s the imposition of a number of restrictions on private offshore borrowing meant that public or publicly guaranteed medium- and long-term debt, usually obtained from official sources at highly concessional rates, accounted for the bulk of Indonesia's foreign liabilities. However, as noted above (see Recent Economic Trends), the relaxation of these borrowing restrictions and the almost simultaneous introduction of domestic monetary restraints resulted in a sharp rise in private debt, much of which was contracted at commercial rates and with relatively short maturities. This caused a sharp rise in Indonesia's overall debt as well as a significant deterioration in most of the country's debt-related indicators, and prompted the government to initiate new measures to control offshore borrowing in 1991. These are expected to curb the growth of foreign indebtedness to more sustainable levels, and ensure that the traditionally high level of international confidence in Indonesia's external payments position is maintained.

C. THE POLICY ENVIRONMENT

MACROECONOMIC POLICIES

Overview

Indonesia's economic policy environment has been conditioned by a variety of influences stretching back to the colonial era. The Indonesian authorities inherited from their colonial counterparts

from the Netherlands a highly regulated economy and a predilection for economic regulation.[3] This *dirigiste* attitude towards economic management was reinforced by the powerful nationalist emotions generated by the long and bitter struggle for Independence, which also gave rise to a strong commitment to egalitarian and quasi-socialist principles. Inspired almost entirely by these ideals until the mid-1960s, Indonesia's economic policy during this period gave high priority to improving the economic position of the indigenous population and preventing a restoration of foreign dominance over the economy.[4] In pursuit of these goals, Indonesian policy makers also adopted the practice of economic planning and a commitment towards State ownership of at least the principal commercial enterprises in each economic sector.

The assumption of power by President Suharto's "New Order" Government in 1965-1966, after several years of economic turmoil and decline, resulted in a comprehensive reassessment of economic policy. In particular, the management of the economy was handed to a group of academic economists, who came to be known as the "technocrats" and whose principal objective was the achievement and maintenance of economic efficiency and competitiveness. With foreign advice and financial assistance these technocrats were able to introduce policy measures which permitted the restoration of economic stability within a relatively short space of time.

While the technocrats' involvement in economic policy-making resulted in the excesses of the previously prevailing policies being abandoned, economic nationalism and an overt dedication to egalitarian ideals have remained an important strand of Indonesian political thought. The Indonesian State ideology, Pancasila, stresses the achievement of social justice as one of its five goals,[5] and this combination of policy objectives has been formalized in the concept of *ekonomi Pancasila* (the "Pancasila economy").[6] Its major features include a commitment to economic growth, stability and equity, which are characterized as the "trilogy of development", and to a mixed economy in which the private, State and cooperative sectors are all intended to play significant and mutually supportive roles.

The integration of these divergent policy objectives has not always proved easy, however, and Indonesia's economic policies during the past 25 years have reflected the tensions arising out of the often incompatible goals of the technocrats and economic nationalists. To some degree, the relative influence of these two groups has varied according to the extent of the resource constraints faced by Indonesia at any given time. The technocratic viewpoint tended to prevail between the late 1960s and the early 1970s, when these constraints were relatively tight, but the economic nationalists gained the ascendancy between the early 1970s and the early 1980s, when the availability of vastly increased oil revenues enabled the Government of Indonesia to give greater emphasis to social, political and strategic goals in formulating economic policy. The decline in international oil prices between 1983 and 1986 resulted in a renewed shift towards the technocratic position, which has remained pre-eminent until the present time.

Planning for development

Stimulating and facilitating Indonesia's economic development has been the principal objective of the New Order Government since it came to power in 1965-66. The vehicle chosen to achieve the eventual aim of take-off into self-sustained economic growth was a series of Five-Year Development Plans known as *Repelita*.[7] These Plans apply to both the public and private sectors, and set development priorities and specific sectoral growth targets, which are subject to annual review. The Plans are indicative in nature, however, and do not provide detailed instructions for the execution of particular programmes and projects. In the case of the public sector, such details are contained in the government's annual budgets, while the private sector is permitted to formulate and implement its own Plans within an overall framework.

Having inherited a badly run-down economy,[8] the new government's first priority was a restoration of internal and external economic balance, which was achieved by 1968. The first Five-Year Plan, *Repelita I* was consequently launched on 1 April 1969 to coincide with the start of the 1969/70 fiscal year. Its main focus was on agricultural and infrastructural development, with some priority also being given to the establishment of a domestic manufacturing capacity for cement, fertilizer, and agricultural processing equipment. Although not all targets were achieved, the implementation of the Plan was broadly successful, and set the scene for the subsequent evolution of the planning process in Indonesia.

Repelita II, which commenced in April 1974, continued to give priority to the development of the agricultural sector, the improvement of infrastructural facilities, and the expansion of the manufacturing base. In addition, it also gave increased emphasis to employment creation and raising the standard of living of the general population. The Plan's targets, which included an annual average GDP growth rate of 7.5 per cent in real terms, were made easier to achieve by the substantial increase in budgetary and foreign exchange resources accruing to Indonesia as a result of the rise in oil prices during this period. In fact a real average GDP growth rate of 7.7 per cent per year was recorded during the plan period, with agricultural output expanding by 4.6 per cent per year and manufacturing value added by some 13 per cent per year.

The formulation and implementation of *Repelita III*, which began in April 1979, was complicated by the uncertainties prevailing in international oil markets, upon which Indonesia had become increasingly dependent during the previous plan period. In recognition of these uncertainties, the Plan proposed an annual average GDP growth rate of 6.5 per cent, with priority still given to agricultural development and distributional equity. An accelerated development of the industrial sector was also envisaged, with private sector investment in the manufacture of intermediate and consumer goods being supplemented by substantial public sector investment in large-scale heavy industrial projects. A reduction of $5 per barrel in oil prices agreed by the Organization of Petroleum Exporting Countries (OPEC) in February 1983 imposed severe balance of payments pressures, and caused the government to postpone the implementation of 47 projects with a total value of $21 billion. Annual average real GDP growth rate of 5.7 per cent was achieved during the Plan period as a whole.

Repelita IV, launched in April 1984, was also overshadowed by weakening international oil prices, as a result of which GDP was targeted to grow at an average rate of 5 per cent per year. With the long-cherished aim of self-sufficiency in the country's principal food grain, rice, having almost been achieved by this time, this Plan gave priority to industrial development. In particular, it sought to consolidate the move into upstream and high technology industries initiated during *Repelita III*, and provided for the manufacturing sector to become the main source of new employment opportunities and non-hydrocarbon export earnings. The private sector was assigned an unprecedentedly large role in the achievement of the Plan's objectives, with its share of the planned investment costs being set at 46 per cent. Despite severe external shocks arising from the sharp drop in oil prices and unfavourable realignments in international exchange rates during 1985-1986, the Government of Indonesia was able, through wide ranging structural adjustments and generous international financial assistance, to sustain the economy's growth momentum. Official estimates thus suggest that an annual GDP growth rate of 5.2 per cent in real terms was achieved during the Plan period, with the manufacturing sector as a whole growing by 12.9 per cent per annum and its non-hydrocarbon component by 12.1 per cent per annum.

By the time *Repelita V* was inaugurated in April 1989, the Indonesian economy's dependence on the hydrocarbon industry had been greatly reduced and the trend towards privately funded industrial investment had been well established. While projecting an overall GDP growth rate of 5 per cent per year, the Plan document consequently called for the manufacturing sector as a

whole to expand at an annual average rate of 8.5 per cent and the non-hydrocarbon component at an average rate of 10 per cent per year.[9/] With the regulatory framework that had previously inhibited private investment having either been partially dismantled, the Plan document also called for the private sector to contribute no less than 55 per cent of the total projected investment requirement of Rp 239.1 trillion.[10/] This private investment was to play a particularly important role in financing industrial development, since only Rp 2.1 trillion was earmarked for the manufacturing sector[11/] out of the government's total planned development expenditure of Rp 107.5 trillion during *Repelita V*.

Fiscal policy

Having come to office at a time when the Indonesian economy was in deep crisis, largely as a result of an almost complete breakdown of fiscal discipline in the preceding years, the New Order government has consistently attached high priority to the pursuit of a conservative fiscal policy.[12/] A particular feature of this policy approach has been a commitment to the maintenance of budgetary balance between total government expenditure and total domestic revenues and foreign aid flows. Although the definition of foreign aid as "revenue" rather than a means of financing a deficit has resulted in a considerable increase in public external debt, the conscious decision to abstain from domestic deficit financing has helped to ensure the maintenance of a relatively high degree of economic stability during the past two and a half decades.

A major aim of Indonesian policy makers during the early years of the New Order period was to expand and diversify the government's revenue base, which until that time had been oriented heavily towards taxes on foreign trade. The sharp rise in international oil prices in 1973/74 and the resulting increase in oil/gas revenues greatly reduced the urgency for the introduction of the necessary reforms to the country's tax laws, however, and resulted in their postponement until after oil prices had begun to weaken again in the early 1980s. Since then, there has been a comprehensive restructuring of the tax system and a concerted effort to increase the number of registered private and corporate income tax payers, which as late as 1983 amounted to only 600,000. The result has been a dramatic increase in non-hydrocarbon domestic revenues, in both absolute and relative terms, since the mid-1980s.

Government spending is classified under the usual categories of recurrent (described in Indonesian budget documents as "routine") and capital (described as "development") expenditures. The direct and multiplier effects of public spending on the creation of employment and national income are considerable, with some 5.5 per cent of the labour force being employed directly by the State in 1990,[13/] and large numbers of private enterprises depending for at least a part of their business on government contracts. Capital expenditure has been channelled mainly towards agricultural, infrastructural, regional and human resources development, with particular emphasis being given to the development of Indonesia's energy resources, transport and communications facilities, health and education services, and rural and urban infrastructure.

Monetary policy

The principal goal of the Government of Indonesia's monetary policy since the restoration of economic stability in 1966-67 has been the promotion of non-inflationary economic growth. The broad outlines of monetary policy are determined by the Economic Stabilization Council, an advisory body answerable directly to the President of Indonesia, which is chaired by the coordinating minister for economic, financial and industrial affairs and development supervision, and also includes the ministers of finance, trade and national planning as well as the governor of

Bank Indonesia, the central bank. The day-to-day execution of monetary policy is entrusted to Bank Indonesia, which exercises monetary control in line with the policies and objectives determined by the government.

Initial attempts to establish indirect mechanisms of central bank control had to be abandoned in 1974, when the vast increases in reserve money generated by the oil price increases of 1973-74 threatened to undermine Indonesia's economic stability and forced the government to impose a number of direct controls. These included credit ceilings and selective credit policies to regulate credit expansion, and the setting of deposit and lending rates offered and charged by the State-owned commercial banks, which were permitted to grant subsidized interest rates to priority borrowers financed by subsidized liquidity credits from Bank Indonesia. These measures enabled the growth of the priority sectors to be maintained without fuelling inflationary increases in aggregate demand, but also gave rise to considerable inefficiencies within the dominant State-owned banking system.

As the balance of payments situation deteriorated in the early 1980s, the effect of these measures in artificially depressing domestic interest rates also provoked a serious outflow of capital. From 1983 onwards, therefore, the government initiated a gradual change in the mechanisms of monetary control employed by Bank Indonesia. A package of policy reforms introduced on 1 June 1983 resulted in the lifting of virtually all credit ceilings and interest rate controls from the State-owned commercial banks and marked the beginning of a progressive phasing out of Bank Indonesia's liquidity credits over the following years.

In February 1984 the government introduced a new form of Treasury bill known as Bank Indonesia Certificates (Sertifikat Bank Indonesia, SBI), which was followed in February 1985 by the introduction of new money market securities known by their Indonesian initials as SBPUs (for Surat Berharga Pasar Uang). With these instruments in place, Bank Indonesia was able to regulate domestic liquidity through open-market operations by selling SBIs if it wanted to achieve monetary contraction and buying SBPUs if it wished to promote monetary expansion. With some refinements over time, this mechanism has remained the principal means of regulating monetary growth in Indonesia since the mid-1980s.

Price policy

While the maintenance of price stability has been a major concern of the government since the mid-1960s, it has sought to achieve this goal primarily through appropriate policies of demand management. Direct price controls have therefore been used sparingly, and only in the case of products deemed to be of strategic or social importance, such as food staples, fuels and electric power, fertilizers and some textiles and building materials. The usual methods employed to control prices have included the setting of administered prices for State-owned monopolies, market intervention by government agencies if the prices prevailing in these markets rise or fall beyond officially acceptable levels, and the setting of administered ex-factory and/or retail prices.

By distorting market signals, the imposition of these price controls has clearly generated considerable inefficiencies in the industries affected by them. Moreover, even though the number and range of industries subject to such price controls is relatively limited, these inefficiencies are often diffused more widely into the economy because of the linkages they have with other sectors and industries. It may thus be plausibly argued, for example, that the policy of artificially depressing prices of fuel and energy has encouraged the emergence of inefficient and inappropriate levels and patterns of demand, and that the policy of artificially raising the price of sugar beyond world market levels is hampering the growth of an export oriented food processing industry in which Indonesia would, in all likelihood, have a strong comparative advantage.[14]

On a more general level, the achievements of the government in maintaining price stability over the past 25 years have been impressive. Despite having to cope with a variety of external shocks and structural adjustments during this period, Indonesia's economic policy makers have succeeded in keeping inflation within broadly acceptable limits. As officially measured by the Central Bureau of Statistics,[15/] consumer price inflation has typically been held below 10 per cent per annum. The only major exceptions to this generally favourable performance occurred in 1973-74, when the price level rose sharply because of the effects of the increase in international oil prices and a poor rice harvest, and in 1979 when the government failed to avert an accommodating increase in the money supply after a 34 per cent devaluation of the rupiah on 15 November 1978.

Trade policy

In contrast to the relatively liberal approach adopted in most fields of economic policy, the Government of Indonesia has traditionally imposed a variety of controls on both external and internal trade. The country's external trade has thus been subject to an extensive regime of import and export duties and taxes, quantitative restrictions, sole trading licences and other restrictions. Domestic trade flows were similarly regulated, with foreign nationals and enterprises not being permitted to engage in the retail trade, ethnic Chinese entrepreneurs being discouraged from operating in rural areas, and commerce in a number of products being restricted to officially endorsed public or private monopolies. Although the reasons for the imposition of these restraints on trade were diverse, and often specific to the individual product concerned, many of them were introduced in support of the import-substituting industrial policies pursued until the mid-1980s, and in order to satisfy politically powerful vested interests.

The decline in world oil prices in the mid-1980s and the consequent need to enhance the international competitiveness of Indonesia's non-hydrocarbon exports caused the government to initiate a programme of trade policy liberalization aimed primarily at reducing the cost of imported inputs for the country's export-oriented manufacturing industries. In a series of trade policy reform packages introduced since May 1986, the share of imports affected by non-tariff barriers has been reduced from 43 per cent to less than 13 per cent of total imports.[16/] In line with this reduction of non-tariff barriers, the government has also gradually reduced the degree of tariff protection for domestic producers, with the weighted average import tariff rate having fallen from 22 per cent in 1985 to 10 per cent in 1991. Taking into account the duty exemptions granted to imports by export producers and officially approved direct investment projects, the actual rate of duty collections amounts to only about 5 per cent of the value of imports.[17/]

Approximately a quarter of all domestic production of tradeable goods is currently estimated to be affected by some form of export restriction, including prohibitions, licensing arrangements, quotas, taxes and quality controls.[18/] These controls are particularly widespread in the case of forestry products, where they apply to logs, sawn timber, raw and semi-processed rattan, and veneer. While export bans on several of these products were replaced by export taxes in June 1992, the taxes have been set at punitive levels and have therefore resulted in no material change in export patterns.

In contrast to the extensive liberalization of the external trade regime achieved since the mid-1980s, the deregulation of domestic trade has made far more limited progress, and several policy measures taken during the past few years have even run counter to this objective. The most celebrated cases in this connection involve the granting of monopolies on the trade in cloves and citrus fruits to business organizations connected to politically influential personalities. The activities of these monopolies have resulted in extensive distortions and generated widespread criticism inside and outside Indonesia.[19/]

Foreign exchange policy

Shortly after assuming office in 1965/66, the New Order Government of President Suharto established an extraordinarily liberal foreign exchange system in Indonesia. The complex structure of exchange controls and multiple exchange rates created by the previous government had been dismantled by 1970, with the rupiah becoming fully convertible. Since then the government has pursued an essentially free and open foreign exchange policy, with only few direct restraints being imposed on the free flow of capital. Even these few existing restraints were removed during the late 1980s, with the country's banking industry being granted unrestricted access to Bank Indonesia's foreign exchange swap facility in October 1986 in order to enable it to cover its foreign exchange risks, and all ceilings on offshore borrowing by Indonesian banks being lifted in March 1989.

More recently, the dramatic growth in private external debt has prompted the re-introduction of some controls. A policy package issued in November 1991 thus requires banks to limit their offshore liabilities to 30 per cent of their capital base, and limits access to the Bank Indonesia swap facility by distinguishing between "investment swaps" and "liquidity swaps", with the former being readily available to cover overseas loans with a minimum maturity of two years, and the latter being provided only in special cases. Despite these new measures, however, Indonesia's foreign exchange system remains remarkably free, with no restrictions being imposed on the provision of foreign exchange for current account transactions.[20/]

Within the framework of this relatively free foreign exchange system, the Government of Indonesia has generally sought to maintain the exchange rate of the rupiah at a level appropriate to the maintenance of a balance of payments equilibrium. After having been pegged against the United States dollar at Rp 415 = $1 in August 1971, the rupiah was devalued by 34 per cent to Rp 625 = $1 in November 1978 when the first oil boom showed signs of petering out and measures to stimulate the growth of non-hydrocarbons exports appeared necessary. At the same time, the link with the dollar was nominally broken, with the rupiah being subjected to a managed float against a basket of currencies of Indonesia's main trading partners.

Although the beneficial impact of the November 1978 devaluation was soon eroded by an inflationary surge prompted by the renewed increases in oil revenues generated by the second oil price boom and by the government's failure to maintain tight monetary control, it nevertheless set the scene for the government's future exchange rate policy. In March 1983 and September 1986 the government again responded to weakening oil prices with hefty devaluations of 28 per cent and 31 per cent, respectively, vis-à-vis the United States dollar. After broadly maintaining the rupiah's parity against the dollar in 1987 (when the dollar itself suffered a substantial depreciation against most other OECD currencies), the government has permitted a gradual depreciation of the rupiah by some 3.5-5.5 per cent per annum in nominal terms since 1988. Bearing in mind the inflation differential between Indonesia and its main trading partners, this has resulted in the real effective exchange rate of the rupiah remaining essentially unchanged during this period.[21/]

Human resources development

Indonesia is the fourth most populous country in the world with a total population of almost 180 million in 1990. Both the regional and the age distribution of the population reveal significant imbalances, which the government has sought to correct through a very active and effective family planning programme as well as a programme of inter-regional resettlement known as "transmigration". These measures have had considerable success, with the overall rate of population growth slowing down substantially over the past two decades, and this slowdown being particularly marked in the densely populated regions of Java and Bali.

While thus seeking to alleviate the growth of population pressure both in the country as a whole and in the areas with high population densities in particular, the government has expended considerable efforts in the past 25 years towards improving the health, education and skill levels, and quality of life of the population. Public capital spending on human resources development has consistently accounted for a substantial proportion of total government development expenditure. The share of the government's capital budget devoted to manpower development, transmigration, education and health amounted to an average of 12.5 per cent during *Repelita II* and rose steadily to an average of 19.8 per cent in *Repelita IV*. In the 1992/93 fiscal year it was budgeted at 21.1 per cent.

The results of these efforts have been impressive. According to data collected by Pernia,[22] the overall adult illiteracy rate fell from 60.1 per cent in 1960 to 32.7 per cent in 1980. Official Indonesian statistics indicate a further decline to 15.8 per cent in 1990, when the level of illiteracy in urban areas amounted to 7.6 per cent of the urban population over ten years old.[23]

Educational facilities have been substantially expanded and improved, with the number of primary schools being increased from approximately 57,300 in the 1966/67 school year to almost 67,000 in 1973/74 and 146,600 in 1989/90. The proportion of primary school-age children attending school meanwhile increased from 55 per cent in 1973/74 to 89.2 per cent by the end of *Repelita II* in 1978/79 and 99.6 per cent by the end of *Repelita IV* in 1988/89. There has been a similar increase in secondary and tertiary educational facilities, which have recorded increases in enrolment from 2.1 million to 10.8 million and 118,500 to 1.7 million, respectively, between 1973/74 and 1988/89. Official estimates thus suggest that the proportion of the population in the relevant age groups enroled in secondary schools increased from 18.7 per cent to 45.2 per cent, while the corresponding participation rate in universities and other institutions of higher education increased from less than 2 per cent to 8.5 per cent during the same period.[24]

Apart from the improvement in general educational facilities, significant efforts have also been made to promote technical education and training. Data released by the Central Bureau of Statistics[25] show that Indonesia had 249 junior technical high schools and 931 senior technical high schools in 1989/90, with a combined enrolment of almost 519,000 students. In addition, there were 1,762 senior economics high schools with more than 689,000 students. These formal educational facilities are supplemented further by a wide range of vocational training schemes designed to enhance the skill levels both of new entrants and existing members of the labour force. The most important of these currently in operation include Labour Training Centres (Balai Latihan Kerja, BLK), Regional Centres to Enhance Labour Productivity (Balai Peningkatan Produktivitas Daerah, BPPD), and Mobile Training Units (MTUs). In 1988/89 a total of almost 419,000 persons benefited from these schemes, although preliminary data for the following two years indicate a sharp drop in this number to 76,300 and 108,900, respectively.

A significant contribution to the development of the education system has been made by the private sector. This is particularly important at the tertiary level, where a recent World Bank report suggests that the number of private universities, academies and related institutions had grown from 350 in 1975 to more than 900, and accounted for two-thirds of all students enroled in post-secondary courses, by 1990. The report points out that private initiative has also played a large role in the rapid expansion of in-service and pre-service training activities, with enrolment in privately operated skill training programmes estimated to be ten times higher than in comparable government operated schemes. Lastly, the report notes that a number of private management training institutions have been established over the past five years.[26]

Considerable resources have also been invested in the improvement of the health-care system. From 1,126 in 1968 the number of general and specialized hospitals increased to 1,552 in 1991,

while the number of hospital beds increased from approximately 85,600 to more than 120,700 during the same period. Acknowledging the inadequacy of available resources for a more ambitious hospital building programme, especially in rural areas, the government has given greater priority to the establishment of a network of public health centres (Pusat kesehatan masyarakat, Puskesmas). These institutions are sited in strategic locations, usually supervised by a qualified doctor, and often supplemented by one or more auxiliary health centres known as sub-Puskesmas. Between 1968 and 1991 the number of Puskesmas and sub-Puskesmas increased from 208 and 11,800 to 6,021 and 20,124, respectively.

This expansion of health-care facilities has been accompanied by a similarly rapid increase in the number of health-care professionals. The latest available data indicate that the number of doctors increased from 2,213 in 1968 to 25,752 by the end of the 1989/90 fiscal year on 31 March 1990, while the number of nurses and midwives increased from 27,976 to 98,842 during the same period. Preliminary statistics for the 1990/91 fiscal year suggest that a further 1,090 doctors and 11,003 nurses and midwives were licensed in that year.

In addition to these measures to enhance the coverage of the available curative medical services, much effort has also been expended in preventive medical care. Immunization has become widespread, and more than 86 per cent of all infants born in 1990/91 were estimated to have been vaccinated against tuberculosis, polio, measles, diphtheria, whooping cough and tetanus. This exceeded by a substantial margin the Universal Child Immunization (UCI) target of 80 per cent set by the United Nations.

The provision of clean water has also been a major goal of government health policy, as has the improvement of public nutrition. The clean water supply programme aims both to provide pipeline connections to urban homes and to install public hydrants and water stations in urban slum areas and rural villages. The nutrition improvement programme, meanwhile, is intended to prevent vitamin A, iodine and iron deficiency, and develop food and nutrition awareness.

The impact of these health policy measures has been dramatic. Pernia has shown, for example, that the average life expectancy at birth increased from 41 years in 1960 to 60 years in 1987, while the infant mortality rate declined from 150 to 71 per 1,000 live births during the same period.[27] Official Indonesian data suggest further improvements in the life expectancy to 63 years and the infant mortality rate to 58 per 1,000 live births by 1990.[28]

Despite these achievements, however, considerable scope still exists for a further development and expansion of the health care system.[29] A comparison of the number of medical personnel in 1990 with the 1990 census data yields a doctor/population ratio of almost 1:7000, and a nurse/population ratio of approximately 1:1800. By contrast, the latest available comparative data published by the World Bank indicate that China and India had a physician/population ratio of 1:1010 and 1:2520, respectively, in 1984, while the corresponding ratios for Malaysia, Thailand and the Philippines amounted to 1:1930, 1:6290 and 1:6570, respectively.[30]

Environmental policies

Public interest in environmental issues began to grow slowly in the 1970s, especially after the convening of the United Nations Conference on the Human Environment in Stockholm in June 1972. Following an initial period of suspicion that such environmental concerns might unduly constrain the Government of Indonesia's drive for economic development, the need to balance the economic growth objective with the protection of Indonesia's environmental heritage was formally recognized by the end of the 1970s. This resulted in a restructuring of the cabinet after the

presidential elections of March 1978, with the creation of the new post of Minister of State for Development Supervision and the Environment. This was followed by the inclusion of environment-related spending as a separate line item in the development budget from the 1979/80 fiscal year onwards. Indonesia's first environmental law was promulgated on 11 March 1982, in the form of enabling legislation providing for the future introduction of detailed regulations on various aspects of environmental protection.[31]

An important insight into early Indonesian perceptions of the complex trade-offs between economic growth and environmental protection was given shortly after the promulgation of this law by the then Minister of State for Development Supervision and the Environment, who argued in 1982 that Indonesia had no choice but to continue on the road towards economic development because of "the social realities around us, our historical experiences, and our hopes for the future". In recognition of the importance of environmental issues, however, he argued further that "we must therefore continue with both development efforts and conservation processes simultaneously, and these are indeed the twin objectives of our national policy of eco-development".[32]

In attempting to elaborate this concept of "eco-development", the Minister of State conceded that "exactly how we will proceed on this course I cannot tell you in detail for this is not a tried and tested course, and we still lack the knowledge to deal with development and the environment". He noted, however, that Indonesia was on the verge of industrialization, which would require it to exploit all available natural resources and generate increased environmental pressures. While stressing that "we do not believe that conservation and development have to be antithetical opposites", he nevertheless acknowledged that the emergence of these increased pressures would necessitate difficult choices and wise management.

During the past decade the Government of Indonesia has continued, in broad terms, to pursue the policy of "eco-development" outlined by the Minister of State in 1982. While continuing to stress economic development as the principal objective, it has begun to establish a framework of laws and regulations aimed at minimizing the negative environmental side-effects of the development process. Under a law passed in June 1986,[33] which came into force a year later, applications for the approval of all major economic development projects have to be accompanied by an environmental impact assessment known by its Indonesian acronym AMDAL (Analisa Mengenai Dampak Lingkungan). Several Presidential Decisions having the force of law were introduced in 1989-1990 regarding the formation of a Coordinating Team on National Land Use Management, the establishment of criteria for the determination of conservation areas, the conversion of agricultural and forest land to industrial uses, and the creation of an official agency known as BAPEDAL (Badan Pengendalian Dampak Lingkungan) to control the undesirable environmental effects of economic development.

Considerable progress has been achieved as a result of these measures, especially in the field of forest conservation and the protection of their biodiversity.[34] At the same time however, the issues of water resource management, atmospheric pollution and the safe disposal of household and industrial waste continue to present serious problems, not least because priority has usually been given to the demands of economic development when these have conflicted with those of environmental protection. In 1989, for example, a private environmentalist organization, the Indonesian Environmental Forum, lost a legal challenge it had mounted against the large pulp and paper producer, PT Inti Indorayon Utama.[35] More recently, the planned construction of a luxury residential housing estate at Kapuk near Jakarta elicited some controversy in September 1992 because of the threat it posed to local mangrove swamps.[36]

D. INDUSTRIAL POLICY

Overview

As discussed later in Chapter II, Indonesia inherited a very limited industrial base at the time of Independence. With the exception of a relatively well-developed oil refining industry,[37] cottage industries and estate-based raw material processing accounted for the bulk of manufacturing activity at that time. The development of manufacturing industry began to be given high priority soon after Indonesia gained Independence,[38] however, and has remained a principal objective of successive Governments of Indonesia throughout the post-Independence period.

While the transition from an essentially agricultural to a predominantly industrial economy has thus constituted one of the underlying goals of economic policy during the past four decades, there have been frequent shifts in emphasis as to the manner in which this transition would be achieved and the purposes it should serve. These shifts have reflected the marked difference of opinion between the two principal schools of thought espoused by Indonesian policy makers, of which one has focused on the use of economic efficiency criteria for determining the pace and pattern of the industrialization process, and the other has viewed industrial growth as a means towards achieving essentially non-economic objectives. As indicated above (see MACROECONOMIC POLICIES - Overview), this divergence of view between the "technocrats" and the "economic nationalists" has been an outstanding feature of economic and industrial policy formulation in Indonesia throughout the country's post-Independence history, and has persisted to the present day.

The first attempt at industrialization, launched as part of the Economic Urgency Plan (*Rencana Urgensi Perekonomian, RUP*) in 1951, sought primarily to promote small-scale industry and indigenous entrepreneurship, with some expansion of State ownership in heavy industry. By the mid-1950s greater stress began to be placed on State ownership, and attitudes towards foreign direct investment became increasingly unfavourable despite the enactment of a relatively moderate Foreign Capital Investment Law in 1958. With the mounting political and economic instability of the late 1950s and early 1960s serving in any case to deter private investment during this period, the focus of industrial policy began to shift towards the establishment of large heavy industrial enterprises under State ownership, with the former Union of Soviet Socialist Republics (USSR) and other socialist countries providing much of the necessary financial and technical support.[39]

The restoration of macro-economic stability in the late 1960s following the assumption of power by President Suharto's New Order Government was accompanied by a deliberate effort to promote Indonesia's rapid industrialization. The goals and objectives of industrial policy during this period were set out, in general terms, in the successive *Repelita* plan documents. As noted by Hill, all of the first four plans emphasized the importance of industries that earn or save foreign exchange, and also encouraged the development of small-scale and labour-intensive industries as well as a regional dispersal of industrial growth.[40] As will be discussed below, these broad objectives were retained in the Fifth Plan, which commenced on 1 April 1989.

Beyond these relatively unchanging basic objectives, however, the more immediate aims of the Government of Indonesia's industrial policy have been adjusted from time to time during the past 25 years in line with changes in the country's economic and industrial structure and in the external economic environment. While *Repelita I* sought primarily to promote industries related to the agricultural sector, for example, *Repelita II* gave greater priority to distributional issues, and to supporting indigenous entrepreneurs and "weak economic groups" in particular.[41] With financial constraints expected to remain weak as a result of continuing high oil revenues, *Repelita III* and *Repelita IV* set more ambitious targets and sought to increase the degree of vertical

integration in the industrial sector. In particular, it was planned to extend the industrial development process further upstream through the establishment of a domestic manufacturing capacity for a wide range of technically sophisticated intermediate goods. This policy had to be supported by a wide range of protectionist measures and became increasingly untenable after the mid-1980s, when the decline in international oil prices provoked a significant tightening of the country's resource constraints. In *Repelita V*, therefore, much greater emphasis was given to the development of internationally competitive export-oriented industries.

Basic policy issues - import substitution versus export promotion

As suggested by the above discussion of the evolution of industrial policy in Indonesia, the conflict between supporters of import substituting and export promoting industrialization strategies has long been a major feature of Indonesia's industrial policy. With economic nationalism representing an important element of political thinking since the earliest days of the country's post-colonial existence, there has always been a strong base of support for import substituting policies within the country. Even when it has been justified in economic terms, for example as a means of conserving scarce foreign exchange, this promotion of import substituting industrialization has often been based on a variety of non-economic considerations. These have ranged from a desire to establish a domestic manufacturing capacity for products regarded as having a strategic importance for Indonesia to a need to satisfy the demands of politically influential vested interests.

This tendency towards autarchy was especially strong in the first fifteen years of the country's history, when the prevailing political circumstances encouraged the emergence of particularly ardent nationalist fervour. Even after the establishment of a much more moderate political environment after the mid-1960s, a belief in the need for the creation of a broad-based industrial structure persisted, irrespective of its economic viability.[42] A progressively more complex web of protectionist measures - comprising, *inter alia*, a variety of direct trade controls, increasingly stringent local content requirements, and the widespread provision of subsidized credits to preferred industries - was consequently constructed in the 1970s and early 1980s to support the creation of a domestic capacity to engage in ever more complex import-substituting manufacturing activities.

The extensive economic inefficiencies associated with this attempt to develop a highly protected import-substituting industrial base could be borne with relatively greater ease in the 1970s than would otherwise have been the case because of the availability of vast windfall revenues from the post-1973 increase in international oil prices. As oil prices began to weaken in the mid-1980s and the need to develop alternative sources of export income grew increasingly urgent, the restraining effect of these inefficiencies on Indonesia's external competitiveness became increasingly evident. In this environment, the weaknesses of Indonesia's then-prevailing "high-cost economy" began to be widely recognized, and its reform became a major issue of economic policy debate and the principal objective of economic policy formulation.

Since the mid-1980s there has consequently been a marked shift towards a pattern of export-oriented industrialization. This has been accompanied by a progressive dismantling of the existing protectionist measures, albeit at a gradual pace because of the continuing political influence of vested interests. The goal of import substitution has only been retained in the case of a few industries deemed to be of strategic importance, although efforts are being made even in these cases to enhance efficiency and encourage exports.

Basic policy issues - public versus private ownership

The long standing industrial policy debate about the relative merits of an import substituting and export promoting strategy has been mirrored in a similar, and related, debate about the roles that the public and private sectors should play in Indonesia's industrial development process. To a large extent, the contest between economic nationalism and economic efficiency also forms the underlying issue in this latter debate. Wary of the historical dominance of ethnic Chinese and foreign businesses in most formal activities in the secondary and tertiary sectors of the Indonesian economy, and recognizing the limited entrepreneurial skills and capital resources of the indigenous Indonesian communities, the advocates of the economic nationalist viewpoint have traditionally argued for the State to play a strong direct role in the economy. By contrast, the proponents of the technocratic viewpoint have sought to promote private investment as a means of mobilizing capital, reducing inefficiency, and minimizing public sector costs.

The strong sense of nationalism prevailing in the early post-Independence period ensured that State ownership grew rapidly in the early stages of the industrialization process. This resulted in part from the nationalization of foreign owned enterprises and the formal exclusion of the private sector from a variety of activities except as an agent of the State, and in part from the State's direct involvement in large-scale industrialization projects. Quoting official data derived from the industrial census of 1964, Hill has shown that although the number of State-owned medium- and large-scale enterprises amounted to only 561 out of a total of some 27,400, they accounted for almost 40 per cent of installed capacity and 20 per cent of employment. "By the mid-1960s", Hill concludes, "the 'commanding heights' of Indonesian industry - what little there was of them - were under State control".[43]

Although the political transition in the mid-1960s to the "New Order" Government of President Suharto resulted in a significant economic liberalization, the ownership of the means of production remained a contentious political issue.[44] While establishing a framework for increased private participation in the economy through the promulgation of the foreign and domestic capital investment laws of 1967 and 1968, respectively, the government therefore continued to be concerned about the need to prevent the emergence of an unbalanced ownership structure in which indigenous Indonesians would play only a peripheral role. For almost two decades the government consequently pursued a two-track industrialization strategy with regard to ownership, involving a carefully controlled expansion of the private sector on the one hand and the continued growth of State involvement, especially in the large-scale and technologically sophisticated upstream sectors of manufacturing industry, on the other.

By the mid-1980s, the share of industrial firms with government equity participation was estimated to be in excess of 50 per cent.[45] The number of wholly State-owned enterprises in all sectors of the economy at this time amounted to some 215, many of which were involved in industrial activities and dominated their respective branches. In the manufacturing sector, this dominance was particularly marked in the basic metals, machine goods, fertilizer and high technology industries, and to a lesser extent in the cement, paper and food processing industries.

With many of the State-owned firms known to be operating inefficiently, and with the government's ability to continue supporting them increasingly constrained by its weakening fiscal resource base following the oil price collapse of 1985-1986, the issue of privatization became an important subject of debate in the second half of the 1980s.[46] In 1987 it was reported that the government had established a team within the Ministry of Finance to study the prospects for privatization with the assistance of advisers provided by the World Bank and the International Monetary Fund. Two years later, in June 1989, the Minister of Finance revealed that some two thirds of the wholly State-owned enterprises were still operating at a loss, and announced that the

government was considering a variety of measures, including partial privatization, to increase their efficiency. By November of that year proposals were announced for the partial divestment of the government's stake in 52 companies during 1990-1991, and the process began to be implemented in April 1990 with the sale of a 70 per cent holding in the loss-making State-owned tyre producer PT Intirub to private interests.

From the outset, however, the government's attempts at privatization have been dogged by a number of political constraints. As early as 1987, when the possibility of such a move first began to be considered, several ministers publicly expressed their opposition to the privatization of any firms falling under their jurisdiction. There has also been a strong resistance within some parts of the government to the privatization of industries deemed to have a "strategic" role, in response to which a special agency, Badan Pengembangan Industri Strategis (BPIS), was created by presidential decree in 1989 to oversee the development of these industries. While the industries placed under the jurisdiction of BPIS are ostensibly subject to the same criteria as other State-owned firms with regard to the privatization programme, the fact that they have been segregated in this manner has been widely interpreted as implying that they will be retained under State ownership.

In addition to the opposition aroused by the privatization proposals among the technical ministries and other vested interests, reservations have also been voiced by some segments of the business community and the public at large. Many independent analysts have expressed the fear, for example, that the large size of the State-owned enterprises would prevent any but the largest of the private Indonesian conglomerates from acquiring them, thereby further reinforcing the already strong concentration of economic power in the hands of a relatively small and politically influential business élite. While this objection has been partially overcome by the government's decision to privatise at least some public enterprises via the capital market, the issue remains sensitive.

The prevailing compromise

The industrial strategy adopted by the Government of Indonesia at present has been determined by the complex interplay of the ideological and pragmatic considerations discussed above. It consequently represents a compromise between still widely held nationalistic and egalitarian principles on the one hand, and the equally widely recognized need for an efficient, growth-oriented institutional framework for industrial development on the other. While continuing to maintain a major direct stake in the economy and supporting the growth of import substituting industrialization in a number of important fields, the government has significantly liberalized the operating environment to attract the entry of large numbers of privately invested firms and taken strong measures to promote the emergence of an export-oriented industrial sector.

The Government of Indonesia's declared objectives and priorities with regard to its current industrialization policy which can be summarized as follows:

- the development of export oriented industry, aimed both at increasing the volume and diversifying the range of manufactured exports;
- the deepening and strengthening of the industrial structure;
- the development of small-scale industries;
- the development of agricultural processing industries;
- the enhancement and dissemination of technological skills; and
- the development of the support structure for industrial growth.

The various measures taken in pursuit of these objectives include:[4]

Promoting export-oriented industries: During *Repelita V* the government aims to consolidate the growth of export-oriented industries achieved in the *Repelita IV* period, stimulate the growth of new industries, promote increased efficiency and higher levels of international competitiveness, create an investment climate conducive to the establishment of export oriented industries, and encourage the expansion of export processing zones. More specifically, the government's industrial policy guidelines call for improvements in the distribution of industrial inputs and the dissemination of export market information, a more effective exploitation of the opportunities offered by preferential trade arrangements such as the General System of Preferences (GSP), and the adoption of improved production technology and equipment in order to enhance the quality of industrial goods manufactured in Indonesia. In addition, the government has also tailored some of its other policies to the promotion of export-oriented industrialization, with particular incentives being given to investors establishing export-oriented enterprises and foreign banks being required to devote a substantial proportion of their loan portfolios towards export credits.

Deepening and strengthening industrial structure: The government's policies in this area are aimed at promoting linkages between the industrial and other sectors and between various industrial branches, encouraging the growth of industries in which Indonesia has a comparative advantage, fostering the development of strategic industries, and improving the efficiency of State-owned enterprises. With a view towards ensuring the achievement of a balanced industrial structure, the government also wishes to encourage the establishment of industries producing raw materials, intermediate goods and capital goods, and industries utilizing the available natural and human resources in Indonesia. In each case, however, the government has committed itself to be guided by rational economic considerations in determining which specific industries, technologies and processes to adopt and support.

Supporting small-scale industries: The government views the development of small-scale industry as an important means of ensuring the creation of sufficient job opportunities to meet the needs of the growing population, and of providing a mechanism for a more equitable distribution of wealth. To achieve these goals, it aims to provide small-scale entrepreneurs with credits, equipment and technical expertise, and to encourage the emergence of small-scale industries in the remote and still relatively underdeveloped parts of the country. In this connection, the government is earmarking 1-5 per cent of the net profits of State-owned enterprises for the development of small-scale industries, and national commercial banks are being encouraged to channel 20 per cent of their loans to small businessmen. In a particularly important development, the government is also attempting to propagate a "foster parent" system, under which existing large-scale companies, both private and State-owned, are being persuaded to support local small-scale industries through the offer of subcontracting arrangements, technical and managerial support, quality control supervision, credit guarantees and other direct and indirect forms of assistance.

Developing agricultural processing industries: In view of Indonesia's extensive and diversified agricultural resource base (including animal husbandry, forestry and fishing), the expansion of the available domestic processing capacity is seen as an important objective of industrial policy. In this connection the government is concerned both to develop the existing industries in this field and to establish new ones, with due regard being given to the principles of comparative advantage and the need to enhance the industry's productivity and efficiency. Preference is to be given both to the adoption of labour-intensive technologies, and increased attention is to be paid to the establishment of quality standards and the increased utilization of bio-technology to improve and standardize product quality. In addition, efforts are to be intensified to promote the development

[4] United Nations Industrial Development Organization

of associated industries, such as those involved in the manufacture of chemical inputs and processing equipment.

Acquiring and disseminating industrial technology: The acquisition and domestic development of industrial technology has been a major priority of the Government of Indonesia since at least the cabinet reshuffle of 1978, when the portfolio of research was extended to include technology. This policy objective calls for the expansion of research and development facilities and the enhancement of domestic technological skills. Both public and private agencies and enterprises are expected to contribute to this effort, which is intended to induce an ongoing improvement in industrial equipment and processes.

Developing the support structure for industrial growth: The activities which the government seeks to undertake or promote in this context include the establishment of national industrial planning and information systems, manpower planning and the promotion of human resources development, the provision of basic infrastructure to support industrial development, and improvements in the mechanisms of public regulation and control. In addition, the government also aims to identify, delineate and prepare promising new regions for industrial development, and to encourage the establishment of industrial estates and export processing zones by both public and private bodies.

INVESTMENT POLICY

Background and evolution

The evolution of public attitudes towards private investment in Indonesia has been determined by the same underlying combination of sentiments, sensitivities and objective needs as the country's economic policies as a whole. Prior to the mid-1960s, private investment was deterred by the unfavourable economic conditions and the quasi-socialist political views then prevailing in the country, even though it was officially permitted subject to certain conditions.[48] After the political transition of 1965-1966, when the need for a large-scale private sector contribution to the revitalization of Indonesia's severely debilitated economy began to be widely recognized, the government took active steps to promote such investment. In particular, it issued two new laws - the Foreign Investment Law of 1967 and the Domestic Investment Law of 1968 - which provided a liberal and secure investment environment and, with some amendments, form the basis of the government's investment regulations to this day.

As originally enacted, the Foreign Investment Law of 1967 was an extremely tolerant document, both in terms of the previously prevailing investment regulations in Indonesia and in comparison with corresponding laws in other countries. In the 1970s, however, a resurgence of nationalist sentiment[49] and the availability of substantially increased oil revenues, which reduced Indonesia's dependence on external investment funds, caused the government to reconsider its investment policy. The increased control over the flow of investment into preferred sectors and industries was formalized in February 1977 with the introduction of a complex Investment Priority List (*Daftar Skala Prioritas*, DSP). This distinguished between four categories of activities: open to foreign investors and eligible for full investment-promotion incentives; open but eligible for only some incentives; open but not eligible for incentives; and closed to foreign investors. In subsequent years this list was reviewed periodically, with adjustments made in line with changing government policies and priorities.

The disincentive effects of the increasingly more restrictive investment regulations were reinforced by the slow and tiresome licensing procedures followed by the Indonesian authorities. Despite the fact that the Foreign Investment Law of 1967 provided for the processing of foreign investment

applications to be coordinated by a Technical Committee for Foreign Investment (*Panitia Teknis Penanaman Modal*, PTPM) especially established for this purpose, the approval process could take between six months and a year. Even after the PTPM was replaced by a more permanent Capital Investment Coordinating Board (*Badan Kordinasi Penanaman Modal*, BKPM) in 1973, the approval process continued to take a year or more. Even though the licensing procedure was simplified and centralized in 1977, with the BKPM being assigned the role of a "one-stop agency" responsible for dealing with all foreign investors' needs, the goal of reducing the waiting time to a maximum of 14 weeks remained unfulfilled.

A sharp fall in investment interest in 1984-1986, the effects of which were exacerbated by the collapse of international oil prices and the resulting contraction of public and foreign exchange revenues, forced the government to undertake a renewed reassessment of its investment policy in the mid- and late 1980s. This led to a conscious decision being taken to shift the emphasis of government policy from investment regulation to investment promotion, and a number of deregulatory reform packages have been introduced since October 1984. These have resulted in: a significant liberalization of the investment licensing system and of the regulations governing the marketing of domestic output by foreign joint ventures; an increase in the maximum initial equity holding allowed to foreign investors in joint ventures from 80 per cent to 95 per cent; a reduction in the minimum external capitalization requirement of joint venture projects from $1 million to $250,000; a reduction of import barriers on intermediate goods; and a relaxation of the regulations governing the employment of expatriate labour. In addition, foreign investors were permitted to establish wholly-owned enterprises on the island of Batam near Singapore from October 1989 onwards, and in April 1992 this facility was extended, subject to certain conditions, to the rest of the country.

Meanwhile, the DSP was liberalized progressively from June 1986 onwards, and in May 1989 was abolished altogether in favour of a simple Negative List (*Daftar Negatif Investasi*, DNI) identifying 75 areas closed to foreign investment. This list itself has been shortened gradually in the following years, most recently in July 1992, when the number of closed areas was cut from 60 to 51. The closure of these areas is not absolute, however, and foreign investment may be relaxed if all or most of the output is intended for export, or if the venture includes an Indonesian cooperative as a minority partner with an equity share of at least 5 per cent.

Private investment: regulations and procedures

Indonesian investment regulations distinguish between three principal fields of investment: the oil and natural gas industries, financial institutions, and all other fields. Investment in the oil/gas sector is regulated by the Directorate General of Oil and Gas (*Direktorat Jenderal Minyak dan Gas Bumi, Migas*) of the Department of Mines and Energy, and all foreign investors in the industry are required to operate as contractors of the State oil company Pertamina, which is responsible for all activities concerned with the exploration and production of petroleum and natural gas in Indonesia.[50/] Investments in the banking (including merchant banking) and insurance industries are regulated by the Department of Finance, and are governed by a separate banking law.[51/] Investment in all other fields, including manufacturing industry but excluding particular industries specified in the negative list, is regulated and coordinated by BKPM.

Foreign direct investment in the fields covered by BKPM is governed by the Foreign Investment Law of 1967, as amended by subsequent regulations and decrees. As a result of the deregulatory measures adopted since the mid-1980s the investment environment in Indonesia has now been liberalized to a degree comparable with most of the rapidly growing countries of south-east Asia. While tax holidays continue to be denied, the government provides a variety of other incentives to foreign investors, including accelerated depreciation schedules for capital equipment, exemptions

from a wide range of tariffs, duties and indirect taxes, no restrictions on the transfer of capital or remittance of profits, and guarantees for the protection of foreign investments. Immigration regulations are also relatively liberal, with business enterprises usually having no difficulties in obtaining work permits for managerial and technical staff in a wide range of occupations.

Under the regulations prevailing in April 1993,[52/] foreign investment projects in fields coming under the jurisdiction of BKPM must, in principle, take the form of joint ventures between the foreign investors and one or more Indonesian partners, who may be corporations or individuals. In most cases the foreign parties must invest a minimum of $1 million, and have a maximum initial equity holding of 80 per cent, which must be reduced to 49 per cent within 20 years of commencement of commercial production. Exceptions to these general rules are provided as follows:

* Investment projects sited in bonded zones (including Batam island) and producing entirely for export may be wholly foreign-owned for the first five years after the commencement of commercial production, following which an Indonesian partner must be given an equity stake of at least 5 per cent.

* Foreign investors may also have an initial equity holding of 100 per cent in projects with a minimum paid-up capital of $50 million or located outside Java, Bali, and most provinces of Sumatra except Jambi and Bengkulu. In this case a 5 per cent holding must be divested to an Indonesian partner within five years of the commencement of commercial production. This Indonesian shareholding must be increased to 20 per cent within the next fifteen years.

* Joint venture enterprises may be established with an initial foreign equity holding of 95 per cent if they are labour-intensive (employing at least 50 workers), export-oriented (exporting at least 65 per cent of their total output) or manufacturers of intermediate goods used by other industries. This foreign shareholding must be reduced to 80 per cent within ten years of the commencement of commercial production, and to 49 per cent within the subsequent ten years. In this case, and in some other projects in service industries, the minimum foreign investment requirement of $1 million may be reduced to $250,000.

Applications for foreign investment projects must be submitted on pre-printed forms available from BKPM. They must also be accompanied by a variety of supporting documents, including financial reports and articles of association of the companies concerned, the joint venture agreement and any technical assistance agreement, a description of the production processes and pollution prevention measures to be employed by the new enterprise, bank references for all companies or persons engaged in the joint venture. In addition, the prospective investors must also obtain a number of permits from the regional authorities in the province where they plan to locate their project, such as land-use and building permits, work permits for expatriate employees and permits under local nuisance acts. The investment applications are subject to formal approval by the President of Indonesia, which is conveyed in due course to the investors by the chairman of BKPM.

Investment by Indonesian nationals or companies is regulated by the Domestic Investment Law of 1968 or by the *Bedrijfs Reglementeerings Ordonnantie (BRO)* of 1934, a commercial licensing laws dating back to the Colonial period. Investments undertaken under the BRO receive no official incentives, and usually involve relatively small enterprises of local importance. Investors

seeking to benefit from official incentives must licence their projects through BKPM in the same manner as foreign-invested projects, and receive broadly the same facilities. In addition, domestic investments are exempt from a number of restrictions imposed on foreign investments, such as minimum capitalization and export requirements and limitations on domestic output marketing activities.

NOTES TO CHAPTER I

1/ Higgins, B., *Indonesia's Economic Stabilization and Development*, New York, Institute of Pacific Relations, 1957 for analyses of the development of the Indonesian economy prior to the mid-1980s.
Mackie, J. A. C., "The Indonesian Economy: 1950-1963", in *Studien zur Entwicklung in Süd- und Ostasien, Neue Folge, Teil 3, Indonesien*, Frankfurt am Main and Berlin, Alfred Metzner Verlag, 1964;
McVey, R. T. (Ed.), *Indonesia*, New Haven, Conn., Human Relations Area Files Inc., 1967;
Glassburner, B. (Ed.), *The Economy of Indonesia: Selected Readings*, Ithaca and London, Cornell University Press, 1971;
Palmer, I., *The Indonesian Economy Since 1965: A Case Study of Political Economy*, London, Frank Cass, 1977;
Booth, A., and McCawley, P. (Eds), *The Indonesian Economy During the Soeharto Era*, Kuala Lumpur, Oxford University Press, 1981;
Arndt, H. W., *The Indonesian Economy: Collected Papers*, Singapore, Chopmen Publishers, 1983;
Hobohm, Sarwar, *Indonesia to 1991: Can Momentum be Regained?*, London, the Economist Intelligence Unit, 1987.

2/ Booth, A., and McCawley, P., "The Indonesian Economy Since the Mid-Sixties", Tables 1.1 and 1.2, pp. 4 and 5, in Booth, A., and McCawley, P. (ed.), *The Indonesian Economy During the Soeharto Era*, Oxford University Press, Kuala Lumpur, 1981.

3/ Higgins, B., *Economic Development: Problems, Principles and Policies*, revised edition, Norton, New York, 1968, p. 693. This resulted, as Higgins has noted, in "the tendency of governments of independent Indonesia ... to add new regulations without removing the old ones".

4/ In discussing this nationalist dimension of Indonesia's economic policy, Myint pointed out in 1967 that it was "obsessed by the fear that once the foreign enterprises were allowed to re-establish themselves in the export industries, they would regain their old 'stranglehold' on the economy". It, therefore, was "interested in getting a large share of the cake irrespective almost of what was happening to the size of the total output" see:
Myint, H., "The Inward and Outward-Looking Countries of Southeast Asia", *Malayan Economic Review*, No. XII, 1, April 1967;
Reprinted in Myint, H., *Economic Theory and the Underdeveloped Countries*, Oxford University Press, London, 1971.

5/ The Pancasila state ideology embodies the five principles of monotheism, humanitarianism, Indonesian unity, representative democracy by consensus, and social justice.

6/ Liddle, R. W., "The Politics of Ekonomi Pancasila", *Bulletin of Indonesian Economic Studies*, Vol. XVIII, No. 1, March 1982, and McCawley, P., "The Economics of Ekonomi Pancasila", *Bulletin of Indonesian Economic Studies*, Vol. XVIII, No. 1, March 1982. For detailed discussions of the political and economic origins of the *Ekonomi Pancasila*

concept.

7/ *Repelita* is an acronym for the Indonesian phrase *Rencana Pembangunan Lima Tahun* (Five-Year Development Plan).

8/ After several years of intense mismanagement, the Indonesian economy was on the verge of collapse in the mid-1960s. Budgetary deficits reached 50 per cent of government expenditure, inflation had risen to an annual rate of some 650 per cent, foreign exchange reserves had fallen to a level sufficient to cover only a few weeks of imports, and foreign indebtedness had risen to the extremely high level, by contemporary standards, of more than $1.6 billion. See Hobohm, S. O. H., "Indonesia: Economy", in *The Far East and Australasia 1990*, Europa Publications Limited, London, 1989, p. 443.

9/ Republic of Indonesia, *Rencana Pembangunan Lima Tahun Kelima, 1989/90-1993/94*, Volume I, p. 60.

10/ Republic of Indonesia, *Rencana Pembangunan Lima Tahun Kelima*, Volume I, Table 2-5, p. 171.

11/ Republic of Indonesia, *Rencana Pembangunan Lima Tahun Kelima*, Volume I, Table 2-7, pp. 177-180.

12/ Booth, A., and McCawley, P., "Fiscal Policy", in Booth, A., and McCawley, P. (Eds.), *The Indonesian Economy During the Soeharto Era*, Oxford University Press, Kuala Lumpur, 1981, for a comprehensive analysis of the origins and performance of the New Order government's fiscal policy to the late 1970s.

13/ This estimate is derived from data obtained from the Central Bureau of Statistics (CBS) of the Government of Indonesia and from the International Institute of Strategic Studies (IISS), London. According to these data Indonesia's total working population numbered 75,850,580 in 1990 (CBS, *Statistical Yearbook 1991*, Table 3.2.2, pp. 46-47), while the number of civil servants amounted to 3,771,285 (CBS, *Statistical Pocketbook 1990*, Table 3.2.15, p. 52) and the total number of Indonesia's military and paramilitary forces amounted to 398,000 (IISS, *The Military Balance 1991-1992*, pp. 164-165).

14/ For a more detailed discussion of this mechanism of price regulation and its implications for economic efficiency, see World Bank, Report No 10470-IND, *Indonesia: Growth, Infrastructure and Human Resources*, Washington DC, 26 May 1992, pp. 65-66.

15/ The official measurement of consumer price inflation in Indonesia employs the somewhat unusual method of adding monthly percentage increases in the consumer price index over a twelve month period to obtain an estimate of the annual inflation rate.

16/ This statement is based on World Bank staff estimates presented in World Bank, Report No. 10470-IND, *Indonesia: Growth, Infrastructure and Human Resources*, Washington DC, 26 May 1992, pp. 59-60, which indicate that this proportion fell from 43 per cent in 1986 to 13 per cent in June 1991. Since the publication of this report, the Indonesian government has introduced another trade policy reform package in July 1992, which resulted in the removal of non-tariff barriers against imports of a variety of steel products, engineering goods and materials used in the manufacture of *batik* cloth.

17/ World Bank, Report No. 10470-IND, *Indonesia: Growth, Infrastructure and Human Resources*, Washington DC, 26 May 1992, pp.60-61.

18/ World Bank, Report No. 10470-IND, *Indonesia: Growth, Infrastructure and Human Resources*, Washington DC, 26 May 1992, p. 61.

19/ Even the otherwise broadly favourable World Bank report published in May 1992 expressed serious reservations about the need for, and economic effects of, these monopolies (see World Bank, Report No. 10470-IND, *Indonesia: Growth, Infrastructure and Human Resources*, Washington DC, 26 May 1992, p. 64).

20/ In discussing Indonesia's foreign exchange regime, a recent study by the General Agreement on Tariffs and Trade (GATT) stresses that "Indonesia's foreign exchange system permits free allocation and transfer of foreign currency for payment of imported goods and services", and that "payments for imports from, and exports to, any country can be effected by any method normally acceptable in international trade". It also notes that "payments for invisibles are not restricted or subject to control, and proceeds from invisibles need not be surrendered". General Agreement on Tariffs and Trade, *Trade Policy Review: Indonesia 1991*, Geneva, August 1991, Vol. I, p. 50.

21/ World Bank, Report No. 10470-IND, *Indonesia: Growth, Infrastructure and Human Resources*, Washington DC, 26 May 1992, Figure 2.3, p. 34.

22/ Ernesto M. Pernia, "Economic Growth Performance of Indonesia, The Philippines and Thailand: The Human Resource Dimension", Report No 48, *Asian Development Bank Economics and Development Resource Center Report Series*, January 1990, Table 5, p. 10.

23/ Central Bureau of Statistics, *Statistical Yearbook 1991*, Jakarta, January 1992, Table 4.1.17, p. 131.

24/ More recent data suggest a decline in both the absolute numbers of students enroled in secondary schools and the proportion of the such students in the overall population within the relevant age groups in 1989/90, followed by a slight recovery in 1990/91 (Government of Indonesia, Supplement to the President's Report to Parliament, 16 August 1991, Tables XVI-3 and XVI-5, pp. XVI-10 and XVI-13). Addressing this issue, a recent World Bank report has argued that it may merely reflect a shift towards private religious schools not covered by official statistics, but that it may also be due to the inaccessibility, relatively high cost, and comparatively low returns of secondary education (World Bank, Report No. 10470-IND, *Indonesia: Growth, Infrastructure and Human Resources*, Washington DC, May 1992, p. 133).

25/ Central Bureau of Statistics, *Statistical Yearbook of Indonesia 1991*, Jakarta, January 1992 (Tables 4.1.4, 4.1.7 and 4.1.11).

26/ World Bank, Report No. 10470-IND, *Indonesia: Growth, Infrastructure and Human Resources*, Washington DC, May 1992, pp. 123-124.

27/ Pernia, Ernesto M., "Economic Growth Performance of Indonesia, the Philippines and Thailand: The Human Resource Dimension", Report No. 48, *Asian Development Bank Economics and Development Resource Center Reports Series*, January 1990, Table 6, p. 13.

28/ Government of Indonesia, Supplement to the President's Report to Parliament, 16 August 1991, p. XVIII/3.

29/ For a comprehensive discussion of the strengths and weaknesses of Indonesia's current health care system and the scope for its further expansion see the World Bank, *Indonesia: Growth, Infrastructure and Human Resources*, Report No. 10470-IND, Washington DC, May 1992, pp. 125-131.

30/ World Bank, *World Development Report 1992: Development and the Environment*, Oxford University Press, 1992, Table 28, pp. 272-273.

31/ Act No 4/1982 of the Republic of Indonesia concerning basic provisions for environmental management.

32/ Salim, E., "Conservation and Development", *Indonesia Circle*, No. 28, June 1982, pp. 3-8.

33/ Government Regulation No 29/1986 of the Republic of Indonesia concerning Environmental Impact Assessments of 5 June 1986.

34/ For useful summaries of recent achievements and current issues in the field of environmental policy see Government of Indonesia, Department of Information, *Indonesia 1992: An Official Handbook*, Jakarta, 1992, pp. 189-191, and The World Bank, Report No. 10470-IND, *Indonesia: Growth, Infrastructure and Human Resources*, Washington DC, May 1992, pp. 80-82.

35/ The Economist Intelligence Unit, *Country Report: Indonesia*, No. 2, 1989, p. 18 and No. 4, 1989, p. 18.

36/ *Business News*, Jakarta, 7 September 1992, p. 2.

37/ In his study of the historical development of the Indonesian oil industry, Hunter notes that "in the prewar, refining of crude into petroleum products Indonesia was one of the main centres for the Far Eastern areas (including Japan and China) [sic] ... After 1945, this role in Far Eastern markets was taken up again by the two companies mainly involved, Shell and Stanvac. Refinery throughput rose rapidly from zero to 7,552,000 tons by 1950 ... This refinery resuscitation required imports of foreign crude, mainly from Sarawak in the earlier years and later from Brunei and the Middle East". Hunter, A., "The Indonesian Oil Industry", in Glassburner, B. (ed.), *The Economy of Indonesia: Selected Readings*, Ithaca and London, Cornell University Press, 1971, p. 281.

38/ This emphasis on industrial development has been explained by Hill as follows: "The prevailing 'terms of trade pessimism' after the Korean War commodity boom led many policy-makers to believe that industry was the key to progress. This view was reinforced by nationalist sentiment to the effect that the colonial government had deliberately retarded manufacturing." Hill, H., *Foreign Investment and Industrialization in Indonesia*, Oxford University Press, Singapore, 1988, pp. 3-4.

39/ For details of shifting industrial policy priorities in the early post-independence period see Hill, H., *Foreign Investment and Industrialization in Indonesia*, Oxford University Press, Singapore, 1988, pp. 4-6.

40/ Hill, H., *Foreign Investment and Industrialization in Indonesia*, Oxford University Press, Singapore, 1988, p. 11.

41/ A distinction is commonly drawn in Indonesia between indigenous Indonesians, commonly referred to as *pribumi*, and Indonesian citizens of foreign, principally Chinese, ethnic origin, who have traditionally played a leading role in the Indonesian economy and are known as *non-pribumi* or *non-pri*. The term "weak economic group" (*golongan ekonomi lemah*) refers to *pribumis* of limited means, such as agricultural smallholders, artisans, petty traders, and small-scale manufacturers.

42/ Writing in 1981 about the industrial policy priorities contained in *Repelita I* and *Repelita II*, McCawley made the following important observations:

> "First, the tone of policy statements is unmistakably protectionist. Second, this stance is consistent with the general trend of thinking about industrial policy in Indonesia since Independence. Third, industrial policy statements are as interesting for what is omitted as for what is emphasized. There is little attention given to the need for industry to operate more efficiently, to specialize, or to move towards a situation where less protection is needed. Little is said about the interests of consumers, or of the desirability of structural adjustment policies. Although industrial policy is heavily interventionist, matters such as the appropriate structure of different interests, the desirability and methods of government regulation, and the role that market forces might play are hardly mentioned."

McCawley, P., "The Growth of the Industrial Sector", in Booth, A., and McCawley, P. (eds), *The Indonesian Economy During the Soeharto Era*, Oxford University Press, Kuala Lumpur, 1981, p. 78.

43/ Hill, H., *Foreign Investment and Industrialization in Indonesia*, Oxford University Press, Singapore, 1988, p. 6.

44/ This issue is discussed in some detail by Hill, who shows, with reference to two surveys conducted in the mid-1970s and mid-1980s respectively, that widespread fears of foreign economic domination continue to linger. Hill, H., *Foreign investment and Industrialization in Indonesia*, Oxford University Press, Singapore, 1988, pp. 135-137. As McCawley has pointed out, "foreign" in this context usually also includes non-indigenous Indonesian nationals, and in particular the ethnic Chinese business community. McCawley, P., "The Growth of the Industrial Sector", in Booth, A., and McCawley, P. (eds), *The Indonesian Economy During the Soeharto Era*, Oxford University Press, Kuala Lumpur, 1981, p. 91.

45/ Hill, H., "Indonesia's Industrial Transformation: Part II", *Bulletin of Indonesian Economic Studies*, Vol. 26, No. 3, December 1990, p. 78.

46/ The evolution of this debate is chronicled in some detail in the various Country Reports on Indonesia issued on a quarterly basis by the Economist Intelligence Unit, London. The following summary of arguments and events related to the privatization process draws heavily on these Country Reports. For further details, see Reports No. 1 - 1987, page 11;

No. 2 - 1987, page 9; No. 1 - 1989, page 10; No. 3 - 1989, pages 12-13; No. 1 - 1990, pages 19-20; No. 2 - 1990, page 12; and No. 1 - 1991, page 17.

47/ The discussion of Indonesia's industrial policy objectives and priorities presented here is based primarily on the relevant portions of the *Repelita V* Plan document. Additional insights were obtained from an extensive interview in July 1992 with Mr Sunaryo, the Head of the Bureau of Planning of the Department of Industry in Jakarta, whose valuable contribution in this connection is gratefully acknowledged.

48/ For details of government policy towards foreign direct investment during the 1950s and early 1960s see Hill, H., *Foreign Investment and Industrialization in Indonesia*, Oxford University Press, Singapore, 1988, pp. 4-6.

49/ Concern over the risk of foreign economic dominance posed by the foreign investment law increased gradually during the early 1970s, and erupted into violent protests in January 1974 during the visit to Jakarta by Prime Minister Tanaka of Japan. A comprehensive analysis of the causes for this unrest is given by Palmer, I., *The Indonesian Economy Since 1965: A Case Study of Political Economy*, Frank Cass, London, 1978, Chapter 7, pp. 152-174.

50/ Details of investment regulations in the primary production of oil and natural gas, which falls outside the scope of this Review, may be obtained from Migas (Jalan M H Thamrin 1, Jakarta) or Pertamina (Jalan Medan Merdeka Timur 1, Jakarta, or overseas offices London, Los Angeles, Singapore and Tokyo). A very valuable annual survey of the oil and gas sector, known as The Petroleum Report, is published annually by the United States Embassy in Jakarta (Jalan Medan Merdeka Selatan 5, Jakarta).

51/ The Banking Law of 1967, which governed the banking sector for most of the past 25 years, was replaced in February 1992 by a new Banking Law. The banking industry is currently in a transitional stage between these two laws, with the provisions of the latter being introduced gradually over a period of time.

52/ The following information is taken from Investment Coordinating Board (BKPM), "Indonesia's New Foreign Investment Policy", BKPM, Jakarta, 1993. Because investment regulations are subject to frequent revision, potential investors should contact BKPM directly for the updated information.

II. THE MANUFACTURING SECTOR

A. GROWTH AND STRUCTURAL CHANGE

Growth

On Independence in 1945 Indonesia inherited a classical colonial economy based almost entirely on extractive industries. It was characterized by a high degree of dualism[1/] between the foreign-owned export-oriented sector and the subsistence-based domestic sector, with a tenuous link between these two sectors being provided by a class of ethnic Chinese traders. Manufacturing activities during the colonial era had been very limited. They comprised a small petroleum refining industry and some processing industries for local agricultural products such as sugar and rubber, which were operated largely by foreign commercial interests, alongside a predominantly handicraft-based indigenously-owned manufacturing industry producing essential consumer goods, which included an embryonic textile industry.

What little industry had been established during the colonial period was severely disrupted during the Japanese occupation from 1942 to 1945, and the subsequent armed struggle for Independence, which lasted until December 1949. The earliest available data indicate that manufacturing (including, in this case, electricity, gas and water) accounted for no more than 8.5 per cent of domestic output in 1953.[2/] Very little industrial rehabilitation or expansion occurred in the following decade as the political uncertainty and economic dislocation of this period led to shortages of imported raw materials and spare parts, and inhibited investment in the sector. Manufacturing industry grew by an average of only about 2 per cent annually in real terms until the mid-1960s. This fell short of the overall rate of GDP growth and implied a fall in the share of manufacturing (excluding utilities) to 8.3 per cent of GDP by 1965.[3/]

Indonesia's modern manufacturing industry therefore has its origins in the establishment of the New Order Government, which facilitated its emergence both indirectly through a restoration of political and economic stability, and more directly through a conscious promotion of public and private investment in manufacturing industries. This shift in public policies was reinforced by a significant increase in the availability of resources, both from external sources in the form of aid and investment flows and from internal sources in the form of increased hydrocarbon revenues. These favourable circumstances stimulated a rapid growth of the manufacturing sector, and especially its non-oil/gas component, over the following two decades.[4/] By 1985 the share of manufacturing in GDP had risen to 16 per cent.[5/]

As indicated in Chapter I (see Recent Economic Trends), the structural adjustment measures adopted by the Government of Indonesia in response to the oil price collapse of the mid-1980s prompted a further acceleration of industrial growth in the second half of that decade. This resulted in a steady increase in the industrial sector's contribution to domestic production, with

the share of manufacturing value added in GDP rising to almost 20 per cent in 1990. According to preliminary official estimates, this share rose further to approximately 22 per cent in 1991, exceeding that of agriculture for the first time in Indonesia's history and making manufacturing the most important sector in the country's economy in terms of output.

Structural change

Production data for a selection of manufactured goods are presented in Table II.1. These show that the dramatic growth in manufacturing output recorded during the past two and a half decades has been accompanied by an equally remarkable degree of output diversification. Of the 64 items covered in the table, all of which are now produced in significant quantities in Indonesia, 31 were not produced at all under Repelita I, and 19 were not produced under Repelita II. This diversification of output has been the result of a wide ranging structural change in the manufacturing sector, which is still gathering momentum.

Manufacturing activity in Indonesia is greatly varied in scope and scale, ranging from tiny cottage enterprises producing handicrafts and basic consumer goods to vast industrial complexes for the production of highly sophisticated capital and intermediate goods. Any examination of the Indonesian industrial sector must give due regard to this extreme diversity,[6/] which can be categorized in several different ways. Indonesian official statistics distinguish, in particular, on the basis of size and whether the industries concerned are involved in the processing of oil and natural gas or in the production of other goods.

In terms of size, the most commonly used Indonesian statistics, compiled and published by the Central Bureau of Statistics, distinguish between household (cottage), small, medium and large industrial enterprises, which are differentiated according to the number of workers employed. Under the currently prevailing system, household firms are defined as establishments employing fewer than five workers, small firms as companies employing 5-19 workers, medium-sized firms as companies employing 20-99 workers and large firms as companies employing 100 workers or more.[7/] An alternative approach, based on firms' assets, is used by the Department of Industry, but this has been described as "less satisfactory, owing to measurement problems and the need for frequent revisions".[8/]

While cottage and small-scale firms account for the majority of industrial enterprises in numerical terms and in terms of the overall number of workers employed, they are by their very nature difficult to monitor on a continuous basis. Their operations have therefore only been surveyed periodically in conjunction with the three industrial censuses conducted by the Central Bureau of Statistics in 1964, 1974/75 and 1986. The activities of medium- and large-scale firms are monitored on a more regular basis, and most annual industrial statistics published in Indonesia refer to such firms only. The resulting distortions in the data are ameliorated by the fact that these firms account for more than 80 per cent of the value of gross output and manufacturing value added (MVA).

The differentiation between oil/gas and non-oil/gas manufacturing poses a greater problem. The oil and natural gas processing industries (comprising a number of petroleum refineries and the gas liquefaction facilities in the provinces of Aceh and East Kalimantan, and corresponding broadly to ISICs 353 and 354) have traditionally played a major role in Indonesia's manufacturing sector. Since these industries come under the jurisdiction of the Department of Mines and Energy rather than the Department of Industry, however, quantitative data on them is not recorded in Indonesia's industrial statistics. With the exception of data on manufacturing value added (MVA) published in the national accounts statistics, which since 1978 distinguish between the oil processing industry, the natural gas processing industry, and the miscellaneous 'non-oil/gas' sub-

Table II.1. Manufacturing production, 1969/70-1991/92

ISIC	Product	Unit	Annual average Repelita I	Annual average Repelita II	Annual average Repelita III	Annual average Repelita IV	1989/90	1990/91	1991/92[a/]
3112	Condensed milk	Million cases	0.8	3.4	14.8	94.8	100.6	113.5	129.5
3114	Canned fish	Thousand tonnes	-	-	18.3	140.8	186.3	194.5	211.8
3115	Coconut oil	Thousand tonnes	262.2	289.6	319.1	368.6	486.1	490.4	540.3
3115	Palm oil	Thousand tonnes	27.5	32.3	307.9	615.0	846.5	968.9	980.5
3121	Salt	Thousand tonnes	111.4	365.6	619.6	690.6	457.7	900.0	920.0
3122	Animal feed	Thousand tonnes	-	-	248.0	1,810.3	2,458.5	2,650.4	2,730.1
3140	Kretek cigarettes	Billion pieces	23.0	37.2	55.4	99.3	130.4	139.3	138.2
3140	Other cigarettes	Billion pieces	15.3	24.8	29.1	22.3	30.3	34.8	38.0
3211	Yarn	Thousand bales	243.3	597.6	1,323.6	2,158.9	3,405.0	3,572.7	4,140.2
3211	Textiles	Million metres	711.8	1,229.3	2,017.5	2,818.1	4,493.6	5,028.2	5,216.6
3220	Garments	Thousand dozens	-	-	4.5	30.9	48.9	58.6	60.0
3240	Leather shoes	Million pairs	-	-	2.4	16.5	19.5	24.5	31.8
3311	Sawn wood	Million cubic metres	-	0.8	7.4	9.7	10.9	11.1	10.7
3311	Plywood	Million cubic metres	-	-	0.5	5.4	7.7	8.4	8.5
3311	Decorative plywood	Million sheets	-	-	2.9	23.7	30.9	40.8	49.4
3312	Processed rattan	Thousand tonnes	-	-	-	204.8	311.6	349.3	412.2
3410	Pulp and paper	Thousand tonnes	31.2	76.6	271.8	749.8	1,360.3	1,776.4	2,094.7
3511	Caustic soda	Thousand tonnes	1.8	8.0	19.1	33.3	104.1	206.6	185.3
3511	Acetylene	Thousand cubic metres	19.8	258.8	679.4	1,745.8	2,283.0	2,625.0	3,020.0
3512	Urea fertilizer	Thousand tonnes	106.5	685.9	2,013.6	3,818.2	4,891.6	5,131.1	4,881.2
3513	Synthetic resin	Thousand tonnes	-	10.2	51.5	45.5	52.9	81.5	63.7
3523	Soap	Thousand tonnes	132.2	180.5	207.1	162.7	165.7	191.2	215.1
3523	Detergent	Thousand tonnes	4.3	31.6	61.4	152.0	193.2	212.6	224.5
3529	Matches	Million boxes	396.1	661.1	660.5	2,239.6	2,806.8	2,907.6	2,965.7
3551	Motor car tyres	Thousand units	696.9	2,052.6	3,518.8	4,889.5	7,376.8	8,220.3	8,209.1
3551	Motor cycle tyres	Thousand units	-	1,320.6	2,439.4	3,175.1	5,489.8	5,829.2	6,931.1
3559	Crumb rubber	Thousand tonnes	152.1	478.6	640.2	888.3	1,026.8	1,037.5	1,042.7
3559	Rubber shoes	Million pairs	-	-	5.7	37.0	156.7	142.7	185.2
3620	Glass and bottles	Thousand tonnes	16.9	45.4	85.1	122.6	137.2	145.6	152.2
3620	Plate glass	Thousand tonnes	4.5	35.4	102.2	218.3	319.7	353.9	397.9
3691	Ceramic wall tiles	Thousand square metres	-	-	1,263.2	7,139.8	7,809.2	8,910.0	9,400.0
3692	Portland cement	Million tonnes	0.6	2.1	6.6	11.2	14.1	15.8	16.3
3710	Sponge iron	Thousand tonnes	-	-	339.6	1,027.5	1,210.4	1,356.9	1,239.9
3710	Concrete iron	Thousand tonnes	56.7	230.7	656.0	752.2	928.1	1,391.3	1,338.1
3710	Steel ingots	Thousand tonnes	-	79.8	506.3	1,115.2	1,583.1	1,988.1	2,006.4
3710	Galvanized steel sheet	Thousand tonnes	49.8	148.2	298.9	215.9	144.5	159.0	200.9
3710	Steel pipe	Thousand tonnes	-	42.2	122.4	244.8	273.2	326.8	280.6

(continued)

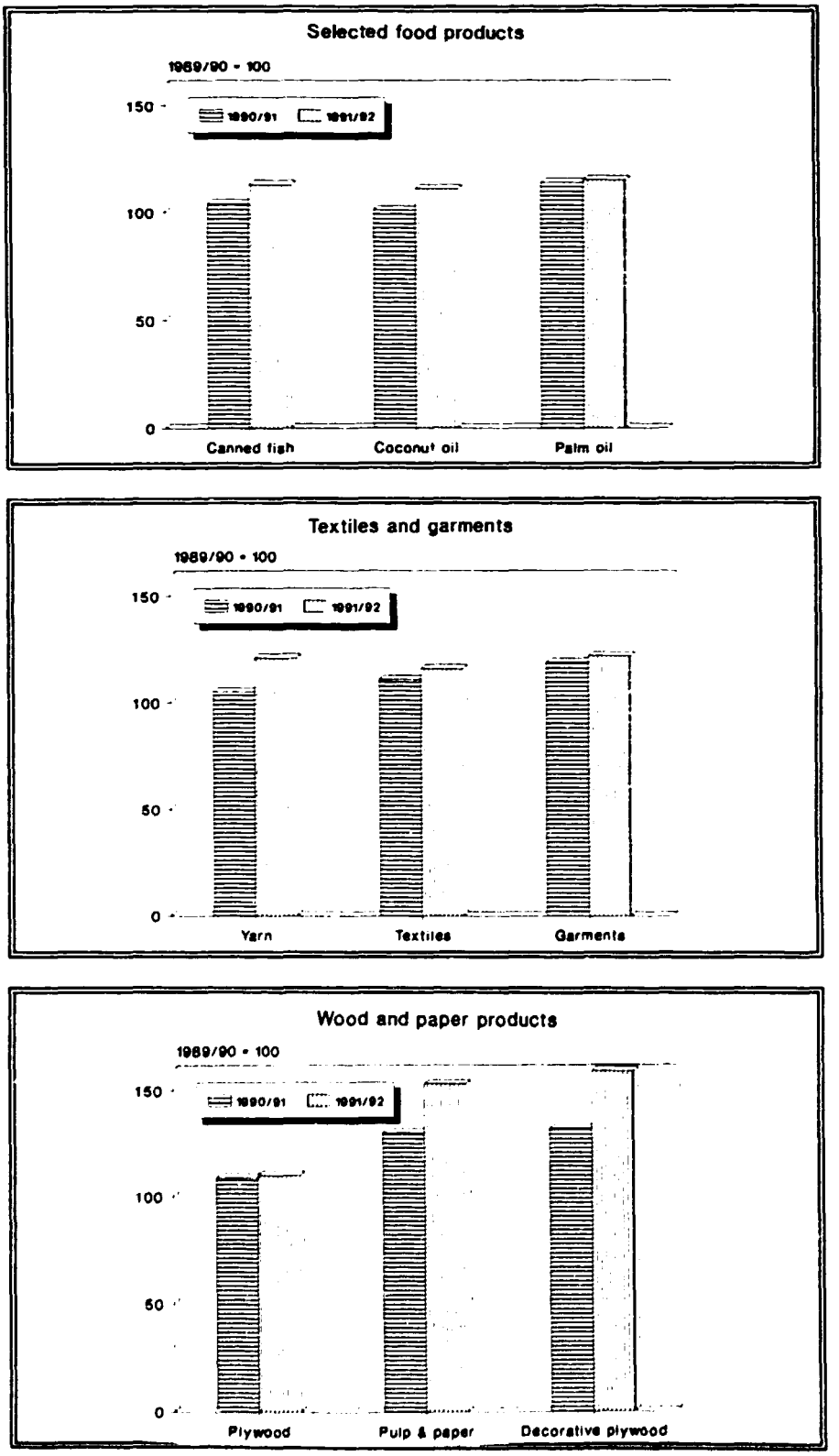
Table II.1. (continued)

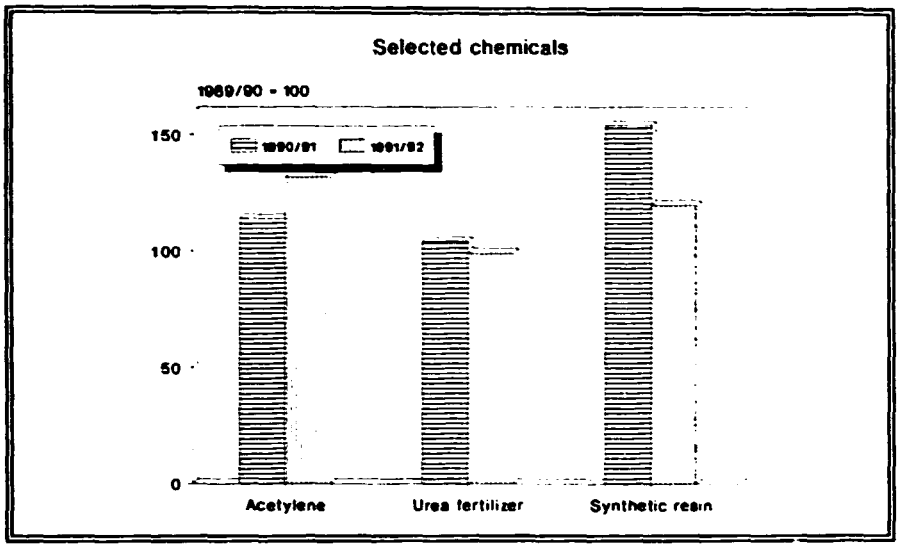
ISIC	Product	Unit	Annual average Repelita I	Annual average Repelita II	Annual average Repelita III	Annual average Repelita IV	1989/90	1990/91	1991/92[a/]
3720	Aluminium extrusion	Thousand tonnes	-	2.0	9.7	12.0	17.4	40.0	44.1
3720	Aluminium sheet	Thousand tonnes	-	6.2	11.6	27.5	28.4	47.2	30.9
3813	Steel tanks	Thousand tonnes	-	-	2.0	9.9	18.0	15.0	18.0
3813	Construction steel	Thousand tonnes	-	-	5.0	34.9	44.8	49.8	163.2
3821	Diesel engines	Thousand units	0.4	19.1	53.2	38.6	35.9	45.9	50.0
3822	Rice hullers	Units	-	-	49.6	564.4	826.0	909.0	1,200.0
3822	Hand tractors	Units	-	70.8	967.4	1,889.0	5,533.0	6,330.0	8,500.0
3829	Steamrollers	Units	232.0	423.2	402.0	168.8	10.0	50.0	97.0
3829	Pistons	Thousand units	-	84.5	150.2	423.0	570.0	627.8	609.5
3829	Sewing machines	Thousand units	285.9	480.8	447.7	147.9	34.0	29.3	28.6
3831	Circuit breakers	Thousand units	-	-	100.0	1,454.1	1,700.0	3,075.2	3,400.0
3831	Generators	Thousand units	-	-	17.7	18.9	7.6	8.3	7.7
3832	Telephone exchanges and PABX	Thousand lines	-	-	26.7	101.3	169.0	206.0	365.7
3832	Telephone receivers	Thousand units	-	-	8.1	102.1	68.7	223.0	581.1
3832	Integrated circuits	Million units	-	-	127.8	196.6	59.8	26.0	49.9
3832	VHF/UHF single channel	Units	-	-	280.0	4,115.6	4,916.0	6,256.0	5,615.0
3832	Radios/radio-cassettes	Thousand units	554.6	1,127.2	1,275.4	1,545.2	2,338.6	3,091.7	3,246.3
3832	Television sets	Thousand units	40.8	262.8	702.6	677.0	796.6	1,082.0	1,010.5
3833	Air conditioners	Thousand units	16.2	26.5	50.1	55.0	78.8	99.2	114.3
3839	Car batteries	Million units	0.1	0.5	3.3	5.9	6.4	8.0	9.4
3839	Dry batteries	Million units	77.0	333.2	550.5	948.2	1,076.7	1,158.4	1,212.3
3841	Steel-hulled ships	Thousand grt	15.0	31.2	31.4	16.4	22.5	32.6	36.3
3843	Motor car assembly	Thousand units	16.9	82.5	165.8	156.6	174.8	271.4	260.5
3843	Motor car radiators	Thousand units	-	22.3	129.2	133.9	170.6	244.0	256.2
3844	Motor cycle assembly	Thousand units	70.5	284.2	418.3	263.9	281.0	410.0	435.5
3845	Aeroplanes	Units	-	5.6	14.4	6.8	12.0	6.0	9.0
3845	Helicopters	Units	-	7.0	17.0	11.6	17.0	14.0	12.0

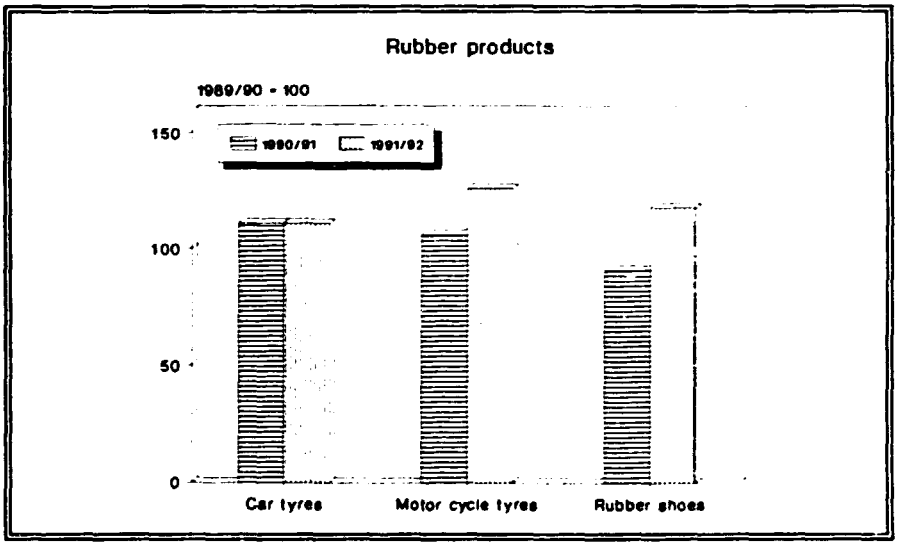
Sources: 1969/70-1987/88: Government of Indonesia, Nota Keuangan 1991/92, Tables VI.42-VI.44
1988/89-1991/92: Government of Indonesia, Supplement to President's Speech, 15 August 1992, Tables VIII.1-VIII.3

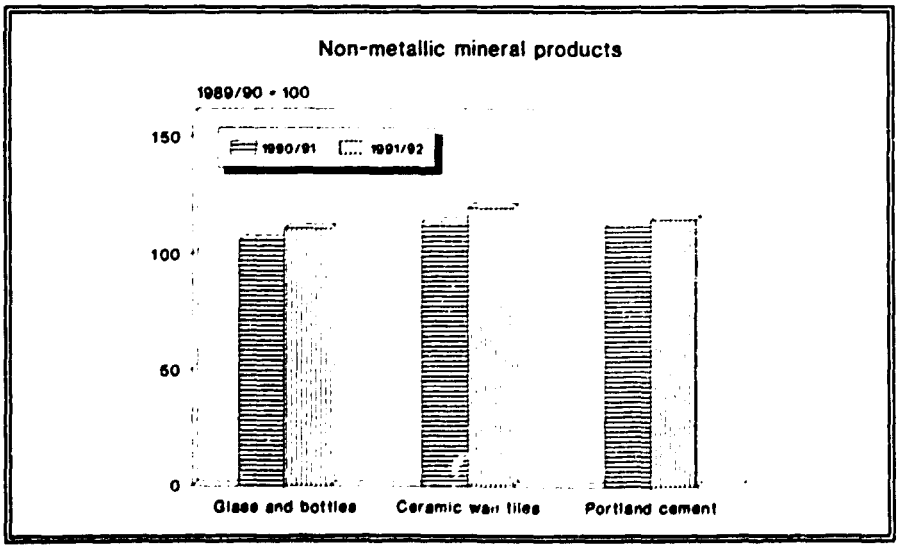
a/ Provisional.

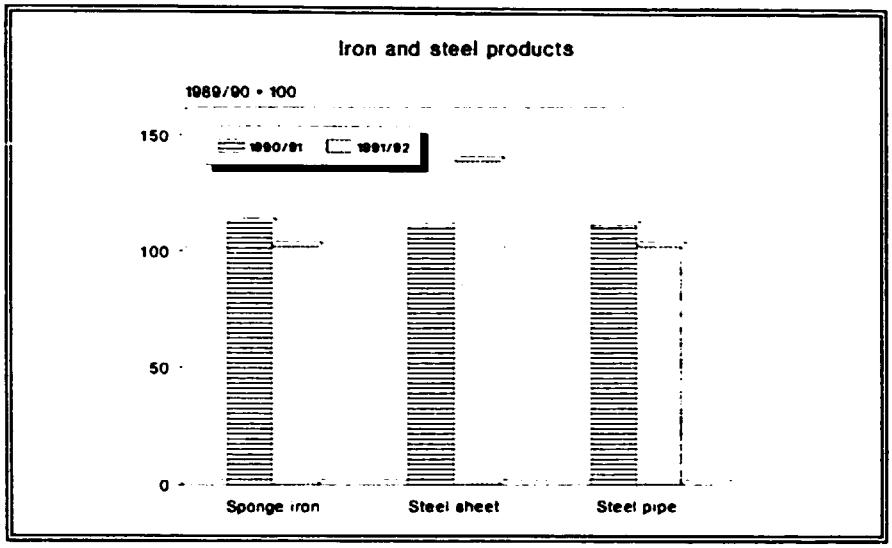
FIG. II.A. PRODUCTION OF SELECTED MANUFACTURED GOODS, 1990/91-1991/92
(1989/90 =100)

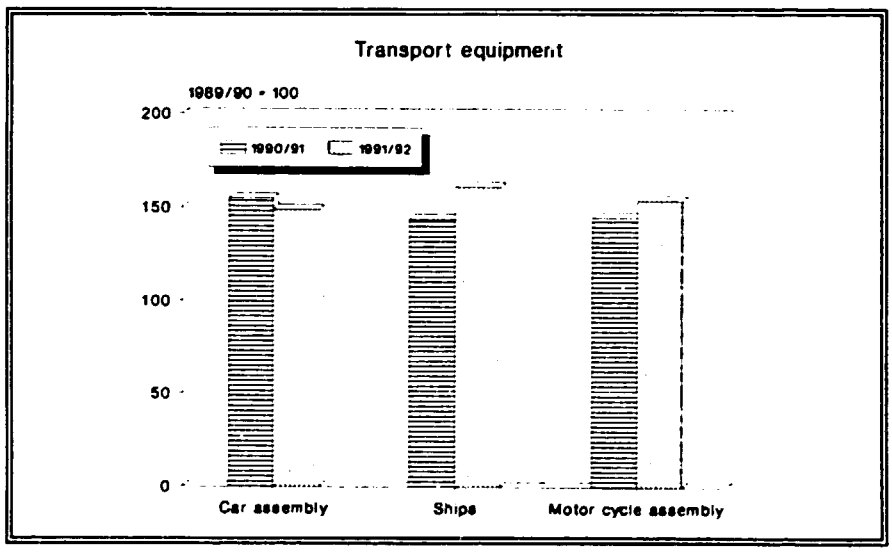


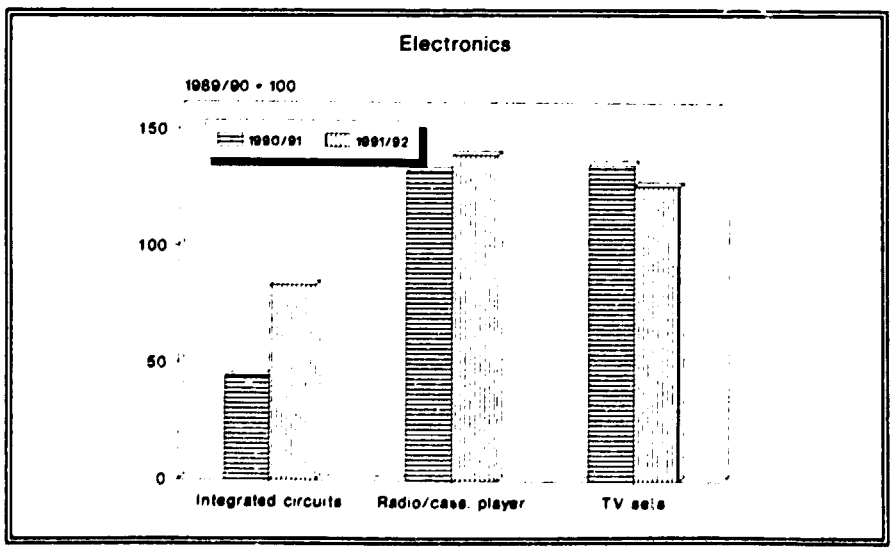












sector comprising all other manufacturing activities, very little additional quantitative information on the oil and gas sub-sectors is released in a form which would allow direct comparisons with the more comprehensive data available for the non-oil/gas industries.

The absence of a consolidated data series including both oil/gas and non-oil/gas manufacturing activities inevitably hampers a thorough analysis of the process of structural change in Indonesia's manufacturing industry. At the same time, however, the available data do permit a two-stage analysis showing, firstly, changes in the relative importance of the oil/gas and non-oil/gas industries and, secondly, shifts between the various branches of non-oil/gas manufacturing. This approach has been established in past analyses of Indonesia's industrial development, and is therefore also adopted here.

A review of the separate growth trends for the oil, natural gas and non-oil/gas sectors since the late 1970s, when such disaggregated industrial MVA statistics began to be published, reveals that the oil and gas processing industries recorded very rapid growth until the mid-1980s. This was fuelled by the relatively high energy prices prevailing at the time, which enhanced the attractiveness of large-scale investments in these industries and also provided the financial means for their realization. The subsequent collapse of international energy markets resulted in a sharp deceleration in the growth of oil and gas processing activities, albeit with an inevitable short lag arising from the completion of projects in progress. From the second half of the 1980s onwards, the non-oil/gas branches of the manufacturing sector have assumed the dominant role in generating industrial growth, with their share of total MVA rising from 7.5 per cent in 1987 to 14.1 per cent by 1990.

The longer series of statistical data available for the non-oil/gas component of the manufacturing sector shows that this sector has itself changed dramatically since the mid-1960s. The resulting diversification of its branch structure is revealed particularly vividly by the data on the branch-specific composition of MVA collected by the three industrial censuses of 1964, 1974/75 and 1986. These data, adjusted to ensure the highest possible degree of comparability by Hill in his comprehensive analysis of Indonesia's industrial development published in 1990,[9] have been reproduced in Table II.2.

This Table, which excludes data on cottage industries, shows that whereas the food, beverage and tobacco processing industries (ISIC 311-314) accounted for 53 per cent of non-oil/gas MVA in 1963, their share had fallen to approximately 30 per cent by 1985.[10] The share of rubber processing industries (ISIC 355) in total MVA suffered a similar decline from 17.1 per cent to 2.9 per cent during 1963-85. The wood products industry (ISIC 331) was the only segment of the agricultural processing industry to increase its contribution to non-oil/gas MVA, from 1.9 per cent in 1963 to 9.8 per cent in 1985.

The loss of output share by the agricultural processing industries was offset by a broadly based expansion of most other industrial branches, with particularly strong growth being recorded by a number of heavy industries. The share of the basic metals industry (ISIC 37) thus grew from negligible levels in 1963 to 7.8 per cent in 1985, while the share of the transport equipment industry (ISIC 384) increased from 1.1 per cent to 5.7 per cent during the same period. More generally, the data in Table II.2 show that the share of light industry in non-oil/gas MVA fell from 84.8 per cent to 62.2 per cent between 1963 and 1985, while the shares of heavy processing and heavy engineering industries rose from 9.4 per cent to 24.5 per cent and from 5.8 per cent to 13.3 per cent, respectively, during the same period. A fuller time series of branch-specific MVA data for the latter half of the 1980s yielded by the annual survey of medium- and large-scale manufacturing establishments is presented in Table II.3.

Fig. II.B. Growth of manufacturing value added (MVA), 1984-1990

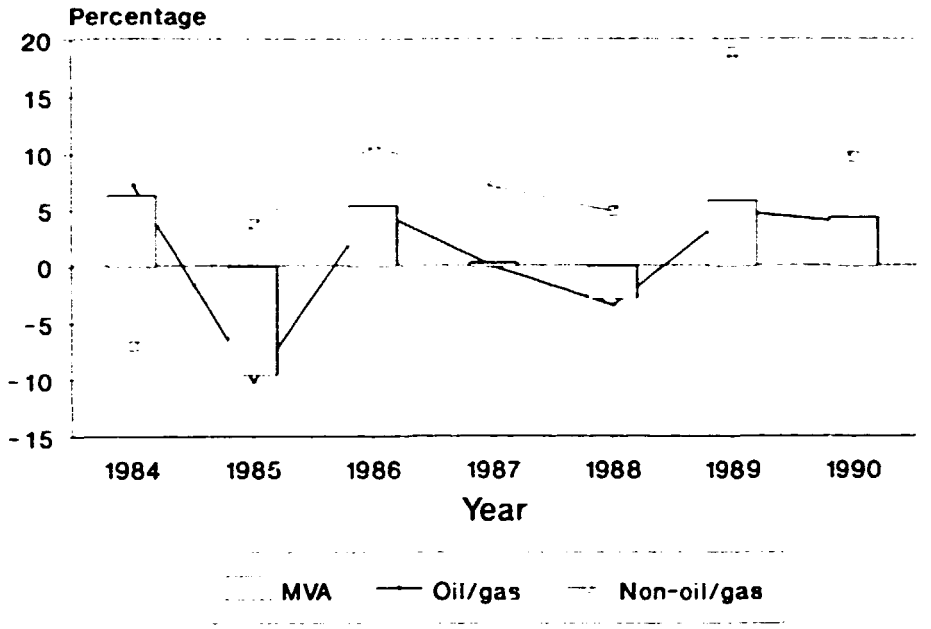
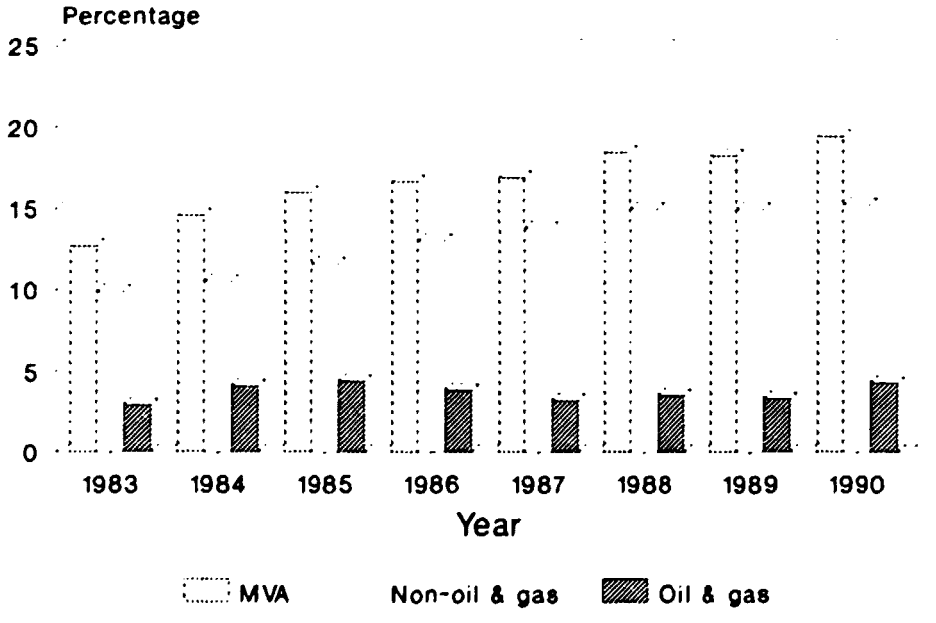


Fig. II.C. Share of MVA in GDP, 1983-1990



This shows that the process of structural change has continued in recent years as the government has stepped up its efforts to stimulate the growth of new non-oil/gas industries in response to the decline in oil prices of the first half of the decade. This change manifested itself particularly clearly in a significant, albeit gradual, reduction in the share of heavy processing industries between 1984 and 1989, with the difference being made up in almost equal measure by light industries and heavy engineering industries, both of which received considerable government support during this period. The data for 1990 suggest a possible shift in this pattern, however, as increased investments in the paper, chemicals and basic metals industries raised the share of the heavy processing segment of the manufacturing sector.

Table II.2. Composition of manufacturing output, 1963, 1975 and 1985[a/]
(Percentage of total, excluding oil and gas)

ISIC	Industry	1963	1975	1985
311	Food products	34.1	17.4	9.3
312			6.2	4.0
313	Beverages	1.3	2.0	1.3
314	Tobacco	17.6	15.4	15.7
321	Textiles	8.3	11.2	11.0
322	Garments	0.8	0.3	2.2
323	Leather products	0.2	0.2	0.4
324	Footwear	-	1.0	0.6
331	Wood products	1.9	3.1	9.8
332	Furniture	0.3	0.5	0.8
341	Paper products	1.3	1.1	1.4
342	Printing and publishing	2.2	2.2	2.2
351	Basic chemicals	3.6	4.0	4.9
352	Other chemicals		4.4	4.9
355	Rubber products	17.1	11.7	2.9
356	Plastics[b/]	-	0.8	1.4
361	Pottery and china	4.5	0.1	0.3
362	Glass products		0.4	1.2
363	Cement		2.9	3.2
364	Structural clay products		0.4	0.5
369	Other non-metallic minerals		0.1	0.3
37	Basic metals	-	0.3	7.8
381	Metal products	3.0	3.7	3.9
382	Non-electric machinery	1.1	1.1	0.8
383	Electrical equipment	0.6	3.6	2.8
384	Transport equipment	1.1	5.7	5.7
385	Professional equipment	-	0.1	0.1
39	Miscellaneous	0.9	0.4	0.6
Total		**100.0**	**100.0**	**100.0**
-	Light industry[c/]	84.8	72.1	62.2[d/]
-	Heavy processing[c/]	9.4	13.7	24.5[d/]
-	Heavy engineering[c/]	5.8	14.2	13.3[d/]

Source: Hill, Hal, "Indonesia's Industrial Transformation, Part I", *Bulletin of Indonesian Economic Studies*, vol. 26, No. 2, August 1990, Table 2, p. 87.

a/ Include firms with a workforce of at least five persons in 1975 and 1986. Data for 1963 refer to firms with a workforce of at least five persons, except for firms with 5-9 workers but not using power.

b/ Data for 1963 included in "Basic and Other chemicals".

c/ Defined as follows: light industry - ISIC 31, 32, 33, 342, 355, 356, 39; heavy processing industry - ISIC 341, 351, 352, 36, 37; heavy engineering industry - ISIC 38.

d/ These shares alter dramatically if oil and gas are included, i.e. the share of light industry and heavy engineering are reduced to 46.2 per cent and 9.8 per cent respectively, while that of heavy processing rises to 44 per cent.

Table II.3. Manufacturing value added, 1980-1990
(Percentage share)

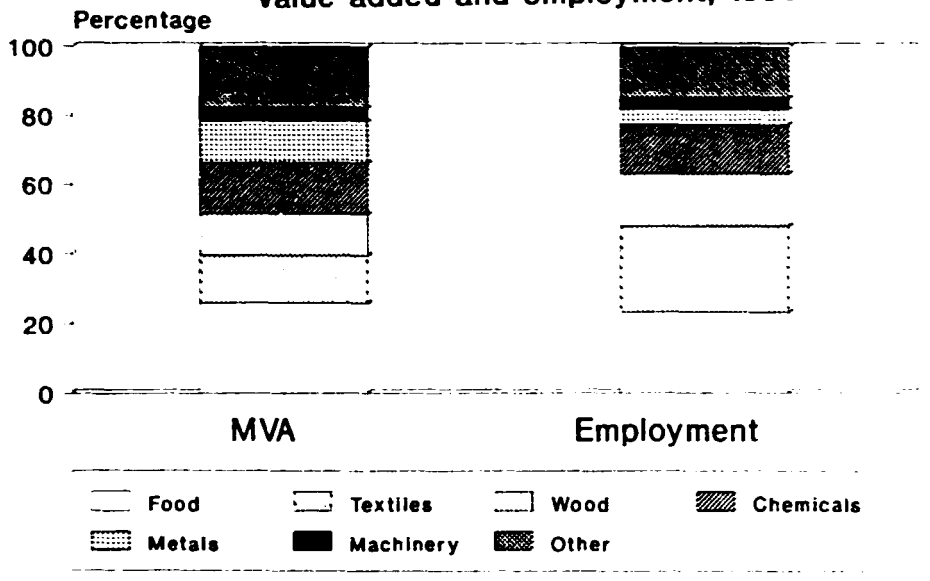
ISIC		1980	1981	1982	1983	1984	1985[a/]	1986	1987	1988	1989	1990
311	Food products	9.5	11.0	10.3	10.2	8.6	10.7	8.6	8.1	9.5	7.4	12.2
312	Food products	1.5	1.6	1.5	1.7	2.1	2.7	3.6	3.1	3.0	4.3	2.8
313	Beverages	1.5	1.4	1.8	2.3	1.8	1.2	1.2	1.1	1.1	0.7	0.8
314	Tobacco	19.1	17.4	16.8	16.7	15.9	11.4	12.9	13.1	11.0	10.4	10.0
321	Textiles	12.4	10.6	11.4	10.3	12.7	10.6	12.5	10.9	9.8	12.5	10.2
322	Garments	0.4	0.6	1.1	1.3	1.6	1.6	1.9	1.7	2.1	2.5	3.6
323	Leather products	0.2	0.2	0.3	0.3	0.4	0.2	0.4	0.1	0.2	0.1	0.3
324	Footwear	0.8	0.4	0.4	0.7	0.5	0.5	0.5	0.4	0.6	0.9	1.5
331	Wood products	7.0	7.4	8.2	8.6	7.0	9.4	10.9	12.7	13.3	12.8	10.9
332	Furniture	0.2	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.5	0.9
341	Paper products	1.5	0.7	1.0	0.7	0.9	1.7	1.3	2.0	3.0	2.4	3.6
342	Printing and publishing	1.5	1.3	1.6	1.4	1.3	1.4	2.1	1.7	1.7	1.4	1.2
351	Basic chemicals	4.3	7.0	7.0	6.1	5.6	6.6	5.5	5.5	5.8	4.6	5.3
352	Other chemicals	7.1	6.2	6.3	5.7	6.1	6.0	5.3	5.1	5.0	4.1	4.1
355	Rubber products	4.8	3.3	3.1	3.7	3.0	5.1	3.2	3.2	4.5	4.6	3.8
356	Plastics	0.7	0.7	0.8	1.1	1.5	2.7	1.4	1.6	1.5	1.3	1.7
361	Pottery and china	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.4	0.6
362	Glass products	1.1	1.6	1.3	1.3	1.1	1.5	1.4	0.7	0.6	0.5	0.5
363	Cement	5.7	5.4	4.3	4.5	3.7	3.5	3.1	3.3	2.5	1.8	2.3
364	Structural clay products	0.1	0.2	0.1	0.2	0.1	0.3	0.3	0.2	0.2	0.2	0.1
369	Other non-metallic minerals	0.1	0.1	0.1	0.2	0.1	0.3	0.3	0.3	0.3	0.2	0.4
371	Basic metals	3.1	2.9	2.3	5.9	11.0	7.2	8.5	10.0	8.3	8.3	8.9
381	Metal products	3.5	3.1	4.6	4.6	3.9	4.3	4.0	4.1	5.5	6.6	3.1
382	Non-electrical machinery	1.6	1.6	1.8	1.4	1.4	1.2	0.8	1.0	1.0	1.0	1.3
383	Electrical equipment	5.3	4.6	5.4	4.0	3.4	3.8	3.0	2.6	2.3	2.7	2.7
384	Transport equipment	6.4	10.2	7.6	6.3	5.5	5.1	6.1	6.3	6.0	6.9	6.6
385	Professional equipment	0.1	-	-	-	-	0.1	-	0.1	0.1	0.1	0.1
390	Miscellaneous	0.4	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.6	0.5
Total		**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Light industry[b/]		60.0	56.2	57.7	58.7	56.8	58.2	59.9	58.5	59.2	60.2	60.6
Heavy processing[b/]		23.2	24.2	22.8	24.9	29.0	27.4	26.1	27.5	26.0	22.6	25.7
Heavy engineering[b/]		16.8	19.6	19.4	16.3	14.2	14.4	14.0	14.1	14.9	17.2	13.7

Source: Government of Indonesia, Central Bureau of Statistics, *Statistik Industri*, various issues.

a/ Census.

b/ Defined as follows: light industry - ISIC 31, 32, 33, 342, 355, 356, 39; heavy processing industry - ISIC 341, 351, 352, 36, 37; heavy engineering industry - ISIC 38.

Fig. II.D. Structure of manufacturing value added and employment, 1990



B. INDUSTRIAL EMPLOYMENT

Quantitative trends

The total share of manufacturing employment still remains relatively small in Indonesia, reflecting the fact that the country embarked upon the industrialization process only comparatively recently. The agricultural sector remains the principal source of employment for the Indonesian labour force, and has accounted for almost one-third of the new employment opportunities created since 1970. The largely informal trade sector and public services also remain a major source of employment, although the jobs they provide are frequently characterized by low levels of productivity. With the agricultural sector's absorptive capacity rapidly approaching its limit, there is a growing awareness in Indonesia that the manufacturing sector must play a leading role in generating high-productivity jobs.

Employment data collected by the Central Bureau of Statistics in its periodic population censuses and labour force surveys reveal a steadily rising trend in manufacturing employment, indicating that this development is already taking place. As shown in Table II.4, which compares the results of the 1971, 1980 and 1990 censuses, the share of the active labour force engaged in manufacturing activities increased from 6.5 per cent in 1971 to 11.6 per cent in 1990. The annual average rate of increase in manufacturing employment during this period amounted to 6 per cent, as against an overall employment increase of approximately 2.8 per cent per year.

Not surprisingly, the vast majority of the available employment opportunities within the manufacturing sector have been created by the cottage and small-scale enterprises that continue to dominate the sector numerically. The findings of the 1986 industrial census show that approximately 1.4 million cottage industries accounted for about 2.7 million of the 5.2 million persons engaged in the manufacturing sector, with the 94,500 small-scale enterprises enumerated by the census accounting for a further 770,000 workers. The medium- and large-scale enterprises, which together numbered less than 12,800, accounted for the remaining 1.7 million employees.[11/]

Table II.4. Employment[a/] by main industry, 1971, 1980 and 1990

Main industry	1971		1980		1990	
	Million	Percentage	Million	Percentage	Million	Percentage
Agriculture, forestry, hunting and fishery	26.5	64.2	28.0	54.8	35.5	50.1
Mining and quarrying	0.1	0.2	0.4	0.7	0.7	1.0
Manufacturing	2.7	6.5	4.4	8.5	8.2	11.6
Electricity, gas and water	0.0	0.1	0.1	0.2	0.1	0.1
Construction	0.7	1.6	1.6	3.1	2.8	4.0
Wholesale and retail trade and restaurants	4.3	10.3	6.6	12.9	10.6	15.0
Transportation, storage and communications	1.0	2.3	1.5	2.9	2.7	3.8
Finance, insurance, real estate and business services	0.1	0.2	0.2	0.4	0.5	0.7
Public services	4.1	10.0	7.7	15.1	9.7	13.7
Others	1.9	4.6	0.7	1.4	0.0	0.0
Total	**41.3**	**100.0**	**51.2**	**100.0**	**70.8**	**100.0**

Source: Government of Indonesia, Central Bureau of Statistics, *Stanstical Yearbook of Indonesia*, various issues.

a/ Refers to population 10 years of age and above who worked during the week previous to the census.

Table II.5 provides a breakdown of employment patterns by industrial branch yielded by the industrial censuses of 1963, 1975 and 1986.[12/] These data, which do not take household or cottage enterprises into account, reveal that the largest contribution to labour absorption is made by the traditional labour intensive industries, such as food processing, tobacco products, textiles, garments and wood products. They show further that the share of labour employed in the tobacco processing and textile industries has declined dramatically since the 1960s as these industries have been subject to an increasing degree of mechanization. The share of employment accounted for by the rubber processing industry also declined sharply, reflecting the decline in the industry itself. By contrast, the share of workers employed in the garments, wood products and furniture industries increased between the mid-1970s and the mid-1980s in line with the rapid expansion of these industries during this period.

More recent employment data for medium- and large-scale enterprises derived from the annual industrial surveys are presented in Table II.6. While indicating a steady and rapid growth in the overall number of workers employed in these enterprises,[13/] they also show branch-specific shifts in employment patterns that are, to a large extent, consistent with the longer term trends revealed by the comparison of the 1963, 1975 and 1986 industrial censuses discussed above. In particular, they confirm the continuing decline in the share of industrial employment accounted for by the tobacco processing and textile industries, and the growing importance of the garments and woodworking industries as sources of employment. The contribution of the rubber products industry to employment has shown some signs of recovery in recent years, on the other hand, largely as a result of a move into downstream activities, including the manufacture of a wide range of non-tyre finished goods.

Table II.5. Distribution of manufacturing employment, 1963, 1975 and 1986[a/]
(Percentage of total, excluding oil and gas)

ISIC	Industry	1963	1975	1986
311	Food products	25.3	21.1	13.5
312			9.8	8.0
313	Beverages	0.8	0.6	0.7
314	Tobacco	18.0	11.2	12.1
321	Textiles	27.3	18.2	14.4
322	Garments	0.8	0.8	5.2
323	Leather products	0.5	0.2	0.4
324	Footwear	-	0.6	1.0
331	Wood products	2.3	4.4	9.2
332	Furniture	1.0	1.8	2.6
341	Paper products	0.8	0.7	1.1
342	Printing and publishing	2.8	2.1	2.3
351	Basic chemicals	2.9	0.9	1.6
352	Other chemicals		2.9	3.0
355	Rubber products	7.3	8.0	3.9
356	Plastics[b/]	-	1.2	2.4
361	Pottery and china	3.7	0.3	0.5
362	Glass products		0.5	0.4
363	Cement		2.4	2.8
364	Structural clay products		3.0	3.5
369	Other non-metallic minerals		0.2	0.4
37	Basic metals	-	0.2	0.7
381	Metal products	2.5	3.7	3.5
382	Non-electric machinery	0.7	0.8	0.8
383	Electric equipment	0.3	1.4	1.7
384	Transport equipment	2.1	2.3	2.9
385	Professional equipment	-	0.1	0.1
39	Miscellaneous	1.1	0.7	1.4
Total		**100.0**	**100.0**	**100.0**
(Thousand)		(900.3)	(1,468.5)	(2,685.3)
- Light industry[c/]		87.0	80.6	77.0
- Heavy processing[c/]		7.4	11.1	14.0
- Heavy engineering[c/]		5.6	8.3	9.0

Source: Hill, Hal, "Indonesia's Industrial Transformation. Part I". *Bulletin of Indonesian Economic Studies*, vol. 26, No. 2, August 1990, Table 2, p. 87.

a/ Includes firms with a workforce of at least five persons in 1975 and 1986. Data for 1963 refer to firms with a workforce of at least five persons, except for firms with 5-9 workers but not using power.

b/ Data for 1963 included in "Basic and Other chemicals".

c/ Defined as follows: light industry - ISIC 31, 32, 33, 342, 355, 356, 39; heavy processing industry - ISIC 341, 351, 352, 36, 37; heavy engineering industry - ISIC 38.

Table II.6. Manufacturing employment, 1980-1990
(Percentage share)

ISIC		1980	1981	1982	1983	1984	1985[a/]	1986	1987	1988	1989	1990
311	Food products	12.7	12.0	11.3	11.3	10.5	13.0	13.0	12.8	12.0	11.0	10.3
312	Food products	3.2	3.4	3.2	3.2	3.3	5.0	5.3	5.6	5.4	5.0	4.6
313	Beverages	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.5
314	Tobacco	16.4	15.6	15.1	15.0	14.0	12.2	11.8	11.3	9.9	9.5	7.7
321	Textiles	23.9	23.2	21.8	20.2	20.1	17.7	18.3	18.2	17.2	17.6	15.6
322	Garments	1.6	2.0	2.3	2.6	3.0	4.1	3.9	4.5	5.2	5.7	9.1
323	Leather products	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.5
324	Footwear	0.8	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.8	1.1	2.2
331	Wood products	6.1	6.5	8.6	10.1	13.9	10.0	10.0	11.0	13.4	14.0	12.3
332	Furniture	0.6	0.5	0.5	0.5	0.5	0.7	0.8	0.8	1.1	1.2	3.0
341	Paper products	1.2	1.3	1.4	1.3	1.1	1.3	1.5	1.5	1.5	1.5	1.6
342	Printing and publishing	2.1	2.1	2.1	2.0	1.8	2.1	2.2	2.0	1.8	1.7	1.6
351	Basic chemicals	1.4	1.6	1.9	1.9	1.9	2.2	2.1	2.0	1.9	1.8	1.9
352	Other chemicals	4.2	4.5	4.6	4.7	4.4	4.0	4.0	3.9	3.6	3.4	3.2
355	Rubber products	3.8	3.8	3.6	3.4	3.3	5.6	5.4	5.4	5.8	5.7	6.2
356	Plastics	1.8	2.0	2.3	2.6	2.6	2.9	3.0	3.0	3.0	3.1	3.1
361	Pottery and china	0.7	0.7	0.8	0.8	0.9	0.7	0.7	0.7	0.8	0.8	0.9
362	Glass products	0.9	0.9	1.0	0.9	0.8	0.6	0.6	0.6	0.6	0.5	0.5
363	Cement	2.1	2.2	2.1	2.2	2.0	2.1	1.7	1.8	1.6	1.5	1.3
364	Structural clay products	0.8	0.9	0.9	0.8	0.7	1.4	1.3	1.1	1.1	1.0	0.8
369	Other non-metallic minerals	0.3	0.3	0.3	0.3	0.3	0.5	0.4	0.4	0.6	1.0	0.7
371	Basic metals	0.9	0.9	0.9	1.1	1.2	0.9	1.0	0.9	1.0	0.9	1.2
381	Metal products	4.2	4.4	4.2	4.0	3.6	3.5	3.5	3.4	3.3	3.2	3.0
382	Non-electrical machinery	1.2	1.3	1.2	1.1	1.1	1.0	1.0	0.9	0.8	0.9	1.1
383	Electrical equipment	3.9	3.8	3.5	3.3	3.1	2.6	2.3	2.2	2.2	2.3	2.2
384	Transport equipment	3.1	3.6	4.2	4.1	3.6	3.4	3.8	3.7	3.3	3.4	3.3
385	Professional equipment	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1
390	Miscellaneous	0.6	0.6	0.1	0.7	0.7	0.7	0.8	0.8	1.0	1.0	1.1
Total		**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Light industry[b/]		74.8	73.5	73.1	73.3	75.3	75.6	75.8	76.7	77.5	77.6	78.0
Heavy processing industry[b/]		12.6	13.4	13.8	14.0	13.3	13.7	13.5	12.9	12.7	12.5	12.2
Heavy engineering industry[b/]		12.5	13.1	13.1	12.7	11.4	10.6	10.7	10.4	9.8	9.9	9.8

Source: Government of Indonesia, Central Bureau of Statistics, *Statistik Industri*, various issues.

a/ Census.

b/ Defined as follows: light industry - ISIC 31, 32, 33, 342, 355, 356, 39; heavy processing industry - ISIC 341, 351, 352, 36, 37; heavy engineering industry - ISIC 38.

Educational background and skill levels

In view of the still relatively early stage of Indonesia's industrial and economic development, it may be expected on an *a priori* basis that the educational and skill levels of the country's industrial labour force will still be fairly rudimentary. This appears to be confirmed by a succession of annual labour force surveys conducted by the Central Bureau of Statistics, which inter alia enquire into the educational achievements of their respondents. The partial results of a selection of these surveys, covering workers in manufacturing enterprises only, are presented in Table II.7.

Table II.7. Industrial labour force by education, 1976-1990, selected years
(Percentage share)

Educational achievement	1976	1980	1982	1985	1988	1989	1990
No schooling	30.3	23.9	24.8	17.8	10.1	11.9	11.4
Not completed elementary school	37.6	37.6	33.3	32.3	22.4	23.6	21.4
Elementary school	23.6	25.3	29.1	31.5	38.6	39.1	38.3
Junior High School	5.2	7.0	6.7	9.0	13.1	12.7	13.8
General	4.1	5.3	5.0	7.3	11.2	11.2	12.0
Vocational	1.1	1.7	1.7	1.8	1.9	1.6	1.8
Senior High School	3.0	5.6	5.6	8.6	14.3	11.9	13.6
General	1.6	2.9	2.4	4.5	8.5	7.1	8.1
Vocational	1.4	2.8	3.2	4.1	5.8	4.8	5.6
Diploma and academy	0.2	0.3	0.2	0.5	1.0	0.6	0.8
University	0.1	0.2	0.2	0.3	0.4	0.2	0.6
No response	-	-	-	-	-	-	-
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Primary or less	91.5	86.8	87.3	81.5	71.1	74.6	71.2
Secondary	8.2	12.6	12.3	17.7	27.4	24.7	27.5
Tertiary	0.3	0.5	0.4	0.8	1.5	0.8	1.4

Source: Government of Indonesia, Central Bureau of Statistics, *Statistical Pocketbook of Indonesia*, various issues.

Although the interpretation of these data is fraught with some serious difficulties,[14] they nevertheless highlight two basic facts. On the one hand they show that a very high proportion of the industrial work force has few, if any, formal educational qualifications. On the other, they reveal a rapid improvement in the educational standards of the industrial labour force during the past 15 years, reflecting both the development of the educational infrastructure and the more exacting manpower needs of a more sophisticated manufacturing sector.

As late as 1976 more than 90 per cent of the workers in industrial enterprises had at best a primary education, with 30 per cent having had no schooling at all. By 1990, however, the share of wholly uneducated workers had fallen to approximately 11 per cent, although almost three-quarters of the work force had still only had a primary education, which in many cases had not even been completed. Meanwhile, the share of the workforce with a secondary education rose from 8 per cent in 1976 to 27.5 per cent by 1990. A closer analysis of the data reveals, however, that a substantial majority of the high school graduates employed in manufacturing activities in 1990 had attended general curriculum schools, with only about one-third having attended vocational schools. Finally, the share of industrial employees with a tertiary education remained very small at 1.4 per cent in 1990, even though this figure represented an almost fivefold increase over 1976.

As indicated in Chapter I (see Macroeconomic Policies - Human resources development), the Indonesian authorities have given priority to expanding and improving the educational infrastructure. The private sector is also making an important contribution through its involvement in general education and enterprise-level instruction and training. Through these combined efforts of the public and private sectors, and sustained by a widespread public thirst for knowledge and education both for its own sake and as a means to a better life, the improvement in educational standards recorded since 1976 appears certain to continue into the foreseeable future.

The role of women

There are no legal and few cultural restrictions on the active participation of women in the economic and industrial development process in Indonesia. On the contrary, the Indonesian constitution affords women equal status with men as participants in, and beneficiaries from, the development process. Successive sets of State policy guidelines and national development plans have placed special emphasis on the need to integrate women more fully into the development process by increasing their skills and knowledge and expanding their employment opportunities.

The available quantitative information on the role of women in manufacturing industry, derived from population censuses and labour force surveys, indicates that women play a significant part in manufacturing activities. As shown in Table II.8, the share of female employment in all manufacturing activities revealed by these surveys and enumerations has consistently ranged between about 45 per cent and 50 per cent since the early 1970s. However, women play a particularly prominent role as unpaid family labour in cottage and household enterprises, and account for some 70-80 per cent of all such labour. They also play a significant role as employers and own-account workers, accounting for approximately half of the total labour force in this category. Even so, the share of women in paid employment has not exceeded one-third of the total since the early 1970s.

Table II.8. Industrial labour force by status and sex, 1971-1989, selected years
(Percentage share)

	1971	1976	1977	1978	1980	1982	1985	1986	1988	1989
Employers and own-account workers	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Male	53.5	52.2	46.2	39.9	52.1	37.6	50.5	45.7	47.2	46.6
Female	56.5	47.8	53.8	60.1	47.9	62.4	49.5	54.3	52.8	53.4
Paid employees and wage earners	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Male	66.5	67.5	62.4	64.5	64.6	63.0	65.4	68.0	66.8	65.3
Female	33.5	32.5	37.6	35.5	35.4	37.0	34.6	32.0	33.2	34.7
Family workers	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Male	19.8	25.0	25.9	24.5	27.2	25.2	25.2	26.1	25.6	26.4
Female	80.2	75.0	74.1	75.5	72.8	74.8	74.8	73.9	74.4	73.6
Others	-	100.0	100.0	-	100.0	-	100.0	100.0	-	-
Male	-	19.5	-	-	53.8	-	70.8	78.9	-	-
Female	-	80.5	100.0	-	46.2	-	29.2	21.1	-	-
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Male	51.8	52.9	52.7	50.2	55.2	52.1	54.7	55.2	55.1	53.5
Female	48.2	47.1	47.3	49.8	44.8	47.9	45.3	44.8	44.9	46.5

Sources ILO, *Yearbook of Labour Statistics*, various issues, Table 2A

One explanation for the data presented in Table II.8 is the fact that female employment has traditionally been concentrated primarily in the informal sector. This is reflected particularly obviously in the high share of females in the "unpaid family workers" category, which by definition refers to the predominantly informal cottage and household segments of the industrial sector. In addition, however, it is also an important determinant of the relatively large proportion of women in the "own-account workers" category, which includes the large number of women involved in small-scale food processing and handicrafts activities.

While employment in formal sector industrial enterprises remains largely male dominated, a number of recent developments suggest that the involvement of women in the formal sector may increase significantly in the foreseeable future. The structural transformation currently in progress in Indonesia's industrial sector is opening new opportunities for women to participate in a variety of rapidly growing light industries such as those involved in the manufacture of textiles, electronics and high-quality handicrafts, and in the processing of food, beverages and tobacco, which traditionally tend to absorb more female than male labour. In addition, many factories are relocating from urban centres to rural areas and special export processing zones, where they can draw on the female population of surrounding villages to meet their labour requirements.

The data on the numerical breakdown of industrial employment by male and female workers presents only a partial picture of the role of women in Indonesian industry. A recently prepared UNIDO country memorandum on Indonesia notes that:

> "More than half of the working women work part-time in Indonesia, and most women are in low-status, low-paying jobs since they lack the skills and educational qualifications for better jobs. Women at managerial and decision-making levels are very few. Even when educational qualifications are the same, however, women are paid far less, on average, than males. The sex differential is greatest among women workers with the least formal education, but even among academy and university graduates males earn 40 per cent more than their female co-workers. The same pattern holds when male and female workers are matched for hours of work, type of occupation and field of work."[15]

C. PRODUCTIVITY AND PERFORMANCE

Output

The data collected by the annual industrial surveys of the Central Bureau of Statistics show that the share of value added in the gross output of the manufacturing sector as a whole has remained approximately constant throughout the 1980s, fluctuating in a narrow band between approximately 29 per cent and 32 per cent.[16] While this relatively low ratio at the aggregated level suggests that the Indonesian manufacturing industry has a comparatively high physical input cost structure, it conceals significant branch-specific variations. In particular, the MVA/output ratios in the food processing (ISIC 311), leather products and plastics industries have historically been substantially lower than the overall average, while those of the footwear, furniture, pottery and china, and non-metallic minerals industries tend to be substantially higher. At least in the case of food processing, however, this pattern appears to have begun to shift in 1990.

Table II.9. Share of manufacturing value added in gross output by ISIC, 1983-1990
(Percentage)

ISIC	Products	1983	1984	1985[a/]	1986	1987	1988	1989	1990
311	Food products	23.0	22.3	25.5	22.1	19.6	22.2	19.7	33.7
312	Food products	18.6	22.4	26.2	31.3	26.0	24.3	33.2	30.7
313	Beverages	49.9	44.8	36.0	37.6	37.0	34.7	27.0	42.5
314	Tobacco	28.6	29.7	25.0	35.4	37.3	37.8	30.6	39.3
321	Textiles	30.7	34.1	31.9	34.6	28.6	25.0	29.6	29.5
322	Garments	38.1	41.9	33.9	37.7	29.6	30.9	33.9	35.0
323	Leather products	35.1	37.5	31.4	47.9	20.1	20.1	17.8	31.4
324	Footwear	48.2	42.7	45.7	50.9	47.0	41.5	47.6	48.8
331	Wood products	32.9	28.5	35.4	38.2	35.1	31.6	33.8	33.9
332	Furniture	37.8	39.4	39.3	41.1	36.3	38.7	38.4	36.1
341	Paper products	19.3	22.4	29.7	22.7	23.4	29.2	24.4	33.1
342	Printing and publishing	36.1	40.2	38.5	42.0	38.3	37.6	33.1	29.1
351	Basic chemicals	34.3	34.0	32.3	31.0	28.8	32.9	30.2	28.6
352	Other chemicals	30.8	38.1	35.4	31.6	32.2	31.3	29.2	30.2
355	Rubber products	18.6	16.0	27.6	21.3	17.4	20.9	28.1	27.6
356	Plastics	24.6	28.3	39.0	21.7	20.2	16.8	16.7	27.5
361	Pottery and china	38.8	37.2	39.1	43.1	37.6	36.4	39.3	38.1
362	Glass products	39.7	39.4	49.8	50.2	25.9	25.2	25.4	29.6
363	Cement	36.9	36.8	32.0	31.3	35.0	31.4	26.2	35.0
364	Structural clay products	45.5	48.1	45.5	45.5	38.8	39.4	37.0	39.8
369	Other non-metallic minerals	40.6	37.0	46.4	54.2	55.1	48.1	48.8	41.4
371	Basic metals	32.7	50.3	45.2	50.0	54.7	39.6	38.0	36.0
381	Metal products	29.6	27.8	29.5	27.7	27.8	28.7	36.0	27.8
382	Non-electric machinery	39.1	42.2	35.8	33.7	34.5	30.7	32.2	31.1
383	Electrical equipment	23.7	21.2	29.5	27.5	23.7	18.4	22.2	23.5
384	Transport equipment	28.7	29.6	33.4	30.6	36.4	32.8	32.4	31.2
385	Professional equipment	39.0	40.1	31.4	28.2	24.2	21.2	21.1	31.8
390	Miscellaneous	27.4	25.6	29.7	31.0	29.5	33.1	34.3	33.5
Total		**29.0**	**30.6**	**31.3**	**32.3**	**30.5**	**28.9**	**29.7**	**32.4**
Light industry[b]		27.8	28.1	29.3	31.5	28.4	27.5	28.8	33.2
Heavy processing industry[b/]		33.1	39.9	36.5	36.2	36.1	33.7	31.4	32.7
Heavy engineering industry[b/]		28.2	27.4	31.3	29.2	30.4	27.8	31.3	28.6

Source: Government of Indonesia, Central Bureau of Statistics, *Statistik Industri*, various issues.

a/ Census

b/ Defined as follows: light industry - ISIC 31, 32, 33, 342, 355, 356, 39; heavy processing industry - ISIC 341, 351, 352, 36, 37; heavy engineering industry - ISIC 38.

Labour productivity

As argued by Hill, "Indonesia's industrial diversity is nowhere better illustrated than in the range of labour productivities across industries".[17/] This is highlighted by the data in Table II.10, which reveal a wide dispersion of inter-industry productivity even within the non-oil/gas sections of manufacturing industry. Year-to-year fluctuations notwithstanding, the range of these labour productivities stretches from approximately one-fifth of the average for all non-oil/gas manufacturing activities to 9-10 times that average.

Table II.10. Labour productivity (manufacturing value added per employee) by ISIC, 1983-1990
(Index average = 100)

ISIC	Products	1983	1984	1985[a]	1986	1987	1988	1989	1990
311	Food products	90.4	81.1	82.3	66.5	63.4	78.8	67.6	118.9
312	Food products	53.9	64.6	54.1	67.1	54.7	55.2	86.7	61.6
313	Beverages	311.8	247.2	173.3	167.8	170.3	174.9	131.3	178.1
314	Tobacco	111.4	113.6	93.9	109.6	115.4	110.9	109.9	129.5
321	Textiles	51.1	63.0	59.7	68.4	59.6	57.0	71.1	65.1
322	Garments	49.5	52.8	39.4	49.8	38.9	41.0	44.1	39.7
323	Leather products	106.6	144.1	79.9	148.6	57.8	68.0	45.1	68.5
324	Footwear	117.3	95.3	89.1	97.1	88.3	75.1	76.4	66.8
331	Wood products	85.1	50.4	94.0	109.7	116.0	99.4	91.1	88.7
332	Furniture	34.5	35.2	37.1	42.1	37.8	39.8	38.3	30.5
341	Paper products	58.3	78.0	132.7	88.4	138.0	201.3	160.7	221.2
342	Printing and publishing	69.7	72.2	68.2	93.9	85.7	91.6	81.1	71.0
351	Basic chemicals	327.0	288.9	300.7	255.0	270.5	301.7	250.1	278.9
352	Other chemicals	123.1	139.6	147.9	131.2	131.8	137.6	121.1	128.1
355	Rubber products	106.4	88.7	90.5	58.9	60.2	78.4	81.9	61.3
356	Plastics	42.2	57.8	92.0	47.6	52.9	48.6	42.6	55.1
361	Pottery and china	40.6	35.8	50.5	53.9	46.4	49.0	56.6	63.1
362	Glass products	147.7	132.3	242.0	235.9	117.8	105.6	94.9	97.6
363	Cement	204.2	186.9	171.5	179.3	185.5	150.8	121.0	176.0
364	Structural clay products	18.8	17.0	18.2	20.1	17.4	18.2	16.4	15.0
369	Other non-metallic minerals	56.0	50.6	56.3	73.2	68.9	41.3	23.7	54.3
371	Basic metals	516.7	944.9	778.3	851.9	1,066.6	872.6	880.9	721.9
381	Metal products	113.0	108.4	121.5	115.2	120.2	167.8	204.7	101.2
382	Non-electrical machinery	126.5	127.3	118.4	84.8	112.2	122.5	113.7	110.1
383	Electrical equipment	119.1	109.6	146.3	131.9	118.7	103.2	113.5	118.8
384	Transport equipment	153.4	155.0	149.2	158.4	169.4	179.3	206.1	202.8
385	Professional equipment	34.8	28.7	46.5	33.8	36.7	49.3	43.4	55.4
390	Miscellaneous	38.2	51.3	51.9	51.7	49.9	47.1	59.6	42.4
Total		**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Light industry[b/]		80.1	75.5	76.9	79.0	76.2	76.3	77.6	77.7
Heavy processing industry[b/]		178.7	218.0	199.8	193.8	212.2	204.8	180.8	210.8
Heavy engineering industry[b/]		128.3	124.2	135.2	130.5	135.6	151.8	173.2	139.4

Source: Government of Indonesia, Central Bureau of Statistics, *Statistik Industri*, various issues.

a/ Census.

b/ Defined as follows: light industry - ISIC 31, 32, 33, 342, 355, 356, 39; heavy processing industry - ISIC 341, 351, 352, 36, 37; heavy engineering industry - ISIC 38.

The data presented in Table II.10 allow two categories of manufacturing industry to be distinguished, with high value added industries on the one hand and industries with relatively low levels of labour productivity on the other. The former category comprises industries with a high physical capital intensity, high skill requirements and/or a significant degree of product differentiation, and includes the basic metals, basic chemicals, cement, engineering and beverage industries. The latter category consists of essentially labour-intensive industries, and includes the textiles, garments, furniture, footwear, non-metallic minerals (building materials) and miscellaneous manufactures (such as jewellery, sporting goods and musical instruments) industries.

The inter-temporal growth of labour productivity in the non-oil/gas manufacturing industries is more difficult to ascertain, not least because of difficulties associated with the choice of deflator. An approximation of this growth is presented in Table II.11, however, which shows that the 1983-based index rose to almost 285 in nominal terms by 1990, and to about 155-165 in real terms, depending upon whether the implicit deflator for non-oil/gas manufacturing yielded by the national accounts data or whether the implicit deflator for GDP as a whole was employed. These data reveal a particularly rapid growth of labour productivity in the paper products, food products, textiles, pottery and china, basic metals, transport equipment and professional equipment industries, as new investments raised their capital intensity and the sophistication of the production processes employed in them.

Table II.11. Growth of labour productivity by ISIC, 1990
(Index, 1983 = 100)

ISIC	Products	Nominal 1990	Deflated by implicit deflator for non-oil/gas manufacturing from national accounts data 1990	Deflated by GDP deflator 1990
311	Food products	373.8	202.7	218.1
312	Food products	324.7	176.1	189.5
313	Beverages	162.3	88.0	94.7
314	Tobacco	330.5	179.3	192.9
321	Textiles	361.9	196.3	211.2
322	Garments	227.7	123.5	132.9
323	Leather products	182.5	99.0	106.5
324	Footwear	161.9	87.8	94.5
331	Wood products	296.4	160.7	173.0
332	Furniture	251.3	136.3	146.6
341	Paper products	1,077.3	584.3	628.7
342	Printing and publishing	289.4	157.0	168.9
351	Basic chemicals	242.3	131.4	141.4
352	Other chemicals	295.9	160.5	172.7
355	Rubber products	163.6	88.8	95.5
356	Plastics	377.7	204.8	220.4
361	Pottery and china	441.5	239.5	257.7
362	Glass products	187.6	101.8	109.5
363	Cement	244.9	132.8	142.9
364	Structural clay products	227.2	123.2	132.6
369	Other non-metallic minerals	275.5	149.4	160.8
371	Basic metals	397.0	215.3	231.7
381	Metal products	254.4	138.0	148.4
382	Non-electrical machinery	247.4	134.2	144.4
383	Electrical equipment	283.4	153.7	165.4
384	Transport equipment	375.7	203.8	219.3
385	Professional equipment	453.1	245.8	264.4
390	Miscellaneous	315.0	170.9	183.8
Total		**284.1**	**154.1**	**165.8**
Light industry[a/]		275.6	149.5	160.8
Heavy processing industry[a/]		335.1	181.8	195.6
Heavy engineering industry[a/]		308.6	167.4	180.1

Source Computed from industrial and national accounts data published by the Government of Indonesia, Central Bureau of Statistics.

a/ Defined as follows: light industry - ISIC 31, 32, 33, 342, 355, 356, 39; heavy processing industry - ISIC 341, 351, 352, 36, 37; heavy engineering industry - ISIC 38.

At the same time, several branches suffered declining labour productivity in real terms. In the case of the beverages and leather products industries this reflected a long-term secular trend, apparently related to structural shifts in demand. In the case of cement and non-metallic minerals the reasons are more likely to have been cyclical, as a temporary weakening of demand in the construction industry resulted in a reduction of output in the building materials industry without a corresponding reduction in the number of workers employed.

Profitability

Reliable estimates of corporate profitability are extremely difficult to obtain in Indonesia, mainly because most firms are privately owned and structured as highly complex groups of enterprises. Financial statistics are therefore frequently not released at all or, if published, are lacking in transparency. Even the large wave of corporate equity flotations following the liberalization of the domestic capital market regulations since the late 1980s has done little to improve this situation.

Table II.12. Share of gross profits in manufacturing value added by ISIC, 1983-1990
(Percentage)

ISIC	Products	1983	1984	1985[a/]	1986	1987	1988	1989	1990
311	Food products	68.5	68.2	72.7	68.4	66.9	73.5	67.0	83.5
312	Food products	63.5	69.8	69.3	75.9	72.8	71.9	84.0	76.4
313	Beverages	85.4	82.5	78.3	79.0	81.0	80.8	74.8	82.8
314	Tobacco	87.1	87.9	87.3	89.8	93.1	89.7	90.0	91.3
321	Textiles	64.1	74.4	72.9	77.4	76.3	73.0	80.4	78.7
322	Garments	61.4	64.9	56.5	68.6	60.3	63.2	67.7	65.2
323	Leather products	80.5	85.1	77.3	89.4	72.1	75.6	67.8	80.8
324	Footwear	67.3	63.9	68.7	74.4	71.7	65.5	75.0	37.7
331	Wood products	67.7	62.5	75.0	78.1	80.2	77.3	77.1	77.3
332	Furniture	39.8	46.1	48.7	57.2	55.8	59.3	61.5	57.7
341	Paper products	45.9	62.5	77.8	72.2	81.9	86.9	83.0	87.7
342	Printing and publishing	54.8	53.6	49.9	60.2	58.1	60.7	60.8	58.2
351	Basic chemicals	79.3	79.9	75.6	76.0	78.6	80.7	77.0	80.0
352	Other chemicals	60.7	68.8	67.8	67.5	67.4	66.7	69.4	71.1
355	Rubber products	72.4	66.4	74.2	67.3	58.0	68.4	74.9	69.4
356	Plastics	57.1	70.1	81.6	62.4	66.2	67.3	66.9	75.3
361	Pottery and china	44.9	47.7	58.2	65.9	60.0	61.1	70.2	72.2
362	Glass products	68.9	69.5	83.9	84.4	71.5	68.8	68.9	70.5
363	Cement	78.7	77.0	80.5	80.9	82.7	78.4	78.0	84.5
364	Structural clay products	37.5	46.7	50.3	55.8	52.8	55.1	51.7	50.2
369	Other non-metallic minerals	62.8	60.9	66.5	73.5	74.4	65.6	68.2	73.9
371	Basic metals	89.8	94.5	94.5	93.1	95.7	92.8	93.5	93.6
381	Metal products	73.0	74.9	73.7	74.8	78.5	81.5	88.0	77.4
382	Non-electrical machinery	72.8	75.1	75.2	65.9	72.3	70.9	72.5	73.0
383	Electrical equipment	70.4	68.9	77.2	77.0	75.1	69.1	76.4	75.5
384	Transport equipment	67.6	70.6	71.4	72.6	79.5	79.1	83.0	82.7
385	Professional equipment	50.3	52.7	58.7	45.0	40.8	56.9	62.3	64.6
390	Miscellaneous	55.4	62.4	67.3	65.3	63.8	68.4	71.5	67.0
Total		**73.0**	**76.0**	**76.3**	**77.4**	**78.7**	**77.6**	**79.7**	**79.8**
Light industry[b/]		72.8	74.4	75.3	77.0	77.0	75.8	77.8	78.1
Heavy processing industry[b/]		75.0	81.3	79.6	80.3	82.9	81.4	81.8	84.2
Heavy engineering industry[b/]		70.2	71.8	73.8	73.7	77.7	77.8	83.2	79.1

Source: Government of Indonesia, Central Bureau of Statistics, *Statistik Industri*, various issues

a/ Census.

b/ Defined as follows: light industry - ISIC 31, 32, 33, 342, 355, 356, 39; heavy processing industry - ISIC 341, 351, 352, 36, 37; heavy engineering industry - ISIC 38.

While firms going public must fulfil relatively strict disclosure requirements, ways have often been found to limit the extent of the disclosure, for example by floating only small subsidiaries of large conglomerates. On several occasions, the data released by such firms have also been found misleading.[18/]

An impression of the overall profitability of Indonesian industry can, however, be gleaned from the data collected by the surveys of medium- and large-scale non-oil/gas manufacturing enterprises conducted by the Central Bureau of Statistics (see Table II.12). These data show that the share of gross profits in MVA increased gradually but steadily from 73 per cent in 1983 to almost 80 per cent in 1990. A more detailed examination of gross profits generated in various branches of manufacturing industry shows this relatively high average figure to be fairly representative of most forms of manufacturing activity. With the exception only of structural clay products and footwear, the share of gross profit in MVA exceeded 60 per cent in all branches in 1990, and in most cases ranged between 70 per cent and 90 per cent.

D. OWNERSHIP AND INVESTMENT PATTERNS

Ownership

Official Indonesian statistics distinguish seven categories of industrial ownership. Three of these comprise wholly owned enterprises belonging to the government, domestic private businessmen or foreign investors, while a further three refer to joint ventures between any two of these three individual ownership groups. The last category refers to joint ventures involving all three of these groups. The latest comprehensive data on the distribution of ownership among these categories were collected as part of the 1986 industrial census. A comparison of these data, which cover medium- and large-scale enterprises outside the oil/gas sector only, with corresponding data from the earlier industrial censuses is presented in Table II.13. These figures show that the domestic private sector has traditionally accounted for the lion's share of all non-oil/gas manufacturing enterprises, and a significant proportion of the employment and MVA that they have generated. At the same time, however, they also show that the government does play a significant direct role in the manufacturing sector, with firms owned wholly or partially by the government accounting for 25.5 per cent of total MVA at the time of the 1986 census. According to Hill, this figure would have been even higher, at about 44 per cent, if the oil and natural gas processing industries had been included in the census data.[19/]

The role of wholly or partially State-owned enterprises has traditionally been particularly important in the heavier branches of manufacturing industry. This is indicated in Table II.14, which shows that such firms accounted for more than 50 per cent of Indonesia's total output of basic chemicals, oil and natural gas products, basic metals, and non-electrical machinery. This concentration of State ownership in the upstream reaches of the manufacturing sector has prompted one team of analysts to describe its structure as being one of "upstream socialism, downstream capitalism".[20/]

Within the private sector a dominant role has historically been played by businessmen of ethnic Chinese origin. Most of Indonesia's large conglomerates, which tend to have highly diversified interests in a variety of fields including manufacturing, were founded by such businessmen, who have for the most part retained full or majority ownership over these enterprises. For political reasons, these businessmen have often had to collaborate with influential indigenous Indonesian interests. Until the mid-1980s the most important of these were connected with the military, and included either serving or retired senior officers as well as a number of foundations established by the armed forces. More recently, the focus of this collaboration has shifted to well-connected private entrepreneurs, many of whom have become leading members of Indonesia's business community during the mid-1980s and early-1990s.

Table II.13. Summary of indicators for major ownership groups, 1963, 1974 and 1985[a/]

		Government	Domestic Private	Foreign	Government/ Domestic Private	Government/ Foreign	Domestic Private/ Foreign	Government/ Domestic Private/ Foreign	Total
Shares (Per cent of all firms)									
1985	Firms	0.9	92.2	0.4	0.6	0.1	2.7	3.1	12,909
	Employment	1.0	74.9	1.3	0.4	0.2	7.4	14.9	1,584,726
	Value added	0.4	55.8	1.3	0.4	0.5	17.1	24.7	Rp 7,153,837
1974	Firms	6.8	87.9	1.4	1.2	0.2	25.0	-	7,091
	Employment	19.3	68.9	2.6	1.3	0.7	7.3	-	655,821
	Value added	25.9	47.2	10.8	1.5	2.2	13.3	-	Rp 478,446
1963	Firms	4.7	95.3						10,586
	Employment	31.1	68.9						527,717
	Power	39.7	60.3						HP[b/] 715,520
Indices of relative size (average = 100)									
1985	Value added/firm	40	60	328	64	833	641	794	
	Value added/employee	40	75	97	105	244	230	165	
	Employees/firm	101	81	339	61	342	279	480	
1974	Value added/firm	398	54	756	88	1,091	534	-	
	Value added/employee	129	68	418	123	315	183	-	
	Employees/firm	285	78	181	106	346	292	-	
1963	Power/firm	851	63						
	Power/employee	127	88						
	Employees/firm	668	72						

Source Hill, Hal, "Indonesia's Industrial Transformation - Part II", *Bulletin of Indonesian Economic Studies*, vol. 26, No. 3, December 1990, Table 13, p. 76.

a/ The data for 1974 and 1985 refer to firms employing at least 20 workers, and exclude oil and gas processing. There is no separate identification of government/private/foreign firms in 1974, presumably they were included in the government group. The 1963 data refer to firms employing at least five workers and using power. No reliable value added data by ownership are provided, so installed power capacity is used.

b/ Horsepower.

Table II.14. Ownership by major industry group, 1985[a/]
(Percentage of each industry's output)

ISIC	Industry	Domestic Private	Government	Foreign	Government (Joint ventures)
311	Food products	61.3	2.2	7.0	29.5
312	Food products	69.4	1.2	18.0	11.4
313	Beverages	35.1	0.1	36.3	28.5
314	Tobacco	94.3	-	5.4	0.3
321	Textiles	61.0	0.8	28.6	10.4
322	Garments	97.7	0.1	1.1	1.1
323	Leather products	76.2	0.6	20.1	3.1
324	Footwear	59.3	-	40.7	-
331	Wood products	73.7	0.5	12.1	13.7
332	Furniture	98.4	-	1.5	0.1
341	Paper products	57.4	-	11.4	31.0
342	Printing and publishing	89.1	4.7	0.4	5.8
351	Basic chemicals	14.4	0.4	8.9	76.3
352	Other chemicals	58.5	0.1	29.4	12.0
353/4	Oil and gas processing	-	43.5	-	56.5
355	Rubber products	83.0	2.1	7.1	7.8
356	Plastics	43.4	-	56.5	0.1
361	Pottery and china	96.0	1.2	2.8	-
362	Glass products	14.7	-	81.0	4.4
363	Cement	42.5	0.6	21.3	35.6
364	Structural clay products	93.1	0.8	4.1	2.0
369	Other non-metallic minerals	94.1	3.5	-	2.4
37	Basic metals	9.1	-	1.4	89.6
381	Metal products	66.8	0.2	21.0	12.0
382	Non-electrical machinery	29.4	0.2	18.9	51.5
383	Electrical equipment	45.2	-	39.8	15.0
384	Transport equipment	68.7	-	16.6	14.6
385	Professional equipment	77.3	-	22.7	-
39	Miscellaneous	77.5	-	20.6	1.9
Total:					
	Excluding oil and gas	58.4	0.8	17.2	23.6
	Including oil and gas	38.8	15.8	10.8	34.7

Source Hill, Hal. "Indonesia's Industrial Transformation - Part II". *Bulletin of Indonesian Economic Studies*, vol. 26, No. 3, December 1990, Table 14, p. 79.

a/ Includes all firms with a work force of at least five persons. All small firms (5-19 persons) are assumed to be privately owned.

Foreign ownership mostly takes the form of limited joint-venture partnerships with Indonesian firms. Overseas investments retaining full foreign ownership were permitted between 1967 and 1974, when several large-scale wholly foreign owned projects were licensed in resource-based industries, such as the mining of copper in Irian Jaya and nickel in South Sulawesi. Growing public disquiet about the threat of excessive foreign control over the Indonesian economy prompted a revision of the foreign investment regulations in 1974, however, as a result of which all new foreign investments had to take the form of joint ventures with private or official Indonesian entities. Since 1990, these regulations have been slowly and partly relaxed.

Investment

The private sector has customarily been the main source of investment in manufacturing industry in Indonesia. As indicated in Chapter I, the government has historically concentrated its capital expenditure in the fields of agriculture, mining, transportation, regional development and education. Private investment, by contrast, has been directed mainly towards the manufacturing sector, as shown in Table II.15.

The data in Table II.15 reveal further that the chemical and rubber industries have attracted particularly strong investment interest, from both domestic and foreign investors. The textiles and garments industries have also traditionally been major beneficiaries of domestic and, to a lesser extent, foreign investment. A significant share of foreign investment has also been channelled into the metalworking industries and, more recently, into the pulp and paper industries.

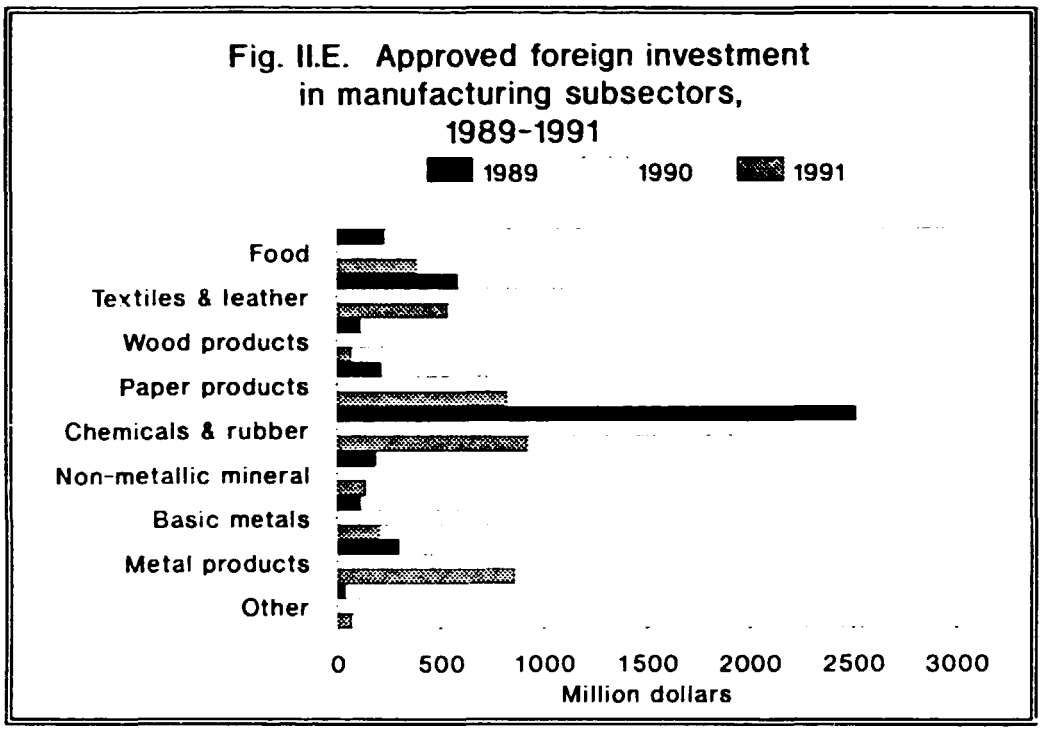
Table II.15. Approved investment by sector, 1985-1991[a/]

Sector	1985	1986	1987	1988	1989	1990	1991
Foreign investment (Million $)							
Agriculture	9	126	117	8	122	170	14
Forestry	-	-	5	34	4	2	1
Fisheries	11	4	12	65	47	20	11
Mining and quarrying	-	-	-	-	-	116	-
Manufacturing	687	537	852	3,785	4,246	5,648	3,970
Food	6	34	54	212	223	99	382
Textiles and leather	7	9	118	224	581	1,094	532
Wood and wood products	-	32	45	77	106	218	62
Paper and paper products	25	47	109	1,506	211	729	822
Chemicals and rubber	338	294	209	1,533	2,512	1,991	923
Non-metallic minerals	3	-	251	30	184	125	133
Basic metals	65	39	7	61	106	825	197
Metals products	244	82	57	127	292	160	856
Others	-	-	3	15	30	107	62
Construction	122	65	42	2	16	77	26
Hotels	-	-	196	395	98	874	4,019
Transport and communications	-	70	213	3	5	803	167
Real estate and other services	29	25	20	191	181	1,042	570
Total	**859**	**826**	**1,457**	**4,482**	**4,719**	**8,751**	**8,778**
Domestic investment (Billion Rp)							
Agriculture, fisheries and livestock	899	1,879	2,885	2,721	3,418	6,435	3,468
Forestry	37	21	640	487	252	593	1,477
Mining	38	89	290	111	94	147	182
Manufacturing	1,632	1,842	5,518	9,663	12,776	39,122	26,465
Textiles	97	263	1,289	2,299	3,563	12,609	3,648
Chemicals	928	773	2,047	3,022	4,058	8,539	8,429
Other	607	806	2,183	4,342	5,155	17,974	14,388
Construction	270	74	50	31	146	87	295
Hotels	312	17	139	561	1,265	4,562	3,897
Real estate	267	169	174	236	936	1,820	3,504
Others[b/]	296	325	569	428	552	2,512	1,822
Total	3,750	4,417	10,265	14,238	19,439	55,278	41,085

Source Government of Indonesia, National Investment Coordinating Board (BKPM), *Statistics on Investment*, various issues.

a/ Figures refer to intended capital investments, and represent original approvals plus approved expansions minus cancellations.

b/ Includes transportation sector.



E. INDUSTRIAL LOCATION

Indonesia's manufacturing industry is concentrated heavily in Java, which offers not only the largest markets because of its high population densities and comparatively high levels of per capita income, but also the best opportunities for efficiency-enhancing inter-industry linkages. Abstracting from the large oil and natural gas processing facilities in East Kalimantan and various parts of Sumatra, Java was shown by the 1986 industrial census to account for some three quarters of total manufacturing output. With much of the new industrial investment of subsequent years also having been located in Java, this share is bound to have increased further in the mean time.

This *a priori* expectation is supported by the annual surveys of medium- and large-scale manufacturing establishments (excluding oil refining and natural gas processing enterprises) conducted by the Central Bureau of Statistics. The latest available data from these surveys show that Java accounted for almost 79 per cent of the number of such firms in 1989, and for more than 76 per cent of the labour employed by these firms. In addition, Java also has the most comprehensive industrial structure, with all of the island's five provinces possessing enterprises in more than 20 of the 28 three-digit ISIC categories of non-oil/gas manufacturing employed by the Indonesian statistical authorities, and three of the five provinces possessing the full complement of 28 branches.

Within Java, the strongest industrial concentrations are found in Jakarta and the surrounding province of West Java, where the three towns of Tanggerang, Bogor and Bekasi on the western, southern and eastern fringes of Jakarta have become little more than industrial suburbs of the national capital. In addition, a heavy concentration of industry has also emerged to the west of Jakarta towards the Sunda Straits, where the towns of Serang and Cilegon have emerged as important centres of heavy engineering. The satellite town of Gresik outside Surabaya in the province of East Java is another major industrial centre, accommodating a wide range of heavy, intermediate and light industries.

Elsewhere in Indonesia the degree of industrialization is much less advanced. The island of Sumatra takes a distant second place to Java in terms of industrial development, accounting for some 12.6 per cent of the country's total number of medium- and large-scale establishments involved in non-oil/gas manufacturing in 1989, and 13.6 per cent of the labour employed by these establishments. All principal branches of manufacturing are represented on the island, although only the province of North Sumatra has a well diversified industrial base with firms in 27 different ISIC categories. As the main centre of Indonesia's plantation agriculture, this province has a strong raw material base for the agricultural and wood processing industries, which in 1989 accounted for 519 of the 962 medium- and large-scale manufacturing enterprises in the province.

Table II.16. Regional distribution of medium- and large-scale manufacturing establishments, 1989

	Number of establishments	Number of branches (ISIC 3-digits)	Number of workers[a/]
Sumatra	1,853	28	307,956
Aceh	84	16	13,369
North Sumatra	962	27	148,533
West Sumatra	108	15	15,146
Riau	195	18	33,532
Jambi	101	10	19,232
South Sumatra	229	20	45,359
Bengkulu	14	6	970
Lampung	160	20	31,815
Java	11,534	28	1,723,352
Jakarta	2,100	25	289,343
West Java	3,505	28	571,144
Central Java	2,457	28	328,001
Yogyakarta	163	21	20,751
East Java	3,309	28	514,113
Bali	328	19	29,311
Nusa Tenggara/Timor	126	15	15,282
West Nusa Tenggara	97	13	13,648
East Nusa Tenggara	21	8	1,369
East Timor	8	7	265
Kalimantan	433	19	132,630
West Kalimantan	110	11	35,088
Central Kalimantan	64	7	18,178
South Kalimantan	140	13	35,668
East Kalimantan	119	15	43,696
Sulawesi	320	22	30,988
North Sulawesi	79	14	5,485
Central Sulawesi	50	8	5,852
South Sulawesi	157	19	18,083
Southeast Sulawesi	34	7	1,568
Maluku	48	10	14,894
Irian Jaya	34	7	4,757
Indonesia	14,676	28	2,259,170

Source: Government of Indonesia, Central Bureau of Statistics, unpublished data.

a/ Includes non-paid family labour.

Since the mid-1980s the Government of Indonesia has been actively promoting the industrial development of the Riau islands near Singapore, and the island of Batam in particular. In order to attract increased foreign investment into the region, the government has permitted full foreign ownership of enterprises established by foreign investors in Batam since late 1989. In early 1991, it agreed with the Governments of Singapore and Malaysia to link Batam, Singapore and the Malaysian State of Johore into a "triangle of growth", allowing each of these entities to benefit from the complementary resource endowments of the other two. As a result of these developments, Batam and its neighbouring islands are rapidly developing into important industrial locations.

The other regions of Indonesia are still in their industrial infancy. The bulk of the manufacturing activity in these regions consists of small-scale and handicraft production for the small local markets, or involves the processing of local raw materials in enclave establishments using significant quantities of imported capital and, in many cases, labour. Although the government has sought to stimulate a more broadly based industrial development of the eastern parts of Indonesia in recent years, and offered a variety of investment incentives in pursuit of this goal, the remoteness of these regions and their lack of adequate infrastructure and markets will inevitably restrain their industrial development for some time to come (see Table II.16 above).

F. ENVIRONMENTAL ISSUES

The surge of manufacturing activity during recent years has inevitably placed an increased burden on the environment. This has been exacerbated by the fact that many of the most rapidly expanding industries (such as the wood products industries, the pulp and paper industries, the chemical industries and the engineering industries) have a particularly high potential for causing wide-ranging environmental damage, including land denudation and soil erosion, water and air pollution, and a loss of ecological habitats and biodiversity. To minimize this environmental damage, such industries must employ a variety of complex environmentally-friendly production techniques and equipment, which have for the most part been developed relatively recently and tend to be more costly than their conventional counterparts.

Although the environmental risks of economic and industrial development began to be publicly acknowledged in Indonesia in the late 1970s (see Chapter I - Environmental policies), it was not until almost a decade later that serious attempts began to be made to limit the potential environmental damage arising from this economic development. The first major step in this direction was only taken in 1987, when the government began to require environmental impact assessments for all major investment projects. A formal government agency to monitor and regulate the environmental effects of the development process was not established until 1990.

The relatively late introduction of these mechanisms to control the environmental degradation caused by economic development has resulted in a severe paucity of relevant empirical data. While it is thus not possible to determine the precise impact of economic and industrial development on the environment because of a lack of appropriate quantitative studies, there is much qualitative evidence to indicate that this impact has been considerable in some cases. Jakarta, one of the most intensively industrialized regions of Indonesia, is almost permanently shrouded in a cloud of yellow smog, which is particularly clearly visible from its northern maritime approaches. The river is also heavily polluted, and the northern suburbs and canal networks of the city near the port of Tanjung Priok consist of little more than a malodorous treacly black sludge.

With much greater attention now being paid to environmental issues, both by the government and by a growing number of local and national non-governmental organizations, pressures for the adoption of more environmentally friendly technologies are bound to increase. With similar pressures also being faced by Indonesia's foreign competitors, the employment of such technologies will not necessarily result in a serious loss of Indonesia's international competitiveness. On the contrary, it will ensure that Indonesia's programme of industrial development is sustainable over a longer period without unduly endangering the country's natural resource base and the health of its population.

G. TRADE IN MANUFACTURES

Imports

As an essentially resource-based economy, Indonesia has long been dependent on imports to satisfy its demand for manufactures. Although this dependence has been reduced as a result of the industrial development achieved during the past two decades, manufactures continue to constitute the bulk of Indonesia's imports. As indicated in Table II.17, the share of manufactured products declined, with some modest year-to-year fluctuations, from almost 96 per cent in 1975 to approximately 85 per cent in 1990.

Table II.17. Share of manufactures in total imports, 1975-1990, selected years
(Percentage)

	1975	1980	1985	1986	1987	1988	1989	1990
All manufactures	95.8	87.9	81.7	84.1	85.4	86.3	84.6	84.6
Capital goods	33.5	32.1	33.0	35.4	37.0	36.9	34.7	39.3
Processed food	10.8	10.1	3.0	3.1	3.4	4.2	4.1	2.2

Source: UNIDO database, (PPD/IPP/REG).

This decline in the proportion of manufactured imports has been accompanied by a significant shift in their composition. Particularly noticeable in this context has been a steady, if gradual, rise in the share of capital goods imports as the development of Indonesia's own downstream processing and manufacturing has increased the demand for capital goods needed by these industries and reduced the need to import consumer goods. Processed foods, for example, accounted for 10.8 per cent of the value of all imports in 1975 but less than 2.2 per cent in 1990.

These trends are confirmed by the data in Table II.18, which provide a more detailed breakdown of the composition of manufactured imports by major product groups. While the share of processed food declined, the share of textiles and garments rose, largely as a result of the increased import of cotton yarns and other intermediate textile products by Indonesia's own burgeoning textile and garments industries. Meanwhile, a decline in the share of iron and steel products, representing a variety of finished goods increasingly being manufactured within Indonesia, was more than offset by a sharp rise in the share of machinery and equipment imports from some 44 per cent in 1975 to almost 56 per cent in 1990.

Table II.18. Composition of manufactured imports by major product category, 1975-1990, selected years
(Percentage share)

	1975	1980	1985	1986	1987	1988	1989	1990
Processed foods, beverages, tobacco	11.3	11.4	3.7	3.7	4.0	4.9	4.9	2.6
Textiles and garments	3.7	2.5	1.9	2.3	2.4	3.2	4.6	5.3
Wood products, furniture	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2
Paper, printing, publishing	1.3	1.9	2.1	1.8	1.7	1.4	1.3	1.2
Chemicals	24.6	25.6	28.4	29.3	29.1	28.2	28.2	24.2
Non-metallic minerals	2.2	1.3	2.4	1.7	1.3	1.1	1.4	1.1
Basic metals, iron and steel	12.1	11.8	11.0	9.3	8.7	10.1	9.6	9.4
Machinery and equipment	44.3	44.8	50.0	51.2	52.4	50.7	49.3	55.6
Miscellaneous products	0.3	0.7	0.4	0.6	0.4	0.5	0.6	0.5

Source: UNIDO database, (PPD/IPP/REG).

Exports

The export performance of Indonesia's manufacturing industry has been determined in large part by the industrial policies pursued by the Government of Indonesia. Until the mid-1980s, these policies were aimed primarily at import substitution, as a result of which the share of industrial products in the country's exports increased only very slowly. The collapse of international oil prices in 1985-86 resulted in a sharp re-orientation of industrial policy towards the promotion of manufactured exports. As shown in Table II.19, the impact of this policy shift has been dramatic. From less than 16 per cent in 1975, the contribution of manufactures to Indonesia's total export earnings increased only slowly and fitfully to about 27 per cent in 1985. Since then it has increased sharply and continuously to almost 54 per cent in 1990.

Table II.19. Share of manufactures in total exports, 1975-1990, selected years
(Percentage)

	1975	1980	1985	1986	1987	1988	1989	1990
All manufactures	15.9	18.1	26.8	39.3	42.4	48.7	52.2	53.7
Capital goods	0.5	0.2	0.2	0.4	0.4	0.5	0.8	1.5
Processed food	7.5	7.4	10.0	13.2	11.7	13.6	11.8	10.9

Source: UNIDO database, (PPD/IPP/REG).

The product composition of Indonesia's manufactured exports has likewise experienced a number of significant changes in recent years as a result of the expansion and diversification of the country's export-based manufacturing industry. In particular, the share of processed foods and chemical fertilizers, which constituted the mainstay of Indonesia's manufactured exports in the 1970s and early 1980s, has declined sharply as the range of manufactured exports has increased.

The most significant gains have been made by the textiles and garments industry and the wood processing and furniture industry, which together accounted for almost half of the value of all manufactured exports in 1990. Their dominance is likely to experience a degree of erosion in the coming years, however, as the diversification of manufactured exports continues and such industries as consumer electronics, which are only now being established on a significant scale, gain ground (see Table II.20).

Table II.20. Composition of manufactured exports by major product category, 1975-1990, selected years
(Percentage share)

	1975	1980	1985	1986	1987	1988	1989	1990
Processed foods, beverages and tobacco	47.5	40.7	35.6	33.7	27.7	27.8	22.7	20.2
Textiles and garments	0.6	4.3	11.9	14.6	15.8	17.4	19.6	25.1
Wood products, furniture	0.2	1.9	18.8	19.4	26.4	24.5	23.6	24.3
Paper, printing, publishing	0.8	0.2	0.4	0.6	1.3	1.6	1.6	1.3
Chemicals	37.4	32.5	14.1	17.2	15.4	12.4	13.9	14.9
Non-metallic minerals	0.1	0.8	0.6	1.0	1.4	2.2	2.3	1.7
Basic metals, iron and steel	9.6	15.5	14.2	9.5	9.9	10.2	11.2	6.3
Machinery and equipment	3.7	3.9	3.9	3.1	1.9	2.7	3.6	5.1
Miscellaneous products	0.2	0.1	0.3	0.8	0.3	1.3	1.4	1.2

Source: UNIDO database, (PPD/IPP/REG).

H. INTERNATIONAL COOPERATION FOR INDUSTRIAL DEVELOPMENT

Indonesia has a long standing technical cooperation relationship with the specialized agencies of the United Nations, the bulk of whose assistance is coordinated through the United Nations Development Programme (UNDP). The government's technical cooperation priorities reflect the structure of its overall development programme, which is based on the view that public efforts should be concentrated on infrastructural, agricultural, human resources and regional development. By contrast, the development of manufacturing industry is expected to be funded and executed primarily by the private sector.

Until the mid-1980s, the technical cooperation programmes of the United Nations agencies were structured on a sectoral basis without any specific themes. This structure was adjusted significantly after 1986, however, in line with the reorientation of government policies triggered by the collapse of international oil prices. In particular, these changes involved the introduction of three cross-sectional themes:

- Employment creation, income generation and entrepreneurship development;
- Promotion of non-oil/gas exports; and
- Fulfilling the basic needs of the Indonesian population.[21/]

The Fourth Country Programme for Technical Cooperation with Indonesia, was drawn up by the UNDP and other United Nations agencies to coincide with the country's Fifth National Development Plan (*Repelita V*, April 1989 - March 1994). Its principal aim is to support the government's efforts to achieve the five development objectives set for *Repelita V*, namely:

- poverty alleviation;
- strengthening the economic base of the nation;
- socio-economic and physical infrastructure development;
- environmental protection and management of natural resources; and
- managing development.

As a vehicle for the achievement of these objectives, the government has identified 11 major multisectoral programmes, all of which refer to more than one development objective. These programmes comprise:

- meeting the basic needs of the Indonesian population;
- employment creation;
- promotion of income potentials;
- promotion of entrepreneurship and skills development;
- promotion of non-oil exports;
- technology development;
- infrastructure development;
- enhancement of the environment and natural resources management;
- public sector efficiency;
- social and community participation; and
- regional development.

These objectives and programmes established by the Government of Indonesia have formed the main basis for determining UNIDO's technical assistance activities to the industrial sector during the period of the fourth country programme. A number of projects aiming to meet one or more of the government's objectives have been proposed in this context. These include projects for:

- development of small-scale industries with emphasis on subcontracting linkages;
- domestic processing of natural resources and commodities aimed at increasing domestic value added and export revenues;
- rural industrialization;
- supporting both private and public sector industrial activities;
- technology development and innovation; and
- minimizing the extent of environmental damage resulting from the industrialization process.

UNIDO had ten approved and/or operational technical cooperation projects in Indonesia in early 1993, of which seven were large-scale projects with total budgets of $150,000 or more. Two of these had budgets of more than $1 million, these can be seen in Annex Table A-32.

NOTES TO CHAPTER II

1/ The very concept of economic dualism was devised in reference to the situation prevailing in pre-independence Indonesia by Boeke, a one-time Dutch colonial civil servant based in the then Dutch East Indies. For critical reviews of Boeke's theories see Higgins, B.H., "The 'Dualistic Theory' of Underdeveloped Areas", *Economic Development and Cultural Change*, vol. 4, No. 2, January 1956, and Sadli, M., "Reflection on Boeke's Theory of Dualistic Economies", in Glassburner, B., *The Economy of Indonesia - Selected Readings*, Cornell University Press, Ithaca and London, 1971.

2/ Booth, A., and McCawley, P., "The Indonesian Economy Since the Mid-Sixties", in Booth, A., and McCawley, P. (eds.), *The Indonesian Economy During the Soeharto Era*, Oxford University Press, Kuala Lumpur, 1981, Table 1.2, p. 5.

3/ Booth, A., and McCawley, P., "The Indonesian Economy Since the Mid-Sixties", in Booth, A., and McCawley, P. (eds.), *The Indonesian Economy During the Soeharto Era*, Oxford University Press, Kuala Lumpur, 1981, Tables 1.1 and 1.2, pp. 4-5.

4/ Hill, H., "Manufacturing Industry", in Booth, A. (Ed.), *The Oil Boom and After - Indonesian Economic Policy and Performance in the Soeharto Era*, Oxford University Press, Singapore, 1992, p. 209. Hill has pointed out, however, that the share of manufacturing in GDP did not rise appreciably in terms of current prices until the mid-1980s because of "the boom in the oil sector, which squeezed not only the competitiveness of other tradables but also their shares of GDP".

5/ For a comprehensive analysis of Indonesia's industrialization in the 1980s, see Torben M. Roepstorff, "Industrial Development in Indonesia: Performance and Prospects", *Bulletin of Indonesian Economic Studies, Special Issue in honour of Professor H. W. Arndt*, Vol. XXI, No. 1, April 1985; UNIDO Indonesia Industry Sector Study "Prospects for Industrial Development and for a Capital Goods Industry in Indonesia", UNIDO/IS.479 and Add. 1 and 2, 20 July 1984, 3 volumes and UNIDO Industrial Development Review "Indonesia - Changing Industrial Priorities", UNIDO/PPD.60, 29 October 1987.

6/ This point has been made particularly forcefully by Hill, who notes in a recent article that "to speak of the 'industrial sector' as a homogenous entity is clearly misleading". Hill, H., "Manufacturing Industry", in Booth, A. (Ed.), *The Oil Boom and After - Indonesian Economic Policy and Performance in the Soeharto Era*, Oxford University Press, Singapore, 1992, p. 206.

7/ Central Bureau of Statistics, *Statistical Year Book of Indonesia 1991*, Jakarta, 1992, p. 254.

8/ Hill, H., "Indonesia's Industrial Transformation, Part II", *Bulletin of Indonesian Economic Studies*, Vol. 26, No. 3, 1990, p. 87, fn. 31.

9/ Hill, H., "Indonesia's Industrial Transformation, Parts I & II", *Bulletin of Indonesian Economic Studies*, Vol. 26, Nos. 2 and 3, August and December 1990.

10/ The 1986 industrial census in fact refers to 1985 for medium and large scale firms, and to 1986 for small-scale firms. In order to assure comparability, Hill adjusted the data for small-scale enterprises back to 1985 as well (Hill, H., "Indonesia's Industrial Transformation: Part I", *Bulletin of Indonesian Economic Studies*, Vol. 26, No. 2, August 1990, p. 81). The column for the 1986 industrial census in Table II.2 thus refers to 1985.

11/ Central Bureau of Statistics, *Statistical Yearbook 1991*, Table 6.1.1., pp. 260-261.

12/ As in the case of the output data presented in Table II.2 (see note 10), the employment data presented in this table under the 1986 column in this table also refer to 1985.

13/ The employment impact of the Indonesian government's increasing promotion of heavy upstream industries since the mid-1970s became the subject of an interesting debate between analysts of the Indonesian economy in the late 1970s. According to one view, the available data suggested that the rapidly emerging modern medium and large scale industries had generated a substantial growth in employment of more than 11 per cent per annum in 1970-73 and about 8.6 per cent per annum in 1974-77 (McCawley, P., and Tait, M., "New Data on Employment in Manufacturing, 1970-77", *Bulletin of Indonesian Economic Studies*, Vol. XV, No. 1, March 1979, p. 131). This view was contested strongly by other informed analysts of the Indonesian economy, who argued that the medium and large scale industries had only a modest employment impact, and that the bulk of manufacturing employment growth recorded during this period had been attributable to the cottage and small scale industries (Dapice, D., and Snodgrass, D., "Employment in Manufacturing, 1970-77: A Comment", *Bulletin of Indonesian Economic Studies*, Vol. XV, No. 3, November 1979, especially pp. 129-130). Reflecting upon this debate with the benefit of hindsight and the results of the 1986 industrial census a decade later, Hill noted that "it is now clear that this earlier pessimism [as expressed by Dapice and Snodgrass] was not justified. Employment grew rapidly over the period 1975-86, in large and medium and small firms" (Hill, H., "Indonesia's Industrial Transformation: Part I", *Bulletin of Indonesian Economic Studies*, Vol. 26, No. 2, August 1990, p. 91).

14/ The most important weakness of these data arises from the fact that they are derived from random sample surveys conducted at different enterprises and not necessarily at the same time of the year. Consequently, the absolute numbers of workers determined by these surveys fluctuate considerably from year to year, both in overall terms and between categories of educational achievement. By calculating the distribution of the workforce between educational categories for individual years and then comparing these results between years, however, it is possible to arrive at a reasonable approximation of inter-temporal trends.

15/ UNIDO, *Women in Industry - Country Information: Indonesia*, Update September 1992, p. 4.

16/ As noted above, these data refer only to medium and large scale enterprises in the non-oil/gas manufacturing sector.

17/ Hill, H., "Indonesia's Industrial Transformation - Part I", *Bulletin of Indonesian Economic Studies*, Vol. 26, No. 2, page 88.

18/ A number of important Indonesian companies, including the *kretek* cigarette manufacturer PT Perusahaan Rokok Tjap Bentoel, the diversified food processing group PT Mantrust, and the industrial and financial Summa conglomerate. See the Economist Intelligence

Unit, *Country Report: Indonesia*, Nos. 3-1991 (p. 14), 2-1992 (pp. 23-24) and 1-1993 (pp. 21-23).

19/ Hill, H., "Manufacturing Industry", in Booth, A. (ed.), *The Oil Boom and After - Indonesian Economic Policy and Performance in the Soeharto Era*, Oxford University Press, Singapore, 1992, page 231.

20/ Thee Kian Wie and Yoshihara, K., "Foreign and Domestic Capital in Indonesian Industrialization", *Southeast Asian Studies*, Vol. 24, No. 4, 1987, p. 343.

21/ United Nations, Governing Council of the United Nations Development Programme, "Fourth Country Programme for Indonesia", Document No. DP/CP/INS/4, 4 March 1991.

III. INDUSTRIAL BRANCH PROFILES

A. AGRO-INDUSTRIES

STARCHY STAPLE FOODS

The resource base

Of the wide range of agricultural activities practised in Indonesia, smallholder production of staple foods has traditionally been the most important, accounting for more than 60 per cent of total agricultural output for much of the 1980s. The principal food crop produced and consumed in Indonesia is rice, and the country has been essentially self-sufficient in rice since 1985, although modest quantities had to be imported after a severe drought in 1991. Other staple foods produced and consumed in substantial quantities include maize, cassava, sweet potatoes and sago, of which the last plays a particularly important role in the eastern islands of Indonesia. Demand for wheat has risen steadily since the mid-1960s, but has been met almost entirely by imports as domestic production capacity has remained negligible (see Table III.1).

Table III.1. Production of starchy staple foods,[a/] 1970-1991, selected years
(Thousand tonnes)

	1970	1975	1980	1985	1988	1989	1990	1991[b/]
Rice[c/]	23.4	29.2	29.7	39.0	41.7	44.7	45.2	44.3
Maize[d/]	2.8	2.9	4.0	4.3	6.7	6.2	6.7	6.2
Cassava[e/]	10.5	12.5	13.7	14.1	15.5	17.1	15.8	15.8
Sweet potatoes[e/]	2.2	2.4	2.1	2.2	2.2	2.2	2.0	2.0

Source: Government of Indonesia, Central Bureau of Statistics, *Indikator Ekonomi*, various issues.

a/ Data for sago not available.
b/ Estimate.
c/ Threshed, unhusked.
d/ Shelled.
e/ Roots.

RICE

Past trends

The importance of rice production and consumption in Indonesia has ensured that rice milling has historically been one of the country's most important agro-industrial activities. This process, which involves the separation of the rice kernel from the husk, was traditionally carried out on the smallholdings, mainly by women, with the threshed but unhusked grains being pounded by hand. Within a very short space of time in the early 1970s, however, these traditional hand pounding techniques were displaced almost entirely by the widespread introduction of mechanized milling facilities in all of the major rice producing regions of Indonesia.[1/] Most of these mills are relatively small in scale and use comparatively simple technology. They are located mainly in rural areas, and operated by small local entrepreneurs or cooperatives. With rice continuing to be consumed mainly as a grain, further processing into flour, noodles or confectionery is extremely limited.

Constraints and prospects

Because of the relatively simple processing technologies employed by the bulk of the Indonesian rice milling industry, the technical quality of domestically milled rice tends to be comparatively low. Rice milled in Indonesia has, for example, traditionally had a significantly higher proportion of broken grains, discoloured grains and foreign matter than rice milled in Thailand. Since almost all of the locally produced rice is consumed within Indonesia, however, where much greater emphasis is placed on variety and taste than on milling quality, its poor technical specifications do not constitute a major constraint to the future growth of the industry.[2/] With rice being almost certain to remain the preferred staple of the vast majority of the Indonesian population for the foreseeable future, and with the population itself continuing to grow at an annual rate of some 1.6 per cent, the prospects for the rice milling industry remain favourable.

CASSAVA

Past trends

Cassava is of secondary importance as a staple food within Indonesia, and is consumed mainly in the form of tapioca flour or light snacks such as cassava crackers. However, it emerged as a significant export product during the 1980s (see Table III.2), with progressively greater volumes of cassava chips and pellets being shipped abroad. The European Community (EC) provides the main market for these exports, which are used as an input in the manufacture of animal feed. The domestic processing activities vary from product to product, but are relatively uncomplicated in overall terms, comprising such tasks as peeling, washing, boiling, pounding or grinding, sun-drying and, in the case of pellets, compressing. While the manufacture of tapioca flour and its further processing into chips and pellets is largely mechanized, the production of simple foods such as cassava crackers continues to be based in household enterprises relying almost exclusively on manual labour.

Constraints and prospects

The growing external demand for cassava products augurs well for a continued rapid development of the cassava processing industry. Although exports to the biggest market, the EC, are limited by quota, the prevailing quota of 825,000 tonnes has usually been well in excess of Indonesia's realized exports to the EC, and has not yet begun to act as a serious constraint. Preparing itself

for the time when this quota may become an obstacle, the Indonesian cassava industry has begun to explore other markets, including China and the Republic of Korea, which in 1989 accounted for some two-thirds of Indonesia's total shipments of 1.15 million tonnes.

The growth of the cassava processing industry will also be supported by further increases in the domestic utilization of cassava for purposes other than direct consumption. A highly versatile plant, cassava can yield a variety of products, including dextrin, fructose, ethanol and organic acids, the need for which will increase as Indonesia's food and chemical industries expand. Since cassava is propagated simply by planting stem cuttings, and since Indonesia has vast areas of suitable land not yet planted to the crop, the growth of the industry will also not be hampered by supply constraints.

Table III.2. Exports of cassava-based products, 1986-1991
(Thousand tonnes)

	1986	1987	1988	1989	1990	1991
Tapioca chips	205.0	451.4	583.9	833.9	465.5	..
Tapioca pellets	219.6	331.7	502.1	310.3	346.5	..
Others	-	-	-	1.7	0.3	..
Total[a/]	**424.6**	**783.1**	**1,086.1**	**1,145.9**	**812.2**	**1,019.2**[b/]

Sources: Government of Indonesia. Central Bureau of Statistics. *Indikator Ekonomi*, various issues. Figures for 1991 total from Department of Agriculture, Jakarta.

a/ Totals may not add due to rounding.
b/ Estimate.

SAGO

Past trends

Another staple food to receive increased recognition in recent years is sago, which is initially processed into flour for cooking and further industrial processing. Though found in many parts of Indonesia, this commodity forms an important part of the popular diet only in the eastern islands, and in the province of Maiuku in particular, where it used to be obtained almost exclusively from wild growing stands of the sago palm and converted into flour by means of traditional processing methods. Industrial processing is at present still conducted on a comparatively small scale, with the latest available data showing that Indonesia had 446 enterprises producing sago flour or starch, with a total annual capacity of approximately 48,600 tonnes, in mid-1992 (see Table III.3).

Since 1990, however, the Government of Indonesia has actively promoted the commercial cultivation and processing of sago as an alternative to other more costly staples such as rice and wheat, and as a raw material for the manufacture of a variety of products, including fructose, maltose, glucose, dextrine, alcohol, ethanol, monosodium glutamate, plywood adhesives, textiles and paper. Several large-scale firms have already been set up to exploit Indonesia's sago

resources, both through the utilization of existing stands of natural sago forests and the planting of sago estates. The most important of these are the State-owned Inhutani I forestry corporation, which is pioneering the development of industrial sago processing in Maluku, and the privately owned firms PT Sagindo Sari Lestari and PT Sagu Sari, which are doing the same in Irian Jaya and West Kalimantan, respectively.

Constraints and prospects

Prospects for sago processing are similarly bright. The government's recent initiative to promote the large-scale commercial exploitation of Indonesia's extensive sago resources has attracted a strong response from the country's business community. A study published in mid-1992 indicated, for example, that 13 large companies had been licensed to operate in Irian Jaya alone in 1990-1991.[3/] The same study provides an indication of the industry's future potential by reference to its recent growth in Malaysia, where the modernization and expansion of processing plants resulted in the volume of flour increasing from 53,000 tonnes in 1984 to 85,000 tonnes in 1988, and where sago flour has become an important input for the production of noodles, monosodium glutamate, glucose, maltose and dextrose.

Table III.3. Sago processing industry, 1992

Location	Number of enterprises	Capacity tonnes/year
Riau	92	39,020
Maluku	92	4,620
West Kalimantan	36	1,749
North Sulawesi	81	1,317
Lampung	2	922
South Kalimantan	50	684
South Sulawesi	80	157
East Kalimantan	7	79
Irian Jaya	3	75
South Sumatra	1	75
South-east Sulawesi	2	24
Total	**446**	**48,622**

Source. Cengkawak, Suteja, "In Sago Business, Indonesia Makes One Step, Malaysia Makes Great Strides", *Business News*, No. 5270, 12 June 1992, Jakarta

MAIZE AND SWEET POTATOES

Past trends

The other two principal starchy staples produced in Indonesia, maize and sweet potatoes, are grown primarily for domestic consumption. The bulk of the maize produced in the country is eaten on the cob without any significant processing, although modest quantities are also utilized for the production of corn-meal, corn-oil and maize-based animal feeds. Sweet potatoes are likewise eaten mainly without any further processing except peeling and cooking in the home, with only a small amount of domestic production being converted into pre-processed snacks, usually in small-scale household enterprises.

Constraints and prospects

Since both maize and sweet potatoes enjoy only a limited consumer appeal in Indonesia, where they are regarded as inferior food staples, it appears unlikely that domestic demand will rise sufficiently in the foreseeable future to induce a marked increase in the production and processing of these foods. Some increase may, however, be expected in the demand for commercially produced snacks, such as chips and popcorn, as a result of the spread of foreign cultural influences, especially in the major urban areas. Farther afield, there may be some scope for the export-oriented production of foods and feeds based on maize and sweet potatoes, but this has not yet been explored or identified to any significant degree.

WHEAT-BASED PRODUCTS

Past trends

Rising income levels have resulted in a significant increase in demand for wheat-based products, such as bread, biscuits and noodles, especially in the urban areas of Indonesia. Since virtually no wheat is grown in Indonesia, this growth in demand is highlighted by the expansion of imports since the 1970s, from negligible amounts of wheat grain and 355,000 tonnes of wheat flour in 1970 to 2.2 million tonnes of wheat grain and an additional 52,000 tonnes of wheat flour in 1991. This shift in the balance of imports between grain and flour also illustrates the growing capacity of the domestic flour milling industry, which is dominated by PT Bogasari Flour Mills, a company belonging to the large Salim conglomerate.

The steady expansion of the domestic flour milling capacity has been accompanied by a corresponding growth in downstream processing activities, including the production of bread, biscuits, pasta and instant noodles. While bread is mainly produced and sold fresh by a variety of local bakeries, ownership of the other branches of the wheat-based food industry is highly concentrated in a relatively small number of business groups. The largest of these are the Indofood group (also part of the Salim conglomerate), which has been particularly active in the production of pasta and noodles, and the Khong Guan group, which dominates the biscuit industry.

The production of instant noodles has increased particularly rapidly in recent years, with the total volume of output growing at an average annual rate of 11.3 per cent from 883.2 million packs (of 75-85 grammes each) in 1985 to almost 1.4 billion packs in 1990. During the same period the volume of exports has risen from negligible levels to almost 40 million packs worth $3.2 million.[4] Biscuit production, which has its origins in the establishment of the PT Khong Guan Biskuit Factory Industries Ltd in Surabaya in 1956, has also grown rapidly in the past five years from 37,500 tonnes in 1986 to 50,500 tonnes in 1991. The bulk of this output is consumed domestically, however, with exports amounting to less than 2,400 tonnes in 1991.[5]

Constraints and prospects

The continuing growth of demand for high-quality foods based on wheat will also prompt a further expansion of the wheat processing industry. Particularly rapid growth is likely to be achieved in the higher-value-added downstream branches of the industry involved in the production of biscuits and pasta-type foods, including instant noodles, which have already attracted considerable investor interest in recent years. The growth of these industries will be further supported by an increased penetration of export markets, as indicated by a recently established macaroni plant with an annual capacity of 55,800 tonnes, of which more than 53,000 tonnes are earmarked for export.[6]

FRUIT AND VEGETABLES

The resource base

In view of its equatorial location and its varied topography, Indonesia has the capacity to produce a wide range of tropical and temperate fruits. These include a variety of citrus fruits, lychees and rambutans, melons and mangoes, pineapples and paw paws, and even strawberries. In addition, the country also produces a range of vegetables.

Past trends

The local marketing system for fruits and vegetables remains embryonic, and by far the largest proportion of Indonesian fruits and vegetables are consumed fresh. Rising incomes and changing life styles, especially in urban areas, are beginning to generate a growing demand for prepared foods, however, including canned and frozen fruits and vegetables as well as jams and juices. Responding to this growth in domestic demand, and to a recognition of the strong demand for many such products in overseas markets, many Indonesian business groups have entered the field of preserving and marketing fruits and vegetables in recent years.

The fruit canning industry has attracted particularly strong investment interest, which has enabled it to record an average annual rate of production growth of 4 per cent since the mid-1980s. The industry has a strong export orientation (see Table III.4), with the proportion of total output shipped abroad having risen from 27 per cent in 1987 to 64 per cent in 1991. Its main output is canned pineapple, although it also processes a variety of other fruits.[7/]

Table III.4. Canned fruit production and exports, 1987-1991
(Thousand tonnes)

	1987	1988	1989	1990	1991
Production	75.3	83.6	85.5	86.5	87.2
Exports	27.0	27.7	48.4	48.8	63.9
Exports as per cent of production	35.9	33.1	56.6	56.4	73.3

Source: "Canned Fruit Industry has Good Prospects of Growth", *Indonesian Commercial Newsletter*, No. 103, 13 July 1992, Jakarta.

The vegetable canning industry is devoted primarily to the production of canned mushrooms, of which Indonesia is becoming a major producer. The total production capacity of the mushroom canning industry amounted to more than 90,000 tonnes per year in 1990, and is continuing to expand rapidly. In 1991 alone, the BKPM licensed six investment projects in the mushroom canning industry with a total capacity of more than 35,600 tonnes per year. Meanwhile, entrepreneurs are also beginning to turn their attention to other vegetables, such as asparagus and baby corn. As these newer industries have been developed, so the share of canned mushroom exports in total exports of canned vegetables has declined from almost 97 per cent in 1985 to less than 40 per cent in 1989 (see Table III.5).[8/]

Table III.5. Exports of canned mushrooms, 1985-1990

Year	Thousand tonnes	Per cent of total canned vegetable exports
1985	0.2	96.9
1986	1.9	98.2
1987	2.3	90.7
1988	1.9	36.5
1989	3.6	39.2
1990	5.7	..

Sources: "Food Canning Industry: Condition and Prospects", *Indonesian Commercial Newsletter*, No. 66, 24 December 1990, Jakarta.
"Indonesia has the Potential to be a Mushroom Supplier", *Indonesian Commercial Newsletter*, No. 88, 25 November 1991.

Constraints and prospects

The principal constraint facing the Indonesian fruit and vegetable canning industry is the uncertain availability of appropriate raw materials. While Indonesia is able to produce a diversity of crops suitable for canning, the essentially small-scale nature of much of this production by peasant farmers renders it difficult for canners to obtain fresh fruits and vegetables of a sufficiently and consistently high quality. The problem is exacerbated by the remoteness of many cultivation sites, and the absence of an adequate transport infrastructure for the efficient movement of highly perishable produce.

These supply problems represent a particularly significant constraint in the case of export-oriented canning operations, where product quality is a prime consideration. Frequently, these problems can only be overcome by a high degree of vertical integration, with canning enterprises having to maintain their own plantations in order to ensure an adequate and uninterrupted supply of raw materials. This approach has been adopted by several major canneries in Indonesia, especially those producing pineapples and mushrooms.

If the problems associated with the supply of raw materials can be resolved, the prospects for the fruit and vegetable canning industry appear extremely bright. Considerable export potential still remains in a number of external markets, including the EC, Japan and the United States. In addition, several of Indonesia's regional competitors, such as Thailand and the Philippines, are beginning to experience land shortages and rising labour costs, thereby providing Indonesia with an opportunity to increase its share of markets traditionally supplied by these competitors. The industry itself has considerable excess capacity, which could permit a rapid expansion of output as new market opportunities are realized.

ANNUAL AND PERENNIAL CASH CROPS

The resource base

Although starchy staple foods account for some two-thirds of total agricultural output in Indonesia, the country also produces a wide variety of food and non-food cash crops, including palm oil,

coconuts, soya beans, groundnuts, coffee, tea, cocoa, sugar, spices (especially pepper, cloves and nutmeg), rubber and tobacco. These are grown both by smallholders and by publicly or privately owned estates, with cash crops produced by smallholders accounting for an average of 12-14 per cent of total agricultural production during the past ten years, and those produced by agricultural estates rising from about 2 per cent to about 4 per cent of agricultural output during this period. With the exception of sugar, these crops are produced predominantly for export, and Indonesia is a leading supplier of many of them on world markets. Indonesia's production of sugar cane, though substantial, still needs to be supplemented with imports to cover domestic requirements.

Past trends

Despite year to year fluctuations caused by climatic conditions and changes in the market environment, a dramatic increase has been witnessed in the production of most major cash crops since the 1970s. This has been accomplished both by an expansion of planted area and the use of higher yielding plant varieties. It has also been accompanied by efforts to enhance the quality of smallholder production, primarily through the promotion of nucleus estate and smallholder (NES) schemes, whereby estates are required to provide surrounding smallholders with a variety of land clearing, extension, technical and marketing services (see Table III.6).

Table III.6. Production of cash crops, 1970-1991, selected years
(Thousand tonnes)

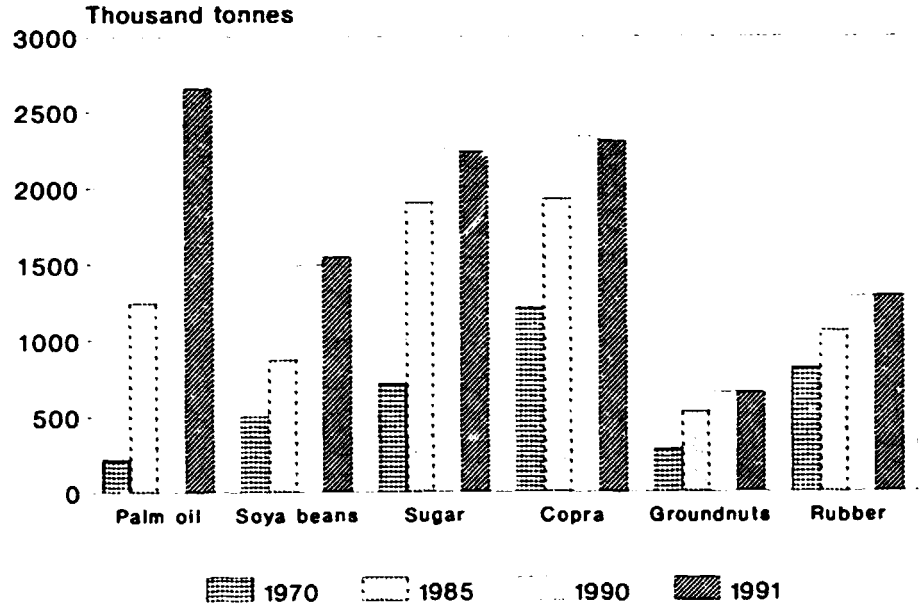
	1970	1975	1980	1985	1988	1989	1990	1991[a/]
Palm oil	216	411	701	1,243	1,800	1,965	2,413	2,658
Palm kernels	48	83	126	258	360	393	504	551
Copra	1,208	1,391	1,759	1,920	2,139	2,208	2,332	2,305
Soya beans	498	590	653	870	1,270	1,315	1,487	1,541
Groundnuts	281	380	470	528	589	620	651	646
Coffee	186	171	285	311	386	401	413	419
Tea	63	69	106	127	137	141	155	158
Cocoa	2	4	16	45	102	120	155	180
Sugar[b/]	713	1,030	1,249	1,899	2,004	2,108	2,256	2,233
Pepper[c/]	17	23	37	41	56	68	70	71
Cloves	15	19	39	42	61	65	66	84
Nutmeg	9	14	18	14	15	15	..	..
Rubber	809	787	1,002	1,055	1,176	1,209	1,275	1,284
Tobacco	75	93	116	161	116	81	156	101

Sources: Government of Indonesia, Central Bureau of Statistics, *Indikator Ekonomi*, various issues; Supplement to the President's Report to Parliament, 15 August 1992; Bank Indonesia Annual Reports, various issues.

a/ Estimate.
b/ Granulated.
c/ Black and white.

Most cash crops were originally grown almost entirely for export as raw materials, with only the most rudimentary of primary processing being performed within Indonesia. More recently, however, there has been a marked shift towards the establishment of associated downstream manufacturing industries and the increased addition of domestic value to Indonesia's cash-crop based exports. This trend has been actively encouraged by the government, which regards the promotion of resource based manufacturing as one of the principal objectives of its industrial policy.

Fig. III.A. Production of selected cash crops, 1970-1991, selected years



OILSEEDS

Past trends

The production of oils and oilseeds, comprising mainly palm oil, coconut oil, soya beans and groundnuts, expanded particularly rapidly. Oil palms are cultivated mainly on large-scale estates, both publicly and privately owned, or on surrounding smallholder plots linked to the estates through an NES relationship. Coconut palms, soya beans and groundnuts, by contrast, are grown mainly on smallholdings. While the fruits of the oil palm are used almost exclusively for the production of oil, the other three major oilseeds grown in Indonesia have a much wider range of applications. Coconuts, for example, can be consumed fresh or processed into copra, desiccated coconut, coconut milk and coconut meat in addition to coconut oil, and also provide coconut water, and fibre. Soya beans and groundnuts, meanwhile, are not generally used as a raw material for oil in Indonesia, but are processed into a variety of meals and snacks, which are consumed almost entirely within the country. In addition, soya beans can also be processed into such products as soya bean cake, which constitutes an important input for the expanding domestic animal feed industry, and soya bean milk, which the Swiss dairy products manufacturer Nestlé is planning to produce in East Java from the end of 1993.[9/]

The large oil palm estates are usually equipped with integrated crushing facilities to produce crude palm oil (CPO) and palm kernel oil (PKO). The latest available data show that 104 palm oil mills with a combined processing capacity of 3,888 tonnes of fresh oil palm fruits per hour were in operation, and another 22 plants with a total capacity of 595 tonnes per hour under construction, in Indonesia in 1991.[10/] By contrast, the number of palm oil mills at the end of the Third Five-

Year Plan, *Repelita III*, in March 1984 amounted to only 47, with a total capacity of 1,160 tonnes per hour.[11] Primary processing of coconut, on the other hand, is to a large extent still conducted as a cottage industry by a large number of mills dispersed widely in the coconut growing regions of Indonesia. The main output of these processing units is crude coconut oil (CCO), although they also produce desiccated coconut, coconut water, coconut milk and coconut meat.

Under an arrangement in force until 1978, Indonesia's output of CCO was used almost entirely for the domestic production of cooking oil for local consumption. The inability of coconut oil production to keep pace with the growth in demand for cooking oil gave rise to the need for the supplies of CCO to the domestic cooking oil industry to be supplemented by additional deliveries of CPO and PKO. This, in turn, resulted in the introduction of a number of controls on the marketing of CPO and PKO with effect from 1 January 1979 in order to ensure the availability of an adequate supply of raw materials at politically acceptable prices to the cooking oil industry. These were not lifted until June 1991, when the trade in palm oil was liberalized as part of a general package of economic deregulation.[12]

The imposition of trade controls on palm oil and palm kernel oil in 1979 resulted in a significant diversion of trade in these products. From having originally been intended primarily as export products, they now began to be sold mainly in the domestic market, and exports invariably accounted for less than 50 per cent of total production between 1980 and 1990. As a corollary of these developments, Indonesia's capacity to process CPO and PKO into edible cooking oil increased rapidly from negligible levels in the late 1970s to 600,000-800,000 tonnes annually by the early 1990s.[13]

Even though a substantial proportion of Indonesia's production of oil palm and coconut products is absorbed in the domestic market, considerable quantities have nevertheless continued to be exported as well. The EC countries constitute the most important market for these exports, with Germany, Italy, the Netherlands, and the United Kingdom alone accounting for almost 70 per cent of Indonesia's total exports of CPO in 1990, and France, Portugal and Spain also importing significant quantities (see Table III.7). In order to exploit the promising market opportunities in west, south, central and north Asia, Indonesian entrepreneurs involved in the production of CPO have begun to offer to build CPO processing plants in several countries in these regions, including China, India and Saudi Arabia.

Constraints and prospects

The already large and growing domestic demand for CCO and CPO based cooking oils, which has made Indonesia the world's largest consumer of both coconut oil and palm oil,[14] provides the Indonesian oilseed processing industry with a solid base for expansion. The fact that the vast bulk of domestic absorption of these products is still accounted for by the cooking oil industry, the output of which had increased to 1.1 million tonnes by 1987 and has expanded at an annual average rate of 6.4 per cent since then to 1.5 million tonnes in 1991,[15] also provides it with a considerable potential for diversification. Through further processing, both CCO and CPO can be made to yield industrial lubricants, margarine, shortening, and a variety of oleochemicals, including glycerin, fatty acids, fatty alcohol, detergents, surfactants and soap. Indonesia's industrial capacity for the manufacture of these products remains comparatively small, and capable of considerable expansion.

The export prospects for CCO and CPO are more uncertain. The effects of the normal interplay of supply and demand in international markets are reinforced by the existence of a wide range of competing vegetable oils and animal fats, resulting in a high degree of price volatility. The situation is exacerbated by occasional attempts by major competitors and potential consumers such

as the United States and the EC to restrict imports into their own markets,[16] and by their widespread subsidization of their own oilseed exports to third-country markets. The potential for a significant expansion of exports nevertheless exists, especially within the Asian region, and is being enhanced by the willingness of Indonesian CPO exporters to establish plants for the further processing of CPO in a number of importing countries.

While the volatility of international prices poses a possible threat to the further development of the Indonesian oilseed processing industry, the extent of this threat appears modest. According to recent estimates, Indonesia's costs of production for CPO are lower than those of any of its major competitors,[17] primarily as a result of the low labour costs prevailing in the country. This allows the Indonesian industry to remain profitable even at relatively low product prices. Though reliable data are lacking, the same is probably also true for the CCO industry in view of the fact that coconut cultivation is almost entirely in the hands of smallholders and the primary processing of coconuts is carried out mainly in small-scale local enterprises.

Recognizing the favourable prospects for the palm oil industry in particular, private investors are continuing to come forward in large numbers to establish oil palm plantations and palm oil processing plants. In the first six months of 1992 the BKPM licensed eight integrated projects involving the establishment of oil palm plantations and palm oil mills. While most of these projects are concerned only with the manufacture of CPO and PKO, two of them also propose the further processing of these products into olein, stearin and fatty acids.

Table III.7. Exports of oil palm and coconut products, 1985-1990
(Thousand tonnes)

	1985	1986	1987	1988	1989	1990
Crude palm oil	518.8	566.9	551.1	731.1	781.8	815.0
Palm kernel oil	..	41.9	87.3	121.7	135.4	155.3
Copra	5.0	-	-	-	4.0	-
Coconut oil	192.1	5.5	118.4	206.6	191.6	210.0
Desiccated coconut	5.8	0.3	2.4	3.8	0.5	1.5
Coconut residue/meat	381.4	380.5	381.5	387.1	311.1	385.0

Sources: CPO and PKO from Central Bureau of Statistics, various publications. Coconut products from "Very Low Income for Coconut Growers Compared with Earnings From Other Crop Culture", *Business News*, No. 5103, 10 May 1991, Jakarta.

BEVERAGE CROPS

Past trends

Rapid rates of output growth since the 1970s have resulted in Indonesia becoming a leading producer of the three major beverage crops - tea, coffee and cacao. While tea and coffee have a relatively long history in the country, only the former was cultivated on a significant scale until the early 1970s,[18] with the expansion of the latter having been largely a phenomenon of the late 1970s and 1980s in response to the strengthening of international coffee prices following harvest failures in Brazil in the mid-1970s. Cacao also began to be cultivated on a large scale after the mid-1970s, but output has increased dramatically in subsequent years.

The bulk of Indonesia's production of these crops is exported with only minimal domestic processing. Increasingly, however, rising domestic incomes and changes in popular tastes are generating an increase in domestic demand for these products. This, in turn, is stimulating the development of downstream industries covering all stages of processing and marketing to the retail level. Indonesian supermarkets now stock extensive ranges of domestically produced tea and coffee processed in a wide variety of ways. The cacao processing industry has grown at a particularly rapid rate in recent years, with output of processed cocoa products (including snacks) increasing from less than 29,800 tonnes in 1987 to more than 53,800 tonnes in 1991. This growth in the processing industry is also being reflected in an increase in processed exports, with the share of cocoa paste, cocoa butter, cocoa powder and other processed cocoa products rising from 9.1 per cent in 1987 to 13.3 per cent in 1991.

Table III.8. Exports of cacao beans and processed cocoa, 1987-1991
(Tonnes)

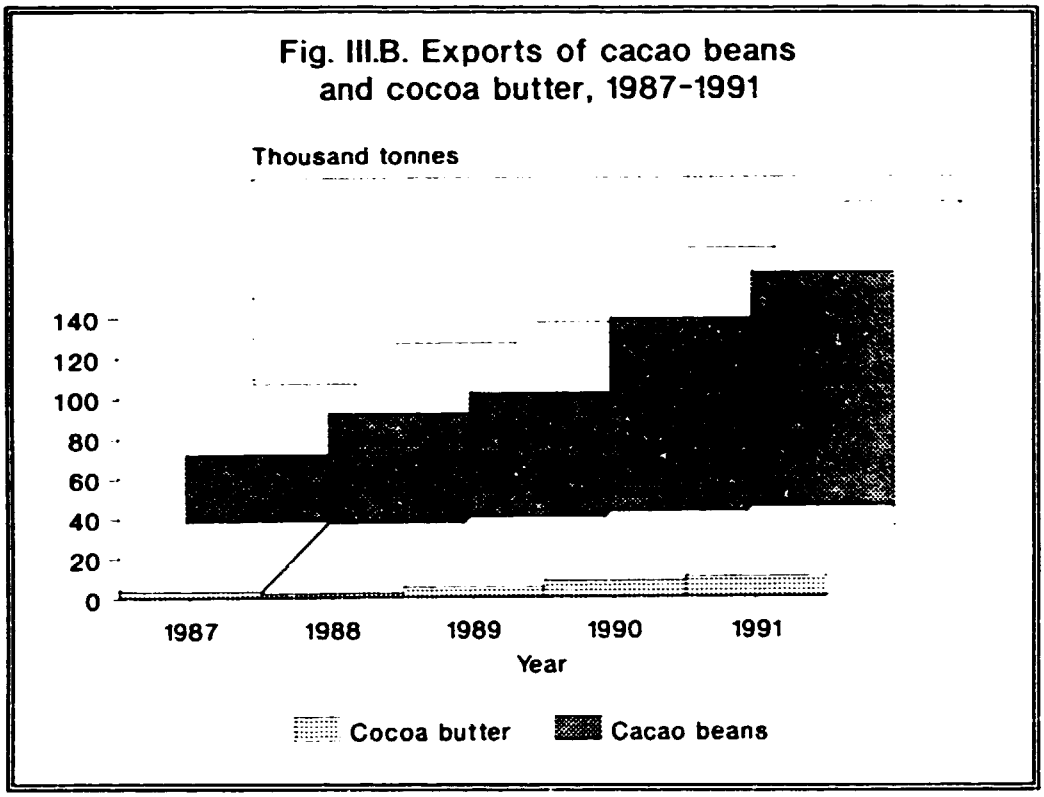
	1987	1988	1989	1990	1991
Forms of cacao:					
Cacao beans	37,170	57,357	67,588	104,470	127,064
Cocoa paste	-	-	571	569	376
Cocoa butter	3,668	3,617	5,516	8,440	10,509
Cocoa powder	15	300	459	332	2,058
Others	43	236	2,226	5,941	6,578
Total	**40,954**	**61,510**	**76,000**	**119,725**	**146,585**

Source: "Condition and Prospects of Indonesian Cacao Industry", *Indonesian Commercial Newsletter*, No. 107, 14 September 1992, Table 7.

Constraints and prospects

The growth of Indonesia's tea and coffee production is likely to be constrained in the short term by uncertain price prospects in international markets and the relatively poor quality of the Indonesian products, with tea produced in Indonesia generally being regarded as inferior in taste to that produced in India and Sri Lanka, and the demand for coffee in major consumer markets shifting increasingly from the robusta varieties produced in Indonesia to the mild arabica varieties produced in South America and parts of East Africa. Growing domestic consumption will stimulate an increased demand for such products as tea bags and instant coffee, however, and will support the continued expansion of local processing industries for these crops.

The outlook for cacao is significantly more favourable, with continuing increases in demand projected for both the domestic and the export markets.[19] This ongoing growth in demand will help to fuel the further expansion of cacao production into the foreseeable future. This is underlined by the fact that the BKPM licensed no fewer than 13 major investment projects in cacao plantations with a total capacity of almost 54,400 tonnes per year in the 18 months to July 1992. The trend towards increased domestic processing is also being sustained, with nine investment projects in the cacao processing industry having been approved by the BKPM during the same period. These projects will have a combined annual production capacity of almost 112,700 tonnes of cocoa butter, 9,372 tonnes of cocoa powder, and 1,200 tonnes of cocoa oil.



SUGAR

Past trends

The cultivation of sugar cane and its milling into granulated sugar has a long history in Indonesia, with the sugar industry having been a particular mainstay of the Indonesian economy during the colonial period. Even after Indonesia gained Independence, the cultivation and refining of sugar continued to be dominated by commercial firms from the Netherlands until 1957, when these enterprises were nationalized by the Government of Indonesia and reconstituted as State plantation companies.[20/] State intervention in the sugar industry continued even after the establishment of the *New Order* government, which has assigned the national logistics agency BULOG the task of regulating the domestic market for sugar and imposed a wide variety of surcharges and levies on the production and marketing of sugar.

A further significant change in the structure of the sugar industry took place after 1975, when the government initiated a programme to promote smallholder cultivation of sugar cane.[21/] This programme, known after its Indonesian initials as TRI (Tebu Rakyat Intensifikasi), has proved very successful, and attracted large numbers of small farmers, especially in Java, into the sugar industry. By 1990 the proportion of smallholder sugar acreage had risen to almost 70 per cent of the total area planted to sugar, with State-owned plantations accounting for approximately 22 per cent of the total and privately owned plantations for the remaining 8 per cent.

The high degree of government intervention in the sugar industry has not been entirely beneficial. The price controls and marketing regulations imposed on the industry have deterred a significant involvement by medium and large-scale investors in the industry, while the State-owned plantations

and associated milling enterprises have been operated at less than optimum efficiency. According to data published by the Indonesian Sugar Council (Dewan Gula Indonesia, DGI), there were 68 sugar mills in operation in 1991, of which 58 were operated by State plantation companies. Much of this existing sugar milling capacity has not been upgraded since Indonesia gained Independence, and is now obsolescent.[22]

The shift towards increased smallholder cultivation, and the resulting increase in the use of marginal land and sub-optimal cultivation practices, has combined with the decline in the efficiency of the sugar milling equipment to cause a sharp fall in yield rates. Whereas yields of granulated sugar averaged 9.7 tonnes per hectare between 1970 and 1976,[23] the data in Table III.9 show that they fluctuated between 5.5 and 6.5 tonnes per hectare between 1986 and 1991. In spite of an average annual increase of approximately 2.3 per cent in planted area from some 325,700 hectares in 1986 to 364,300 hectares in 1991, the output of granulated sugar consequently increased by an average of only 2.1 per cent per annum during the same period, from 2.01 million tonnes to 2.23 million tonnes.

Table III.9. Area, production and yield of cane sugar, 1986-1991

	1986	1987	1988	1989	1990	1991
Area (Thousand hectares)	325.7	334.9	365.5	357.8	363.4	364.3
Production (Thousand tonnes)	2,012.8	2,175.9	2,004.1	2,108.3	2,255.7	2,233.2
Yield (Kilo/hectare)	6.2	6.5	5.5	5.9	6.2	6.1

Sources: "National Sugar Production Still Low", *Indonesian Commercial Newsletter*, No. 85, 14 October 1991, Jakarta, Tables 1 and 2, pp. 54-55.
"Development of Sugar Industry", *Indonesian Commercial Newsletter*, No. 110, 26 October 1992, Jakarta, Table 2, p. 14.
"High Price of Sugar Caused By Too Many Cost Components, *Indonesian Commercial Newsletter*, No. 109, 12 October 1992, Jakarta, Table 3, p. 37.

One of the principal downstream products of the sugar industry is confectionery, the production of which has increased sharply in recent years. From approximately 28,200 tonnes in 1986, commercial production of confectionery rose to 45,300 tonnes in 1991, implying an annual average growth rate of 9.9 per cent. This increase in production has been matched by an even more overwhelming surge in exports, the volume of which increased from 78 tonnes to 14,300 tonnes during the same period.[24]

Constraints and prospects

The sugar industry remains constrained by excessive regulation, which is deterring the large-scale new investments needed to upgrade cultivation techniques and modernize the existing milling equipment. The situation is exacerbated by the declining scope for a further expansion of cultivated area on the heavily populated island of Java, which currently accounts for some 70 per cent of Indonesia's total sugar cane acreage, and the lack of suitable soil and manpower resources in many of the outer islands. Against this background, a significant expansion of the sugar industry appears unlikely in the foreseeable future.

Despite these unfavourable prospects, the Government of Indonesia remains committed to the goal of achieving self-sufficiency in sugar. In pursuit of this goal it has initiated a number of measures in the recent past to improve the performance of the State-owned enterprises dominating the sugar milling industry. In January 1991 the government thus announced plans to establish three new sugar mills in South Sulawesi. This was followed in mid-1992 by the announcement of further plans to set up six additional mills in the provinces of Lampung, Southeast Sulawesi and North Sulawesi. Private investment interest has remained very limited, with only four projects having been approved by the BKPM between January 1991 and September 1992.

The outlook for the confectionery business remains promising, however. During 1990 and 1991 seven project proposals for investments in the industry, with a combined capacity of almost 25,000 tonnes per annum, were approved by BKPM. When completed, these plants will increase Indonesia's output of commercially produced confectionery by no less than 55 per cent.

RUBBER

Past trends

Indonesia is the world's third largest producer of natural rubber, having been edged out of second place only in 1990, when it was overtaken by Thailand. Production is dominated by smallholders, who in 1990 accounted for 71.4 of total output, with State-owned plantations accounting for a further 17.3 per cent and private plantations for the remaining 11.3 per cent.[25] Almost 85 per cent of the country's output is exported as crude rubber with only minimal processing.

Unlike Malaysia and Thailand, where smallholder producers have received considerable technical and financial assistance from the governments, and where extensive replanting with high yielding varieties has been undertaken, the smallholder producers in Indonesia have received relatively little official support. Latex yields are consequently much lower in Indonesian smallholdings than in those of other South-East Asian producing countries,[26] and the field coagulum produced by Indonesian smallholders is also generally of low quality. In particular, it contains excessive quantities of such impurities as twigs, wood chips, leaves and earth.

Until the late 1960s much of this smallholder product was processed further by smoking houses and remilling plants into a variety of (low) export quality crepes and sheets. Since the early 1970s, however, the low-quality smallholder rubber has been required, by presidential decree, to be processed into crumb rubber conforming to the technical specifications of the Standard Indonesian Rubber (SIR) grading system. This has resulted in a dramatic expansion of crumb rubber factories throughout the rubber producing areas of Indonesia.

The publicly and privately owned rubber estates, on the other hand, are able to apply higher standards of quality control, and therefore tend to produce more valuable varieties of crude rubber. These include latex concentrate and traditional visually graded forms of solid rubber, such as ribbed smoked sheets (RSS) and crepes of various kinds. With smallholders accounting for the vast bulk of Indonesian output, however, the country's exports are dominated by technically specified varieties (see Table III.10).[27]

Further processing of natural rubber into rubber products has traditionally been relatively limited, although there has been a significant expansion of most branches of the rubber products industry in recent years. Consequently, Indonesia now has the capacity to produce a wide range of rubber based goods, including tyres and tubes, hoses and belts, garments and shoes, and gloves and condoms. Most of these industries have been established to play an import-substituting role, although many have also begun to export at least part of their output.

Table III.10. Rubber exports by type and grade, 1985-1990
(Tonnes)

Type and grade	1985	1986	1987	1988	1989	1990
Latex	**35,921**	**43,832**	**43,398**	**49,628**	**33,705**	**31,716**
R S S[a/]	**166,158**	**142,002**	**149,268**	**130,434**	**150,703**	**123,907**
I	145,932	128,846	122,613	109,415	131,560	109,844
II	6,632	5,168	5,242	5,695	6,644	5,350
III	4,129	3,012	4,117	4,300	4,179	2,730
IV	9,465	4,976	17,296	11,024	8,320	5,983
S I R[b/]	**783,440**	**761,817**	**889,065**	**939,524**	**958,890**	**915,293**
5CV	17,695	19,315	19,381	15,793	17,900[c/]	21,986[c/]
5LV	53	32	-	50	-	-
5L	20,762	21,523	21,002	21,953	19,680[d/]	20,240[d/]
	-	-	-	-	3,059[e/]	6,933[e/]
5	3,528	5,553	4,738	4,360	21,012	30,485
10	56,335	62,014	76,876	60,713	70,622	68,093
20	670,865	644,518	762,821	830,054	826,617	767,556
50	14,202	8,862	4,247	6,601	-	-
Pale crepe	**1,651**	**2,400**	**1,894**	**1,917**	**620**	**427**
I	1,627	2,205	1,651	1,387	412	324
II	24	56	96	151	177	90
III	-	139	147	379	31	13
Cuttings	**227**	-	-	-	-	-
A	197	-	-	-	-	-
B	30	-	-	-	-	-
Brown crepe	**12,541**	**7,622**	**7,570**	**8,672**	**6,037**	**3,789**
Blanket C	3,653	2,866	3,230	2,965	2,149	1,682
Remilled 2	-	107	12	117	416	365
Remilled 3	2,817	1,498	1,782	971	377	253
Brown 1x	80	-	-	48	128	-
Brown 2x	2,550	1,651	1,399	1,328	959	267
Brown 3x	3,441	1,500	1,147	3,243	2,008	1,222
Air-dried sheet	**640**	**619**	**1,028**	**1,324**	**766**	**848**
Skimmed rubber	**336**	**387**	**744**	**634**	**1,105**	**1,353**
Grand total	**1,000,914**	**958,679**	**1,092,967**	**1,132,133**	**1,151,826**	**1,077,333**

Source. Government of Indonesia, Central Bureau of Statistics, as cited in Setyawan, T. H., "The role of Natural Rubber in Indonesia", *Business News*, No. 5142, 9 August 1992.

a/ Rubbed smoked sheets.
b/ Standard Indonesian Rubber (technically specified crumb rubber).
c/ 3CV.
d/ 3L.
e/ 3WF.

The tyre industry, comprising manufacturers of tyres and inner tubes for both two-wheeled and four-wheeled vehicles, is the most important domestic user of natural rubber. This is dominated by seven major producers with a combined annual capacity in 1991 of 10,740 car tyres and 12,100 motorcycle tyres.[28/] Production levels have consistently fallen short of capacity, however,

despite a significant increase in output during the past five years. Only a relatively small share of this output is exported, with the volume of exports actually having declined in 1989-1991 in response to weakening world demand and tougher international competition in Indonesia's major export markets in Africa, West, East and South-East Asia, and the United States (see Table III.11).

Table III.11. Production and exports of automotive tyres, 1986-1991
(Million units)

	1986	1987	1988	1989	1990	1991
Production						
Car tyres	4.9	5.2	6.3	7.3	8.2	8.5
Motorcycle tyres	2.2	3.5	3.0	6.0	6.1	6.0
Exports						
Car tyres	0.4	1.1	2.5	2.3	2.2	1.9
Motorcycle tyres	0.3	1.2	2.2	1.5	1.5	1.4

Sources: "Condition and Prospects of Automotive Tire Industry", *Indonesian Commercial Newsletter*, No. 79, 8 July 1991, Jakarta, Tables 3 and 8, pp. 11 and 15.
"Condition and Prospects of Automotive Tire Industry in Indonesia", *Indonesian Commercial Newsletter*, No. 104, 27 July 1992, Jakarta, Tables 2 and 5, pp. 11-14.

The expansion of tyre production over the past few years has been accompanied by a considerable improvement in the quality of the tyres produced, and by a rapid development of an input supply industry. With regard to the former, there has been a steady shift from the production of bias-ply tyres to radial tyres, which require a greater proportion of synthetic rubber. While this still has to be imported, two plants for the production of styrene butadiene rubber have been licensed by the investment authorities, the first of which is scheduled to commence operations in 1993. Several other important inputs, such as tyre cord and carbon black, have also been produced locally since 1985 and 1990, respectively.

The second most important rubber based industry, which has emerged relatively recently, is the sports shoe industry. This has witnessed a surge in investment since the mid-1980s, with some 190 firms, both domestic and foreign, having been licensed to establish manufacturing plants with a combined annual capacity of almost 570 million pairs of shoes between 1986 and 1991. The result has been a dramatic increase in output from 33.3 million pairs in 1985 to 165.3 million pairs in 1991, implying an annual average growth rate of 30.3 per cent. A substantial proportion of this output is intended for the export market, as a result of which Indonesia's exports of sports shoes have risen similarly sharply from 1.9 million pairs in 1985 to 114.7 million pairs in 1991.[29/]

Another relatively recent phenomenon has been the development of the latex-based dipped-goods industry producing medical gloves and condoms. This industry received a strong boost in the late 1980s as a result of the accelerating spread of the human immunodeficiency virus (HIV) which leads to AIDS, and the recognition that rubber gloves and condoms constituted effective barriers to infection. Its further progress has been patchy, however, as strong external competition has forced it to consolidate its operations and seek government support

The rubber gloves industry expanded particularly rapidly at the end of the 1980s, with some 100 companies applying for investment licences to produce surgical and examination gloves in 1988/89. Even though only about 40 of these firms actually established manufacturing plants, Indonesia's production of rubber gloves expanded from approximately 900,000 pairs in 1987 to more than 2.2 billion pairs in 1990, while the volume of exports also increased dramatically from 162 tonnes in 1988 to almost 1,000 tonnes in 1990. By this time both the domestic and the international market had become saturated, however, not least because of a similarly rapid expansion of the rubber gloves industry in Malaysia and China. This prompted more than half of Indonesia's rubber glove producers to cease production in 1991, either temporarily or permanently, and investment interest collapsed. Only one project for the manufacture of rubber gloves was thus licensed by the BKPM in 1991, while six projects authorized in 1988 had their licences revoked for not having implemented the projects on schedule.[30]

The Indonesian condom industry is much smaller, comprising two companies with a combined production capacity of about 40 million condoms per year. While this falls well short of the estimated annual domestic demand of 70 million, sharp competition from cheap imported condoms within Indonesia has forced these producers to develop export markets. At the same time, the government has also been prevailed upon to impose a duty of 10 per cent on imported condoms since May 1992.

Constraints and prospects

The development of the rubber industry will continue to be constrained in the foreseeable future by the low quality of smallholder production and widespread inefficiencies in the primary processing of domestically produced rubber. The extent of this problem was highlighted in a statement issued in late October 1991 by the Indonesian Rubber Foundation (Yayasan Karet Indonesia, Yakindo), which noted that Indonesia suffered an annual loss of about Rp 250 billion as a result of such processing inefficiencies.[31] The large-scale investments in extension services, replanting programmes, and equipment modernization required to raise the industry's yield to those prevailing elsewhere in South-East Asia are almost certain to be prevented in the short term by resource constraints, which have themselves been made more acute by the low price levels prevailing in international markets in recent years. Despite its emergence as an exporter in the late 1980s, the Indonesian tyre industry is likely to remain heavily dependent on the domestic market for some time to come, with its international competitiveness being limited by both technical and financial constraints. The widely expected persistence of the high economic growth rates experienced in recent years should ensure a steady expansion of domestic demand, however, and stimulate a continuing rise in output. In view of these generally favourable prospects, investment interest in the tyre industry has remained strong, with several existing manufacturers announcing expansion plans in the past few years and two new firms having obtained permission from the BKPM to establish tyre factories with a combined capacity of 2.7 million units per year.

The outlook for the sports shoe industry also remains favourable. Domestic demand for such shoes, which span a wide spectrum of quality and price, is likely to continue to grow in response to increasing income levels and changing fashions. Export demand is also likely to expand further, since the Indonesian industry's share of the international market amounts to only about 3 per cent at present. With Indonesia's low wages giving it a very strong comparative advantage in this highly labour-intensive industry, investment interest appears likely to remain strong. In the first nine months of 1992 alone BKPM licensed 11 new investors seeking to establish plants with a combined capacity of more than 43 million pairs per annum. This growth is also likely to trigger an expansion in the domestic production of raw materials other than rubber and shoe-making machines, which at present are still imported to a large extent.

The prospects of the dipped goods industry remain mixed. The expansion of the rubber gloves industry is certain to remain constrained in the short term by the excess capacity created in the late 1980s, although scope still exists for some further diversification of its product mix. The condom industry, on the other hand, may still have some scope for expansion in the coming years, in view of its only partial ability to meet domestic demand and its hitherto relatively modest share of export markets.

TOBACCO

Past trends

Indonesia is a significant producer of tobacco, of which a number of different varieties are grown in various parts of the country (see Table III.12). These include several local varieties grown by smallholders, as well as Virginia tobacco grown by both smallholders and estates, and a number of distinctive cigar tobaccos (such as Besuki, Lumajang, Vorstenland and Deli) grown mainly on State-owned estates. Of these, the smallholder tobaccos and estate-grown Virginia are largely absorbed by the domestic cigarette manufacturing industry, while the cigar tobaccos are produced mainly for export after only the most basic of local processing.

Table III.12. Composition of tobacco production, 1985-1991
(Thousand tonnes)

	1985	1986	1987	1988	1989	1990	1991
Smallholder production[a/]	53.0	52.2	63.4	72.5	62.1	88.4	78.6
Estate Virginia	36.8	29.6	25.9	25.8	15.6	31.4	44.6
Cigar tobacco[b/]	24.0	20.1	15.4	10.8	15.5	15.7	16.8
Total[c/]	**113.8**	**101.9**	**104.7**	**109.1**	**93.3**	**135.5**	**140.0**

Source: Government of Indonesia, Department of Agriculture, as cited in "Tobacco Price remains Low, Despite Shrinkage of Plantations", *Business News*, No. 5244, 10 April, 1992, Jakarta.

a/ Virginia and other varieties.
b/ Basuki, Lumajang, Vorstenland and Deli varieties.
c/ Totals inconsistent with CBS data in Table III.6

The Indonesian cigarette industry is highly developed and produces two main varieties of cigarettes, clove-scented *kretek* cigarettes and normal cigarettes, known in Indonesia as *white* cigarettes. Until the mid-1970s, the *kretek* industry was highly labour-intensive, producing only hand-rolled cigarettes and, according to a 1965 estimate, employing 70,000 workers.[32/] It had its origins in a plethora of small-scale enterprises, believed to have numbered more than 1,000 in the early 1960s, scattered throughout the provinces of Central and East Java. By contrast, the *white* cigarette industry was much more highly mechanized from its inception, having to a large extent been established by foreign investors to produce western brands for the Indonesian market. These had a strong appeal among the status conscious urban consumers and consequently accounted for a significant market share variously estimated at 50 per cent to 75 per cent in the 1960s.

The increasing consolidation and mechanization of the *kretek* industry from the mid-1970s onwards resulted in the production of more sophisticated and more attractively packaged cigarettes, and stimulated a strong surge in demand. Consequently, *kretek* cigarettes now account for about 90 per cent of all cigarettes produced and consumed in Indonesia, and for approximately the same share of total tobacco absorption in the domestic cigarette industry, which in 1991 was estimated at some 152,100 tonnes.[33] The loss of domestic market share by *white* cigarettes was partially offset by a sharp increase in exports during the late 1980s, however, as export volumes rose from less than 200 tonnes in 1986 to almost 19,000 tonnes in 1990. Most of these exports were destined for Cambodia, Hong Kong, and Singapore. Exports of *kretek* cigarettes rose much more slowly during the same period, from well below 400 tonnes to approximately 2,600 tonnes, with Cambodia, Malaysia and Singapore constituting the main markets (see Table III.13).

Table III.13. Production and exports of cigarettes, 1986-1990

	1986	1987	1988	1989	1990
Production (Billion cigarettes)					
Kretek cigarettes	94.9	107.1	118.3	127.5	138.5
(hand rolled)	39.7	39.7	39.9	40.1	40.6
(machine rolled)	55.2	67.4	78.4	87.4	97.9
"White" cigarettes	16.0	14.2	13.9	15.8	17.3
Total[a]	**111.0**	**121.3**	**132.2**	**143.4**	**155.8**
Exports (Thousand tonnes)					
Kretek cigarettes	0.4	0.3	0.4	2.0	2.6
"White" cigarettes	0.2	2.0	4.2	12.9	19.0
Total[a]	**0.5**	**2.3**	**4.6**	**14.8**	**21.6**

Source: "Prospects of Indonesian Cigarette Industry", *Indonesian Commercial Newsletter*, No. 86, 28 October 1991, Jakarta, Tables 3 and 7, pp. 17 and 24.

a/ Totals may not add exactly due to rounding.

More recently, in 1991-1992, the further development of the *kretek* cigarette industry has come under threat from a number of policy measures introduced by the Government of Indonesia. These include the establishment of minimum prices, changes in the mechanism for levying excise duty, the standardization of cigarette packet sizes, the imposition of a requirement for cigarette packets to carry health warnings, and the granting of a monopoly on the clove trade to a semi-public agency. This has resulted in significant cost increases, which in turn has forced producers to raise prices and contemplate a shift to the increased production of *white* cigarettes for export.

Constraints and prospects

The *kretek* cigarette industry, which constitutes by far the most important segment of the tobacco-based manufacturing industry, faces an uncertain future at present. It has been dealt a particularly severe blow by the changes in clove marketing procedures introduced by the government at the end of 1990, as a result of which *kretek* manufacturers are no longer permitted to procure their

clove supplies directly from clove producers but from a semi-official clove marketing board. This has resulted in a significant increase in the purchase price of cloves, and substantially raised production costs. Fearing that they will not be able to cover these increased costs through increased prices, several major *kretek* producers have threatened to leave the industry, and early indications suggest that the volume of tobacco used by them declined by almost 2 per cent in 1991 after having risen steadily at an annual average rate of 7.7 per cent in the previous three years.[34] This is beginning to have an impact on tobacco production, with cultivators being forced to reduce planted acreage and output in order to restore a degree of equilibrium in the tobacco market.

The outlook for producers of *white* cigarettes appears more favourable. While domestic demand is unlikely to experience a significant recovery, except to the extent that higher *kretek* prices induce a shift towards *white* cigarettes, considerable opportunities appear to be opening up in export markets. Eastern Europe and the CIS are regarded as particularly promising markets, and have already begun to be tapped by Indonesian suppliers. In contrast to the *kretek* producers, the manufacturers of *white* cigarettes consequently did not reduce their procurements of tobacco in 1991, but increased them by no less than 8.8 per cent.

ANIMAL HUSBANDRY

The resource base

With extensive areas of grassland, especially in some of the eastern islands, and with the capacity to produce a wide range of animal feeds from the processing residues of its various carbohydrate and oilseed crops, Indonesia is extremely well suited to the large-scale breeding of livestock. In many parts of the country, animal husbandry of various kinds can also be practised successfully as an adjunct to the established forms of smallholder and estate agriculture.[35] While thus being well endowed with the basic requirements for a thriving livestock industry, Indonesia does, however, lack suitable indigenous varieties of animals for the practice of modern commercial livestock farming techniques based on intensive breeding and high yields. The institutional and scientific support base needed to maintain such an industry is also embryonic, and in need of substantial further development.

Past trends

Recognizing Indonesia's potential as a significant producer of livestock products, the government has actively encouraged the development of animal husbandry, both by smallholders and by large-scale private investors, since the 1970s. In order to upgrade the quality of smallholder production, it has also adapted the Nucleus Estate and Smallholder scheme to the animal husbandry sector, thereby requiring commercial ranches and livestock breeding enterprises to support local smallholders. These measures, combined with large-scale imports of breeding stock, have resulted in a steady expansion of the country's herds and flocks of farm animals, and in a significant improvement in their quality.

This, in turn, has stimulated a dramatic increase in the output of livestock products. Official data thus indicate that the volume of meat and eggs produced in Indonesia increased from 313,700 tonnes to 1.1 million tonnes and from 58,600 tonnes to 510,000 tonnes, respectively, between 1970 and 1991, while the volume of milk production increased from 29,300 litres to 360,000 litres during the same period. As a result of these developments, animal husbandry now accounts for approximately 10 per cent of agricultural output (see Table III.14).

Table III.14. Livestock population and production of livestock products, 1970-1991, selected years

	1970	1975	1980	1985	1988	1989	1990	1991[a]
Livestock population (million animals)								
Beef cattle	6.1	6.2	6.4	9.3	9.8	10.1	10.4	10.7
Milch cows	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.3
Buffaloes	3.0	2.4	2.5	3.2	3.2	3.2	3.3	3.3
Goats	6.3	6.3	7.7	9.6	10.6	11.0	11.3	11.5
Sheep	3.4	3.4	4.1	4.9	5.8	5.9	6.0	6.1
Pigs	3.2	2.7	3.2	5.6	6.5	6.9	7.1	7.7
Horses	0.7	0.6	0.6	0.7	0.7	0.7	0.7	0.7
Chickens	63.4	98.5	174.7	331.2	448.3	494.8	571.2	663.8
Ducks	7.4	14.1	21.1	23.9	25.0	24.3	25.6	25.4
Livestock products								
Meat (Thousand tonnes)	313.7	435.0	571.0	808.4	937.0	971.0	1,028.0	1,099.0
Milk (Million litres)	29.3	51.0	78.4	191.9	264.2	338.0	346.0	360.0
Eggs (Thousand tonnes)	58.6	112.2	259.4	369.9	443.1	456.0	484.0	510.0

Sources: Government of Indonesia, *Nota Keuangan dan Rancangan Anggaran Pendapatan dan Belanja Negara*, various issues, and Supplement to the President's Report to Parliament, 15 August 1992.

a/ Preliminary.

Table III.15 Production of processed milk, 1988-1990
(Tonnes)

	1988	1989	1990
Sweetened condensed milk	99,128	98,943	110,488
Milk powder	31,639	32,322	30,581
Infant milk	6,186	6,072	8,021
Tonic food	1,682	2,435	2,013
Baby food	2,599	2,611	2,645
Sterilized milk	1,624	1,[illegible]5	825
Pasteurized milk	13,[illegible]52	14,113	18,191
Butter	1,316	1,366	1,527
Ice cream and yoghurt	765	806	1,094
Cheese	2,010	1,887	2,614
Total equivalent to fresh milk	**645,232**	**652,417**	**703,195**

Source: "Dependence on Milk Imports Dropping", *Indonesian Commercial Newsletter*, No. 73, 8 April 1991, Jakarta.

The two principal processing industries associated with livestock farming, the manufacture of meat and dairy products, have grown in line with the expansion of the raw material base. The slaughtering of animals is carried out both by publicly- and privately-owned abattoirs. The government-owned slaughterhouses generally process indigenous varieties of animal reared by small-scale producers, and produce mainly fresh meat for sale in local markets. The privately-

owned slaughterhouses, on the other hand, often constitute part of complex vertically integrated production systems, covering not merely the breeding or importing of animals for slaughter but also such additional processing activities as freezing and the production of sausages, and are also beginning to tap export markets.[36] The dairy industry, meanwhile, is almost entirely engaged in the production of processed milk, mainly in the form of sweetened condensed milk, milk powder, and pasteurized milk (see Table III.15 above).

Constraints and prospects

Despite the production increases recorded since the 1970s, Indonesia's potential as a producer of livestock products remains seriously underexploited, and considerable capacity still exists for a further expansion in the volume of the country's output as well as an improvement in its quality. A major constraint on the realization of this potential is imposed by the continued absence of a sufficiently well developed institutional and scientific infrastructure to promote the dissemination of modern farming practices among the large majority of smallholder producers. This supply-side constraint is exacerbated by a comparatively low level of domestic demand for meat and dairy products. A recent estimate suggests, for example, that some 60 per cent of Indonesia's average nutritional requirements are covered by carbohydrate foods, as against only about 25 per cent in the developed countries.[37]

The prospects for the further development of the animal husbandry and livestock products industries nevertheless appear favourable. The rapid increases in disposable personal income being generated by the high rates of economic growth in Indonesia will help to sustain and accelerate the increase in domestic demand for animal proteins that has already become apparent in recent years. This shift in domestic consumption patterns will be reinforced by a continued strong demand for high quality meat and dairy products in export markets and by Indonesia's own rapidly expanding tourist industry. As private investors in particular respond to this demand and introduce the modern production and processing facilities required to meet the quality requirements of these more sophisticated markets, the technical constraints prevailing at present will also be progressively reduced.

FISHING

The resource base

Indonesia's geography, and the international recognition of the archipelagic seas as its exclusive economic zone under the United Nations Convention on the Law of the Sea, provide it with a sea area of more than 3.2 million square kilometres. The vast marine fisheries resources contained in these seas are supplemented by substantial freshwater fisheries resources in Indonesia's various rivers and lakes. In addition, fish are also often farmed in flooded rice fields, and in special fish and shrimp hatcheries.

Past trends

The output of the Indonesian fishing industry has increased significantly since the 1970s, with particularly strong growth having been recorded by the sea fishing industry. This consists of two very distinct components: a small-scale traditional component and a large-scale commercial component. Of these, the former is confined largely to coastal waters, reliant on traditional technologies, and characterized by relatively low levels of productivity, while the latter operates in deep-sea areas and employs technically more sophisticated fishing equipment.[38] In addition, a large number of foreign fishing vessels have been licensed to operate in Indonesian waters, and

illegal fishing by unlicensed foreign vessels is also believed to be rampant. According to the latest national accounts estimates, fishing now accounts for approximately 7-8 per cent of total agricultural output (see Table III.16).

Table III.16. Fish catches, 1970-1991, selected years
(Thousand tonnes)

	1970	1975	1980	1985	1988	1989	1990	1991[a/]
Sea fish	808	997	1,395	1,822	2,170	2,272	2,370	2,505
Fresh water fish	421	393	455	574	711	765	793	807

Sources: Government of Indonesia, *Nota Keuangan dan Rancangan Anggaran Pendapatan dan Belanja Negara*, various issues, and Supplement to the President's Report to Parliament, 15 August 1992.

a/ Preliminary.

During the late 1980s, tuna emerged as the principal product of the Indonesian sea fishing industry as a result of strongly growing overseas demand, which attracted substantial investments into the commercial tuna fishing and processing industries.[39/] This resulted in a dramatic increase in the tuna catch between 1986 and 1991, the bulk of which was exported in frozen, fresh or canned form. The most important overseas markets to be developed were Japan and the United States, which accounted for almost all of Indonesia's exports of frozen tuna and approximately half of Indonesia's total exports of canned tuna, respectively. Germany, the Netherlands, Thailand, Taiwan Province and the United Kingdom also became major importers (see Table III.17).

Table III.17. Exports of tuna, 1986-1990
(Thousand tonnes)

	1986	1987	1988	1989	1990
Frozen tuna	21.9	31.9	36.0	27.4	40.1
Fresh tuna	2.4	2.3	4.7	8.6	14.0
Canned tuna	1.8	4.3	8.5	20.6	18.5
Total	**26.1**	**38.4**	**49.3**	**56.7**	**72.6**

Source: "Dolphin Issue Hampers Tuna Exports to the United States", *Indonesian Commercial Newsletter*, No. 98, 27 April 1992, Jakarta.

The tuna industry suffered a setback in the early 1990s in response to financial problems experienced by one of its leading players, the large food-processing conglomerate PT Mantrust, and a renewed shift in international market conditions. This prompted a temporary shutdown of two large tuna canning operations with a total capacity of almost 10,000 tonnes per annum

belonging to PT Mantrust, and the permanent shutdown of several State-owned and privately owned enterprises. The situation was exacerbated at the end of January 1992 by the imposition of an import ban by the United States in response to growing concern over the deaths of dolphins caused by the tuna fishing industry in a number of countries. After guarantees had been received from the Government of Indonesia that the fishing techniques employed by the Indonesian tuna industry did not result in the associated death of dolphins, this ban was lifted in mid-1992.

The most extensive processing of the tuna catch is carried out by the tuna canning industry. This grew rapidly in the late 1980s, and by 1990 consisted of eleven relatively large enterprises with a combined capacity of almost 120,000 tonnes per annum. Despite the temporary difficulties faced by the industry in 1991-1992, investment interest remained strong, and nine further companies were granted official approval to establish tuna canning plants with a total annual capacity of almost 190,000 tonnes between January 1991 and April 1992.

In addition to tuna, the domestic fish canning industry produces several varieties of shellfish, sardines and a number of other fish products. The total capacity of this industry remains relatively small, however, amounting to only about 40,000 tonnes per year in 1990. The bulk of the canning industry's output of these products is also exported.

During the 1980s Indonesia developed an extensive shrimp industry, based on catching and farming activities in both sea and fresh water. This industry is also largely export oriented, with exports increasing from approximately 25,000 tonnes in 1981 to more than 95,000 tonnes in 1991. The degree of domestic processing is relatively small, however, with much of the shrimp harvest simply being frozen by cold storage companies and exported without further processing. This is done either in the country of final import or in third countries such as Singapore, which is the second most important importer of Indonesian shrimps after Japan, but re-exports most of its imports (see Table III.18).[40]

Table III.18. Exports of shrimps (fresh and frozen), 1985-1991
(Thousand tonnes)

	1985	1986	1987	1988	1989	1990	1991[a]
Shrimps[b]	31.0	36.1	44.3	56.5	77.0	93.9	95.4

Sources "Shrimps Still Attractive to Investors Despite Low Image", *Indonesian Commercial Newsletter*, No. 79, 8 July 1991, Jakarta, Table 1, p. 44
"Condition and Prospects of Indonesian Shrimp Industry", *Indonesian Commercial Newsletter*, No. 103, 13 July 1992, Jakarta, Table 9, pp. 23-24

a Preliminary
b Including prawns, lobsters and crayfish

Meanwhile, much of the inland fishing industry remains in the hands of smallholders, with only a proportion of the fresh water shrimp hatcheries being operated on a commercial basis. The fish produced by this segment of the industry is mainly for domestic consumption, and is subject to virtually no commercial processing. Substantial quantities are consumed by the producing households themselves, and most of the rest is marketed as fresh fish, often sold live in local markets.

Constraints and prospects

Despite its rapid expansion during the past five years or so, the Indonesian tuna industry faces a number of constraints to its further growth. One of the most important of these arises from the fact that the most promising fishing grounds are located in the still relatively underdeveloped eastern part of the country. The continued development of the industry therefore requires heavy investments not merely in appropriate fishing fleets and processing plants, but also in such basic infrastructure as port facilities and transport and communications networks.

A further constraint is imposed by the potential for a rapid spoilage of the fish catch in the tropical weather conditions prevailing in Indonesia, and the consequent need for almost immediate steps to preserve it. This prevents the small-scale traditional fishing operators from playing a major role in the industry as suppliers to processing plants, because their vessels are seldom equipped with the necessary preservation facilities. With increasingly stringent health and hygiene standards being imposed in importing countries, the bulk of the fish produced for export in Indonesia must be caught and processed by large-scale commercial enterprises, usually with highly integrated processing and production operations.

The high investments required for a further expansion of the marine fishing industry notwithstanding, its prospects appear favourable. International demand for tuna and other fish products is likely to remain firm, especially as health conscious consumers in the industrially developed countries shift their diet from red to white meats. At the same time, the declining role of the fishing industries in such countries as Japan, Taiwan Province and Thailand provide Indonesia with a significant opportunity to expand its market share. This opportunity has been enhanced, moreover, by Indonesia's exemption from the United States ban on tuna imports.

Recognizing these favourable market prospects, a number of large Indonesian business groups have entered the fishing and fish processing industry in recent years. Foreign investment interest, also remains high, with many of the Indonesian investors in the industry having established joint ventures with overseas firms. A particularly important partnership of this kind has been established between the Djajanti group, one of Indonesia's leading producers of timber, and Surat Canning Co. of Thailand for the creation of an integrated fishing and fish processing enterprise with a total investment of almost $55 million.

Considerable scope also still exists for the expansion of a shrimp processing industry in order to increase the level of domestic value added in Indonesia's shrimp exports. In doing so, however, Indonesia will have to overcome a latent fear in importing countries about the hygienic conditions likely to be maintained by such processing plants. This fear, which is sometimes cited as one of the main reasons for the fact that much of Indonesia's shrimp production is processed in Singapore, acts as a very severe constraint at present, and is frequently fuelled by rumours that Indonesian shrimps are contaminated by chemicals and disease. In October 1992 it was reported, for example, that Japan had rejected 40,000 tonnes of Indonesian shrimps because they allegedly contained a residue of antibiotics used by breeders to combat fish diseases.[41]

B. TEXTILES, CLOTHING AND FOOTWEAR

TEXTILES AND CLOTHING

The resource base

The Indonesian textile industry is based largely on the production of fabrics made entirely or partially of cotton. Approximately 60 per cent of the industry's raw material requirements,

therefore, consists of cotton fibre, with the remaining 40 per cent comprising various kinds of synthetic fibres. Despite considerable efforts to establish a domestic production capacity over the past 10-15 years, the Indonesian textile industry remains heavily dependent on imports to meet its requirements of many of these fibres.

The situation is particularly serious with regard to cotton. Although extensive areas of eastern Indonesia are believed to be suitable for the cultivation of cotton, the growth of domestic production has been hampered by a number of constraints. These include the existence of a wide variety of pests as well as the inexperience of Indonesian smallholders with the crop, which makes them reluctant to experiment with it. In an attempt to overcome these problems, the Government of Indonesia launched a smallholder cotton intensification programme in 1978. The results have been disappointing, however, with the level of domestic production, the productivity of domestic farmers, and the quality of domestic output remaining low. Consequently, the Indonesian textile industry continues to rely on imported cotton for more than 90 per cent of its requirements (see Table III.19).[42]

Table III.19. Production and imports of cotton, 1986-1990
(Thousand tonnes)

	1986	1987	1988	1989	1990
Production	19.7	18.2	7.2	13.4	33.4
Imports	171.4	211.5	195.2	262.3	332.0

Sources "Foreign Exchange Expenditure for Cotton Procurement Continues to Increase", *Indonesian Commercial Newsletter*, No. 72, 25 March 1991, Jakarta, Table 2, p.50
"Local Cotton Not As Good As Imported Cotton, *Indonesian Commercial Newsletter*, No. 106, 24 August 1992, Tables 1 and 2, pp. 24-25

The development of the synthetic fibre industry has been considerably more encouraging. With substantial forestry and oil/gas resources, Indonesia is well placed to produce both rayon, manufactured from wood pulp, and such plastics based fibres as nylon, polyester and acrylic. Substantial investments in these industries during the 1980s have resulted in steady production increases in recent years, with the total volume of synthetic fibres rising from approximately 226,400 tonnes in 1987 to 371,000 tonnes in 1991. The range of such fibres produced domestically is not comprehensive, however, and in some cases domestic production is insufficient to meet the requirements of the downstream textile industry. Consequently, in the case of some varieties and grades of synthetic fibres it is necessary to continue their importation (see Table III.20).[43]

Though principally based on the manufacture of cotton and cotton-polyester blends, the Indonesian textile industry also has a modest production capacity for the manufacture of silk fabrics, and is on the verge of establishing a similar capacity for the production of woollen textiles. Both of these branches of the textile industry also remain dependent on imported raw materials, however, with the silk requirements being met from neighbouring Asian countries and the wool requirements from Australia. While no significant attempts have yet been made to develop a domestic wool fibre industry, several efforts have been made to produce silk in Indonesia, albeit without much success. The industry, which is centred in South Sulawesi, is troubled by a variety of technical and infrastructural constraints, and produces only small quantities of low quality silk.[44]

Table III.20. Production and imports of synthetic fibres, 1986-1991
(Thousand tonnes)

	1986	1987	1988	1989	1990	1991
Production						
Polyester staple fibre	78.0	80.9	100.3	104.6	106.6	124.6
Polyester filament	74.7	82.2	115.4	123.2	133.2	140.0
Nylon filament	11.6	12.0	12.4	12.7	12.9	16.5
Viscose rayon	46.1	51.4	59.9	66.1	70.4	90.0
Imports						
Polyester fibre and filament	12.3	27.5	17.5	17.1	16.5	34.6
Acrylic	25.5	23.5	21.5	11.2	38.2	42.4
Viscose rayon	0.5	0.4	2.9	3.3	12.6	9.2
Others	0.5	1.0	0.9	1.2	-	0.3

Sources: "Development and Prospects of Spinning Industry in Indonesia", *Indonesian Commercial Newsletter*, No. 75, 13 May 1991, Jakarta, Tables 7 and 9, pp. 15-16.
"Development of Textile Fiber Industry in Indonesia", *Indonesian Commercial Newsletter*, No. 106, 24 August 1992, Tables 2 and 8, pp. 11 and 17.

The absence of a raw material base is offset, however, by a number of other advantages available to textile producers in Indonesia. These include a large domestic market, a skilled and educated labour force, and low labour costs. The successful exploitation of these advantages has enabled the Indonesian textile industry to grow substantially in both size and scope since the 1970s, to a point where the production of textiles and garments has become one of the country's principal manufacturing activities.

Past trends

The Indonesian textile industry has a long history, having evolved gradually from a local cottage-based handloom weaving industry dependent almost entirely on imported yarn in the period preceding the First World War to a more balanced structure comprising a number of industrial spinning, weaving, knitting and finishing plants by the mid-1960s. Even at this time, however, the industry was largely unmechanized, with power looms accounting for only about 8 per cent of the total weaving capacity in 1962, and more than half of these power looms being of pre-Second-World-War vintage.[45] The economic dislocations of the early 1960s resulted in a further weakening of the industry, with shortages of raw materials and spare parts forcing the idling of much of its existing capacity.

Regarding the provision of adequate supplies of textiles to be as important as the provision of adequate supplies of food for the population, the New Order Government accorded high priority to the modernization and further development of the textile industry after it assumed office in 1967. Despite a wide range of initial problems,[46] the industry has grown dramatically during the past 20 years. The production of weaving yarn increased from a mere 217,000 bales (of 181.44 kilogrammes each) in 1970/71 to more than 4.1 million bales in 1991/92, while the production of textile fabrics increased from 598.3 million metres to more than 5.2 billion metres during the same period. This expansion in the volume of output has been accompanied by a substantial diversification of the industry's product mix, with yarn being spun from a variety of natural and synthetic fibres and the output of knitted fabrics having increased significantly.[47] In addition,

this growth in the output of textile materials has helped to support a strong expansion of the production of garments and finished goods, which first emerged as a significant industry in the latter half of the 1970s (see Table III.21).[48]

Table. III.21. Production of textiles and garments, 1970/71-1991/92, selected fiscal years

	1970/71	1975/76	1980/81	1985/86	1988/89	1989/90	1990/91	1991/92[a]
Yarn (Million bales)[b]	0.2	0.4	1.2	1.9	2.7	3.4	3.6	4.1
Fabrics (Billion metres)[c]	0.6	1.0	2.0	2.5	3.5	4.5	5.0	5.2
Garments (Million dozen)	-	-	17.6	27.0	39.1	48.9	58.6	60.0

Source Government of Indonesia, Supplements to the President's Reports to Parliament, various issues

a/ Preliminary
b/ Yarn of natural and synthetic fibres (1 bale = 181.44 kilos)
c/ Woven and knitted fabrics

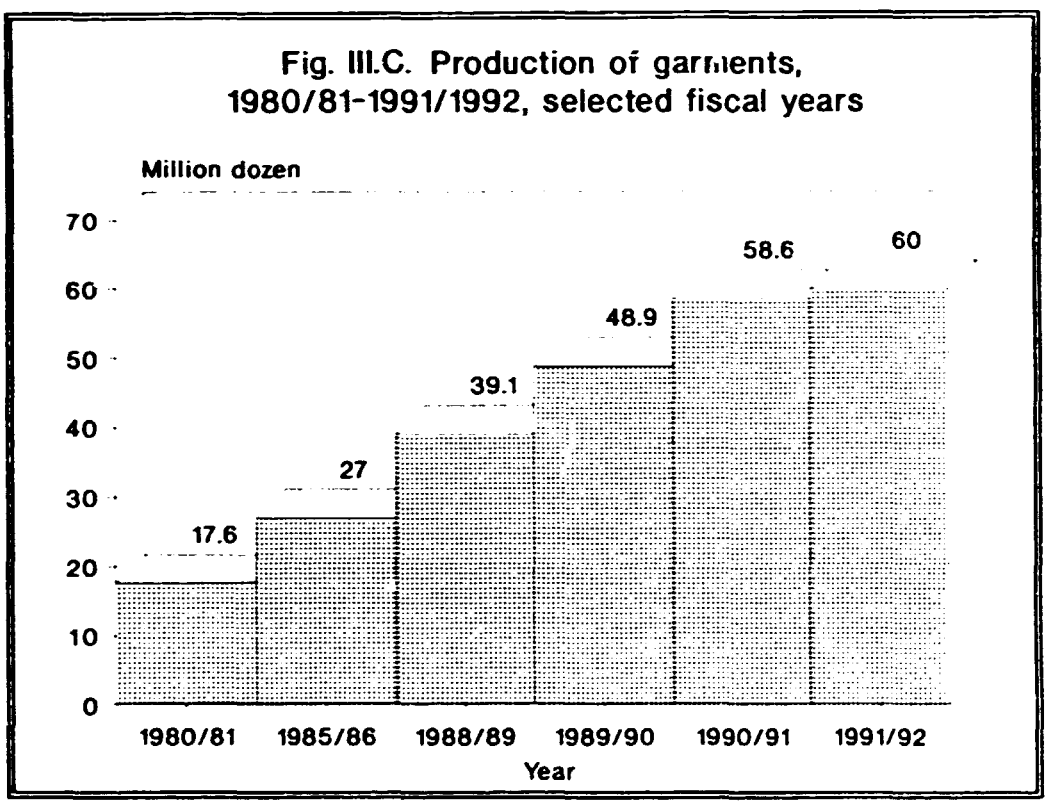
A particularly rapid expansion has been recorded by the spinning industry since the 1970s, with the number of spinning mills increasing from 18 in late 1969 to 158 by 1990, and the total number of spindles increasing from some 407,000 (of which only 334,000 were estimated to be operational) to 3.9 million.[49] The industry is located largely in West Java, which in 1990 accounted for 92 mills and some 2 million spindles, and its large-scale component, consisting of mills with more than 50,000 spindles, is heavily concentrated in a relatively small number of companies. It now produces weaving yarn from a wide variety of natural and synthetic fibres, as well as small volumes of metallized yarn and yarn from animal hair. Since the mid-1980s, the industry has also begun to export modest quantities of its output.

The weaving industry has traditionally been the backbone of the Indonesian textile industry, and remains its most well developed component. By the late 1970s the once predominant handlooms had almost entirely been replaced by mechanized weaving techniques, with their subsequent role being "confined essentially to the provision of residual capacity in peak demand periods and the production of small-volume intricate-design goods of no commercial interest to the mill sector".[50] As a result both of this increase in productivity and a substantial expansion in capacity, the output of the weaving industry has also increased dramatically since the 1970s, from approximately 600 million metres in 1970/71 to more than 4.3 million metres by 1990/91.

The modernization and expansion of the weaving industry has been accompanied by large-scale investment in the knitted fabrics industry. This has resulted in a dramatic increase in output, especially in the latter half of the 1980s. Official estimates cited in a recent report suggest that the output of knitted textiles rose from insignificant levels in the early 1970s to about 400 million metres by the mid-1980s and some 800 million metres by the early 1990s.[51]

The 1980s witnessed an accelerating downstream movement in the textile industry towards the manufacture of garments and other made up articles. From negligible levels in the early 1970s, the output of this industry expanded to about 18 million dozen garments by the early 1980s and

some 60 million dozen garments by the early 1990s. This growth has been supported by the increasing relocation of garment industries from north-eastern Asia, where rising labour costs are rendering them uncompetitive. The most rapid growth has consequently been experienced by the large-scale component of the industry, comprising firms with annual production capacities ranging from several hundred thousand to more than two million dozen garments. These often operate as joint ventures with foreign companies, and produce a wide variety of branded garments under licence.



A further indication of the recent expansion of the weaving, knitting and garment producing industries is given by the growth in the stock of processing machinery (see Table III.22). According to the latest available data, Indonesia had almost 2,400 textile and garment factories in mid-1992, of which almost 1,800 were located in Jakarta and the surrounding province of West Java. The industry consisted of some 1,050 weaving factories, 300 knitting factories, 500 garment factories, and 550 factories involved in other textile processing activities, including spinning, finishing, and the production of such miscellaneous goods as cordage and twine, carpets and rugs, bags and made-up goods other than garments, and traditional textile materials.[52/]

Table III.22. Stock of textile machinery, 1986-1991
(Thousand units)

	1986	1987	1988	1989	1990	1991[a]
Weaving machines	111.0	113.3	118.5	121.9	127.7	127.7
Knitting machines	14.0	18.0	18.9	21.0	21.8	21.9
Sewing machines	84.3	86.5	93.1	105.0	123.0	126.6

Source "Continuation of Quality Control Necessary to Promote Role of Textile Industry in Exports." *Business News*, No. 5191/5192, 4 December 1991, Jakarta.

a Preliminary.

Though making only a comparatively small contribution to the total volume of output, the manufacture of traditional textile materials remains an important element of the Indonesian textile industry. These traditional textiles span a wide variety of products, the most important of which include *batik* (patterned materials produced by repeatedly wax-coating and dyeing plain fabrics), *ikat* (patterned materials produced by weaving with pre-dyed yarns of various colours), *songket* (patterned materials partially woven with metallized yarn), and *lurik* (coarse hand-woven cotton textiles). The manufacture of these textiles is a highly skilled and labour-intensive craft activity, as a result of which they are produced in relatively small quantities and usually command a significantly higher price than similar fabrics produced by mechanized means. The emergence of a number of well-known Indonesian fashion designers working with these traditional textiles since the 1970s has helped to reinforce their image as comparatively high value materials.

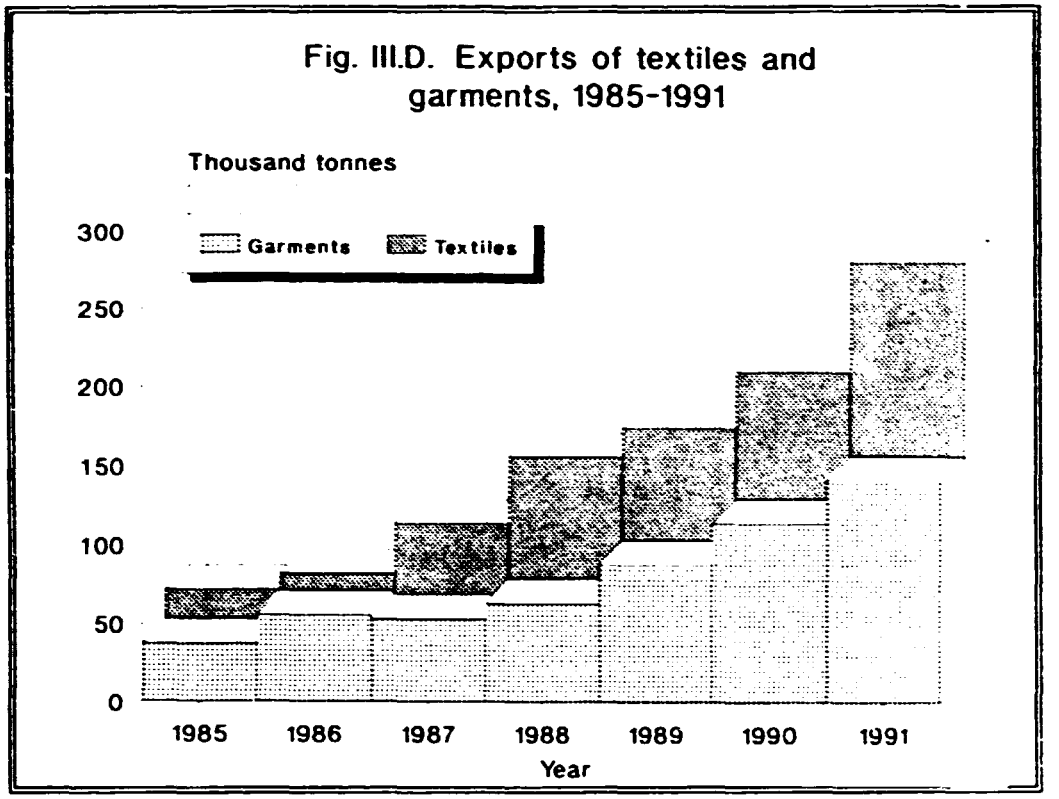
Until the early 1980s, Indonesia's textile and clothing industry was oriented primarily towards the domestic market. The measures taken by the Government of Indonesia to promote non-oil/gas exports following the sharp decline in world oil prices in the mid-1980s, combined with the opportunities created by the gradual exit of north-east Asian producers from the international textile and clothing markets, permitted a rapid increase in Indonesian exports (see Table III.23). By 1991 the textiles and clothing industry had become Indonesia's most important non-oil/gas source of foreign exchange earnings, accounting for almost $4.1 billion in export revenues.

Table III.23. Exports of textiles and garments, 1985-1991
(Thousand tonnes)

	1985	1986	1987	1988	1989	1990	1991[a]
Garments	38.1	56.1	53.8	63.7	87.9	114.1	141.6
Other textiles	57.3	67.3	99.0	141.6	159.5	195.3	266.1

Source Government of Indonesia, Central Bureau of Statistics, *Indikator Ekonomi*, various issues.

a Preliminary.



Indonesia's external trade in textiles is subject to extensive regulation, which affects trade patterns between Indonesia and a number of its most important trading partners as well as the allocation of textile export quotas within Indonesia. Several categories of exports to Canada, the EC, Norway, Sweden, and the United States face quantitative restrictions, either under the terms of the Multi-Fibre Arrangement (MFA) or as a result of bilateral agreements.[53] This has necessitated the imposition of a domestic licensing system for textile exporters to ensure that the export limits set by these quota countries are not breached.[54]

While the growth of Indonesia's textile exports has not been significantly hampered by the imposition of quotas, relatively low rates of quota utilization having been recorded for several categories of textiles in a number of restricted markets, the Indonesian industry has nevertheless begun to pay increased attention to non-quota countries in recent years. The share of exports to the non-quota countries has consequently risen from approximately 41 per cent in 1989 to an estimated 49 per cent in 1991.[55] Particular efforts have been made to promote exports to Japan and west Asia, with Saudi Arabia and the United Arab Emirates becoming the main focus of these efforts in the latter region. In addition, measures have also been taken to increase the output and exports of non-garment textile products, many of which are not subject to quota even in the quota countries. These consist primarily of household textiles, such as towels, bedding, tablecloths and serviettes, curtains and upholstery materials, and decorative textiles.

Constraints and prospects

Although a steady expansion of the domestic production of synthetic fibres seems assured as Indonesia continues to develop its chemical industries, the likelihood of a significant breakthrough in the domestic production of natural fibres remains remote for the foreseeable future. The

Indonesian textile industry will, therefore, inevitably remain dependent on overseas suppliers for a considerable proportion of its raw material needs in the short to medium term. As has been proven in the past, however, this lack of domestic inputs will not necessarily act as a major constraint on the industry's growth, which will continue to be stimulated by the growing domestic market and increasing export demand.

The spinning industry, despite its rapid growth in recent years, is reported to be weighed down by obsolescent plant and equipment. An extensive programme for the modernization and replacement of spinning mills is, therefore, necessary to raise the industry's efficiency and productivity. Early indications suggest that this programme has already begun, with eight mills having announced plans to invest almost $18.7 million in such rehabilitation activities in 1989, and several further mills, including Indonesia's largest spinning company PT Argo Pantes, having announced similar plans in 1990.[56]

The plant modernization programme is being accompanied by continuing large scale investments in new productive capacity, with the number of officially licensed investment projects rising from 17 in 1988 to 45 in 1990.[57] This surge in investment is increasingly being fuelled by foreign entrepreneurs, especially from the newly industrialized economies of north-eastern Asia, who are beginning to relocate their operations to Indonesia and elsewhere in South-East Asia in response to rising labour costs in their own markets. With demand for spun yarn from the growing downstream sections of the Indonesian textile industry continuing to increase, this trend of plant modernization and capacity expansion in the spinning industry appears certain to continue for the foreseeable future.

The weaving, knitting and garment manufacturing industries, meanwhile, will also continue to benefit from the relocation of productive capacity from northeast to southeast Asia in the short term, and from the continuing growth of demand in both local and export markets over the longer term. They are therefore continuing to attract substantial volumes of domestic and foreign investment interest, and experiencing a rapid expansion of capacity. One recent study suggests that 16 projects with a combined investment commitment of $25.8 million were licensed by the Indonesian authorities in the first five months of 1992 alone.[58]

These broadly favourable prospects notwithstanding, the Indonesian textile industry is confronted with two potentially serious risks. The first of these arises from the continued imposition of protectionist barriers in many of Indonesia's most promising markets, which could eventually pose a threat to the growth of Indonesia's textile exports, and by extension to the industry as a whole. Whether this threat can be avoided will depend on the successful outcome of the current negotiations on a new General Agreement on Tariffs and Trade (GATT). The second threat arises from the possibility of a gradual erosion of the main source of the industry's international competitiveness, its low labour costs. These are obtained at the expense of poor working conditions and low standards of living for the industry's workers, whose protests against these conditions have become increasingly vociferous in recent years.[59] Striking a balance between the need to maintain its competitiveness and offer its workers a just reward may be the most serious challenge facing the industry at present.

FOOTWEAR

The resource base

The Indonesian footwear industry has two distinct components, producing rubber-soled sports shoes and leather shoes, respectively.[60] Although rubber and leather are the two principal

material inputs of this industry, it also requires a wide variety of other basic materials, including canvas and other hard-wearing fabrics, imitation leather made of polyurethane (PU) or polyvinyl chloride (PVC), adhesives and shoe threads. Not all of these products are manufactured in significant quantities in Indonesia as yet.

As a major producer of natural rubber, Indonesia is well placed to manufacture domestically the numerous rubber-based products used in the production of sports shoes, including rubber soles, foam rubber inlays and insoles, and other items such as toe and heel caps. These materials are now being made by an increasing number of specialized component suppliers, and often by the producers of sports shoes themselves. The past few years have also witnessed a significant expansion of the imitation leather industry, with output increasing from approximately 33,450 tonnes in 1985 to more than 43,400 tonnes in 1990. A significant proportion of the basic materials used in the production of Indonesian sports shoes must still be imported, however, and a recent estimate suggests that these shoes have an average import content of some 60 per cent.[61]

The domestic supply of leather is dependent on the volume of livestock slaughtered and on the capacity of the domestic tanning industry to process the hides obtained from the slaughterhouses. As indicated in the section on agro-industries, Indonesia's herds of beef cattle have grown substantially since the 1980s, as has the volume of meat produced. The associated increase in available hides and skins has supported a considerable expansion of the leather tanning industry, with the output of tanned leather increasing from some 17,900 tonnes in 1985 to almost 24,700 tonnes in 1990. According to the latest official statistics available, 64 large scale commercial tanneries with a combined capacity of 40,260 tonnes per year were in operation in Indonesia in 1991, and a further 13 under construction with a total capacity of 13,450 tonnes per year. In addition, Indonesia also has a large number of small-scale tanning enterprises dispersed throughout the country with an estimated capacity of 6,000 tonnes per year (see Table III.24.)[62]

Table III.24. Production of basic materials for the footwear industry, 1985-1990
(Thousand tonnes)

	1985	1986	1987	1988	1989	1990
Tanned leather	17.9	18.2	18.6	18.9	22.1	24.7
Imitation leather	33.4	34.3	35.0	36.8	39.0	43.4
Leather soles	0.9	0.9	0.9	1.0	1.1	1.2
Rubber soles	9.5	10.5	11.1	12.3	15.4	19.2

Source "A Bright Prospect for Textile Products and Sports Shoes Exports", *Business News* No. 5181, 8 November 1991, p. 5

In spite of the growth in output since the mid-1980s, the domestic leather manufacturing industry has not entirely been able to meet the quality requirements of the leather shoe industry. Increasing volumes have therefore had to be procured from foreign sources in recent years, with official data showing a tenfold rise in imports from 164 tonnes in 1986 to 1,088 tonnes in 1990. China has emerged as the leading supplier in terms of volume, accounting for almost 250 tonnes in 1990, while the Republic of Korea has become the leading supplier in terms of value because of the much higher price commanded by its high-quality exports. Of the total import value of $6.6 billion recorded in 1990, the Republic of Korea thus accounted for $3.7 billion, even though it supplied less than 180 tonnes.[63]

Though highly labour intensive, the footwear industry nevertheless requires the use of a number of different machines to cut, press and sew the various materials involved in the production of shoes. Since its own capacity to manufacture such equipment is very limited, Indonesia has also had to rely heavily on imports of such shoe making machines. Between 1987 and 1990 the total number of these machines imported into Indonesia increased from 1,112 to 22,800, almost all of which originated from the Republic of Korea, Taiwan Province and Italy.[64]

As in the case of the textile industry, the lack of a comprehensive raw material base for the footwear industry is to a large extent offset by the availability of a large pool of skilled and relatively low-cost labour. At a time when rising labour costs are reducing the competitiveness of the established footwear industries in the newly industrializing economies of north-eastern Asia, this cost advantage is increasing Indonesia's attractiveness as an alternative manufacturing site and prompting an accelerating relocation of production facilities to Indonesia. At the currently prevailing labour costs in Indonesia, entrepreneurs find it profitable to manufacture shoes in the country even if they have to import almost all of their processing machinery and a significant proportion of their raw material inputs.

Past trends

The shifting balance of international competitiveness has stimulated an investment surge in the Indonesian shoe industry since the mid-1980s, with both domestic and foreign investors having contributed to the creation of a substantial manufacturing capacity for footwear. This is particularly true of the sports shoe industry, in which some 190 firms were licensed to establish manufacturing plants with a combined annual capacity of almost 570 million pairs of shoes between 1986 and 1991. Investments in the leather shoe industry, though less dramatic, have also been significant, with 12 domestic investors having been licensed in 1990 alone to establish an additional annual capacity of more than 12.5 million pairs.

The result has been a dramatic increase in the shoe industry's output. Indonesia's output of sports shoes rose from a mere 35.6 million pairs in 1986 to 165.3 million pairs in 1991, implying an annual average growth rate of 30.3 per cent. Its output of leather shoes, meanwhile, grew from approximately 13.7 million pairs to 41.3 million pairs during the same period.

A substantial proportion of the Indonesian shoe industry's output is intended for the export market, as a result of which the country's exports have risen similarly sharply during the second half of the late 1980s. The volume of sports shoes shipped abroad thus increased from 1.9 million pairs in 1986 to 114.7 million pairs by 1991, while the volume of leather shoe exports increased from approximately 370,000 pairs in 1986 to 19.2 million pairs in 1990 (see Table III.25). The main markets for these exports are the United States and the EC, both of which provide access at concessional tariff rates under the Generalized System of Preferences (GSP), although the latter also imposes quotas on certain categories of footwear.[65]

Constraints and prospects

As in textiles and garments, the future development of the shoe industry will depend heavily on Indonesia's ability to sustain its labour cost advantage. Assuming that a suitable balance between the adequate remuneration of workers in the shoe industry and the maintenance of competitive labour costs will be retained, the outlook for the shoe industry remains favourable. Domestic demand for both sports and leather shoes, which span a wide spectrum of quality and price, is likely to continue to grow in response to increasing income levels and changing fashions. Export demand is likely to expand further, as the Indonesian industry's share of the international market amounts to only about 3 per cent for sports shoes and 1 per cent for leather shoes at present.

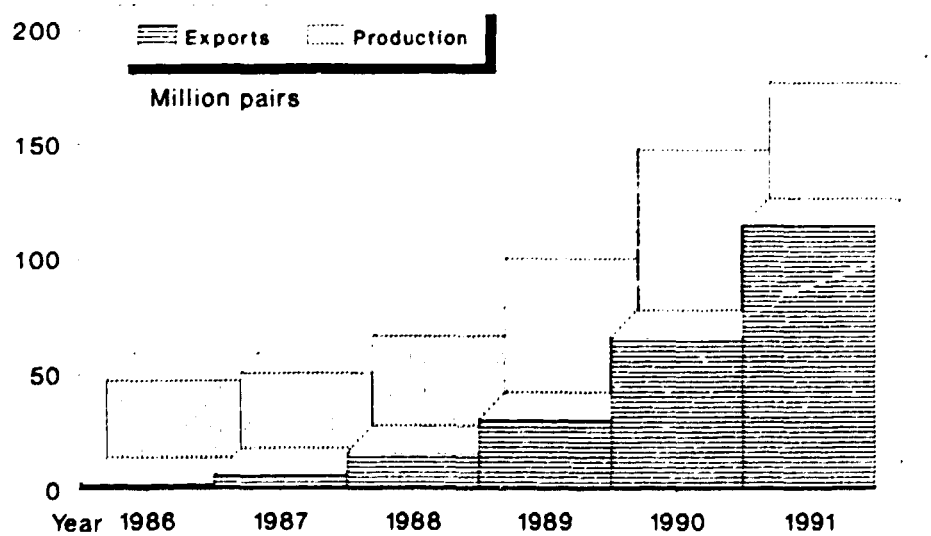
In view of these generally favourable prospects, investment interest appears likely to remain strong. In the first nine months of 1992 alone the BKPM licensed 11 new investors seeking to establish plants with a combined capacity of more than 43 million pairs of sports shoes per annum. This growth is likely to be accompanied, in time, by efforts to enhance the quality of domestically produced shoes, and by increased domestic production of raw materials and shoe-making machines, allowing the development of a more fully integrated industry. In addition, it is likely to prompt a greater diversification of the industry, with manufacturers not only moving into the production of other varieties of shoes, but also beginning to produce other kinds of leather goods, such as purses, bags, belts and jackets, which have hitherto only been manufactured on a relatively modest scale.

Table III.25. Production and exports of shoes, 1986-1991
(Million pairs)

	1986	1987	1988	1989	1990	1991
Sports shoes						
Production	35.6	38.8	55.1	88.4	135.9	165.3
Exports	1.9	6.0	15.8	30.1	65.6	114.7
Leather shoes						
Production	13.7	13.6	17.4	27.9	36.3	41.3
Exports	0.4	1.7	4.1	6.4	19.2	..

Sources: "Sharp Increase in Production of Rubber/Canvas Shoes". *Indonesian Commercial Newsletter*, No. 68, 28 January 1991, Jakarta, Tables 1 and 2, pp. 40-41.
"Exports of Leather Shoes Boosts Imports of Raw Material". *Indonesian Commercial Newsletter*, No. 82, 26 August 1991.
"A Bright Prospect for Textile Products and Sports Shoes Exports". *Business News*, No. 5181, 8 November 1991, Jakarta, p. 5.
"The Shoe Industry Still Attracting New Investors". *Indonesian Commercial Newsletter*, No. 112, 23 November 1992, Jakarta Tables 2 and 3, p. 46.

Fig. III.E. Production and exports of sports shoes, 1986-1991



C. WOOD, WOOD PRODUCTS, PULP AND PAPER

WOOD AND WOOD PRODUCTS

The resource base

Indonesia is endowed with substantial forestry resources. Estimates by the Indonesian forestry industry published in mid-1992 suggest that almost 145 million hectares of the country's total land area of about 195 million hectares are covered by natural forest. Of the overall area under forest, some 50 million hectares are protected or reserved and the remainder are subject to limited or full-scale exploitation.[66] The principal products obtained from Indonesia's natural forests are various kinds of indigenous tropical hardwoods, such as *meranti (Shorea polysperma), ramin (Gonystylus walpurgiann* and *Gonystylus bangkanns), agathis (Agathis alba), kapur (Dryobalanops, various species), keruing (Diptherocarpus), pulai (Alstonia angustiloba)* and *bangkirai (Shorea laevis)*. Other major products include rattan, of which Indonesia is the world's leading producer, and a variety of gums and resins.

Apart from its natural forest resources, Indonesia also has extensive timber plantations. A number of commercial teak plantations were established on the island of Java during the colonial period, and remain the primary source of Indonesia's teak production. An important additional timber resource is provided by a vast acreage of over-age rubber trees in both smallholdings and estates, which are now gradually being replanted. More recently, since the late 1980s, there has been a concerted effort to promote the establishment of industrial forests and timber estates outside Java by the various regional units of the State-owned forestry corporation PT Inhutani as well as domestic and foreign private investors (see Table III.26). By the end of 1991 the total area covered by these timber estates was officially estimated at 326,000 hectares.[67] This area was expected to be expanded by a further 65,000 hectares during 1992 according to a statement issued by the Minister for Forestry in the middle of the year.[68]

Past trends

Indonesia's natural forestry resources began to be exploited commercially in the late 1960s, when strong external demand for timber coincided with the liberalization of the domestic regulatory framework to attract substantial investments in the logging industry. By December 1970, within four years of the promulgation of the Foreign Investment Law of 1967 and three years of the promulgation of the Domestic Investment Law of 1968, private investors had already committed $437 million for 84 forestry and wood-processing projects.[69] Since that time Indonesia's output of wood has increased significantly, albeit with some year-to-year fluctuations prompted by the impact of domestic policy shifts and the vicissitudes of international markets.

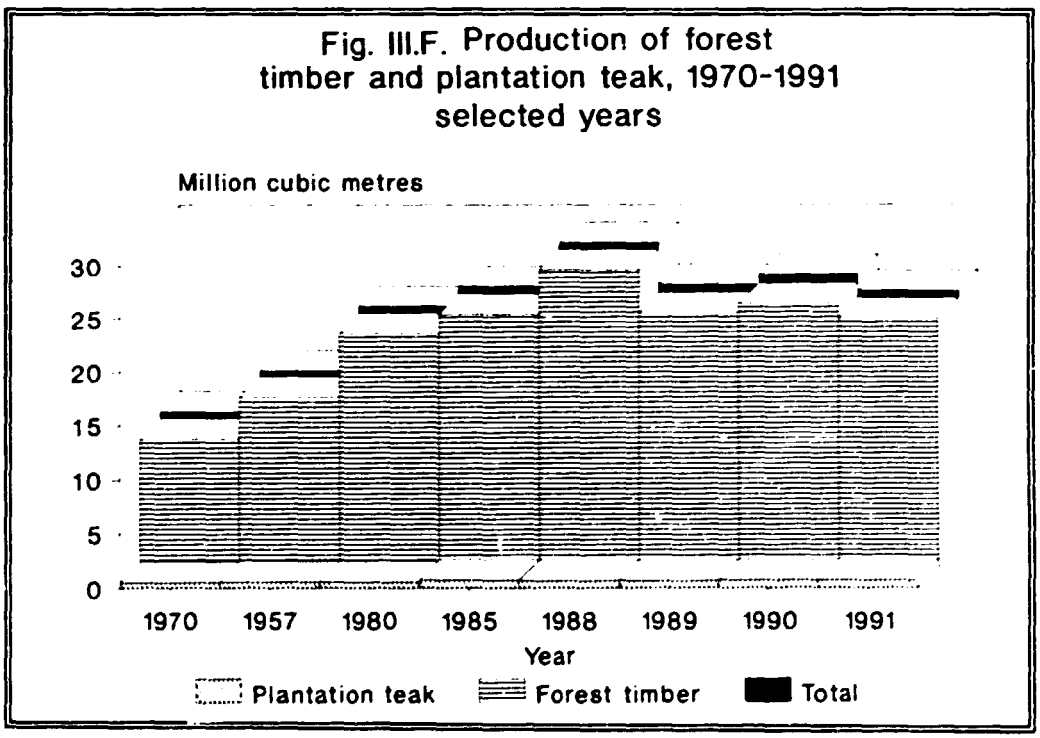
The forestry industry was developed as an export oriented industry from the outset, and began to make a substantial contribution to Indonesia's export earnings within a very short space of time. From a mere $3.6 million in 1966, the value of Indonesia's exports of wood and wood products rose to $25.3 million in 1969, which exceeded the export value of all other non-oil primary commodities except natural rubber. By 1972 the value of timber-based exports had risen further to approximately $230 million, overtaking the value of rubber exports of some $190 million. Until 1991, when it was dislodged by the textile and garments industry, the wood processing industry remained Indonesia's most important source of non-oil/gas export revenues by a substantial margin.

Table III.26. Production of timber, 1970-1991[a/], selected years
(Thousand cubic metres)

	1970	1975	1980	1985	1988	1989	1990	1991[b/]
Forest timber	11,856	15,701	21,702	23,500	27,760	23,684	24,532	23,114
Plantation teak	568	595	613	777	725	725	780	778
Total	**12,424**	**16,296**	**22,315**	**24,277**	**28,485**	**24,409**	**25,312**	**23,892**

Sources: Government of Indonesia, *Nota Keuangan dan Rancangan Anggaran Pendapatan dan Belanja Negara*, various issues, and Supplement to the President's Report to Parliament, 15 August 1992.

a/ Fiscal years beginning 1 April of each year indicated for 1988-1991.
b/ Preliminary.



In order to maximize the degree of domestic value added in Indonesia's wood exports, the decision was taken at a very early stage to encourage a rapid development of the wood processing industry, which had remained embryonic until the mid-1960s. As pointed out in an important contemporary study, this necessitated an expansion of the sawmilling, plywood, veneer, and pulp and paper manufacturing industries in particular.[70/] While, as shown below, the pulp and paper industry has only begun to be developed relatively recently on a large scale, the dramatic growth of the sawmilling and plywood industries has been one of the outstanding features of Indonesia's industrial development since the 1970s.

This growth was particularly rapid after 1980, when the government issued a number of measures to boost private investment in the downstream wood products industry. These included a regulation requiring all forestry concession holders to establish processing facilities for the timber obtained from their concessions, and the imposition of increasingly tight restrictions on the export of unprocessed logs. These latter restrictions culminated in an outright ban on log exports in 1985, which was only lifted in mid-1992, when it was replaced by a punitive export tax.[71]

According to the best available estimates, Indonesia had some 4,000 manually operated sawmills and 500 power driven sawmills with a combined capacity of 4 million cubic metres in 1967, of which only about 60 per cent was actually utilized.[72] By the end of 1990, the total number of sawmills had been reduced to 2,509, but they were almost all power driven and had a total capacity of about 15 million cubic metres. The degree of capacity utilization remained low, however, with the total output of sawn timber amounting to approximately 8.7 million cubic metres.[73]

The plywood industry, which in 1972 consisted of only two operational mills with a (severely underutilized) total capacity of 10,000-15,000 cubic metres per year,[74] had grown to include 29 operational mills with a combined annual capacity of more than 1.9 million cubic metres by 1980. The rate of expansion accelerated significantly during the next five years in response to the government's policy measures, with the number of mills rising to about 100 and the industry's total capacity to about 6.3 million cubic metres per year by 1985. At the end of 1991 the industry was estimated to comprise 114 mills with a combined capacity of 9.5 million cubic metres per year.[75]

These developments have resulted in a complete transformation of the structure of Indonesia's wood exports since the 1970s (see Table III.27). From being almost entirely dependent on the export of unprocessed logs in 1970, the country emerged as the world's largest exporter of plywood as well as a significant exporter of sawn timber during the 1980s. In order to encourage the development of the downstream wood processing industry even further, the government imposed a heavy export tax of $250-500 per cubic metre on sawn wood in 1989, which inevitably prompted a sharp decline in export volumes.

Table III.27. Exports of wood and upstream wood products, 1970-1991[a], selected years
(Thousand tonnes)

	1970	1975	1980	1985	1988	1989	1990	1991[b]
Logs	141	20	17	-	-	..	..	..
Plywood	2,232	4,037	4,607	5,027	5,296	..	..	..
Sawnwood	1,489	2,194	1,809	143	205	..	..	..
Others	372	1,050	1,401	1,359	1,649	..	..	..
Total	**4,234**	**7,301**	**7,834**	**6,529**	**7,150**	**5,773**	**11,043**	**12,652**

Source Government of Indonesia, Central Bureau of Statistics, *Indikator Ekonomi* and *Statistical Pocketbook*, various issues.

a/ Processed wood only.
b/ Preliminary.

At the same time, however, the imposition of the export tax on sawn wood has helped to stimulate the development of an export-oriented wood-based consumer goods industry producing a wide range of products (see Table III.28). These include prefabricated wooden buildings and building materials (such as laminated boards, particle boards, floor boards and parquet panels, skirting boards, doors and windows, ceiling panels etc.), furniture and household goods of various kinds, handicrafts, chopsticks and safety matches.[76] Despite some year-to-year fluctuations, exports of these products have increased significantly since the mid-1980s.

Table III.28. Exports of downstream wood products, 1986-1990
(Tonnes)

	1986	1987	1988	1989	1990
Doors and windows	3,060	9,090	14,940	21,805	47,376
Parquet flooring[a/]	2,975	5,532	876	4,443	4,363
Beading and moulding	30,762	134,936	235,943	369,114	121,633
Frames[b/]	162	6,663	553	1,781	3,854
Chopsticks	3,660	6,926	16,010	26,285	49,190

Sources: "Interest in Investing in the Woodworking Industry High Despite Declining Exports", *Indonesian Commercial Newsletter*, No. 88, 25 November 1991, Jakarta, Table 1, p. 55.
"Exports of Doors and Windows Up Rapidly", *Indonesian Commercial Newsletter*, No. 90, 23 December 1991, Jakarta, Table 1, p. 34.
"Exports of Window and Door Frames and Panels", *Business News*, No. 5261, 22 May 1992, Jakarta.

a/ Teak and softwood.
b/ For photographs, mirrors, etc.

Table III.29. Exports of made-up rattan products, 1985-1991
(Tonnes)

	1985	1986	1987	1988	1989	1990	1991
Tikar mats	1,409	1,765	598	223	221	269	426
Lampit mats	-	529	4,617	7,410	3,465	9,107	10,689
Baskets	-	105	1,970	3,987	5,620	4,948	5,773
Furniture	-	1,944	5,396	15,343	36,923	59,744	69,324
Others	-	29	391	1,057	278	548	706
Total	**1,409**	**4,356**	**12,587**	**28,062**	**46,507**	**74,616**	**86,918**

Sources: "Rattan Furniture the Star of Export Finished Rattan Products", *Indonesian Commercial Newsletter*, No. 64, 26 November 1990, Jakarta, Table 1, pp. 25-26.
"Rattan Furniture the Only Prime Export Commodity from the Industry of Finished Rattan Products", *Indonesian Commercial Newsletter*, No. 98, 27 April 1992, Jakarta, Table 1, p. 32.
"Revocation of the Ban on Unprocessed-Rattan does not Boost Exports", *Indonesian Commercial Newsletter*, No. 102, 22 June 1992, Jakarta, Table 1, p.28.

As in the case of wood, the Government of Indonesia has also sought to enhance the degree of domestic value added in the country's exports of rattan (see Table III.29). This resulted in exports of raw and semi-processed rattan being banned in January 1987 and July 1988, respectively. These bans were only lifted in mid-1992, when they were also replaced by hefty export taxes. Although the manner of their enforcement and their effect of redistributing income from relatively poor rattan collectors in the outer islands to the Java-based furniture industry owned by wealthy business interests caused some controversy, these measures did nevertheless succeed in promoting the rapid development of the domestic rattan processing industry. As a result of these developments, most of Indonesia's rattan exports are now shipped in the form of furniture and other made-up products such as mats and baskets.

Constraints and prospects

The principal constraint facing the Indonesian wood processing industry is the growing public awareness of the environmental risks implicit in the despoliation of virgin tropical forests, on which it continues to rely for the bulk of its raw materials. This is beginning to result in an erosion of demand in many of its major export markets, including the United States, western Europe and Japan, which may be reinforced in due course by the introduction of legislative barriers to the sale of tropical wood products in these countries. An example of such legal restraints is provided by the imposition by Austria in late 1992 of a labelling requirement for products made from tropical timbers. This legal restraint was, however, repealed in 1993 after Indonesia and Malaysia had threatened to boycott the import of goods from Austria.

Despite its forceful response to the Austrian initiative, the Government of Indonesia has responded to these concerns from the West and international environmental groups with a number of measures to minimize the environmental damage inflicted by the forestry industry. From the late 1970s onwards forestry concession holders began to be encouraged to employ selective tree cutting policies, and in 1985 the practice of total tree felling was banned altogether. This was followed in 1990 by a 150 per cent increase in the reforestation fee levied on logging companies, in an attempt to raise the effectiveness of the extensive but only partially successful regreening and reforestation programmes initially launched in the late 1960s.

Recognizing that these measures may not be sufficient to alleviate the environmental concerns prompting the shift in consumer demand away from tropical timber products, the government adopted a comprehensive National Forestry Action Programme in August 1991. One of the principal features of this programme, which is aimed at ensuring a sustainable exploitation of Indonesia's forestry resources while protecting the country's natural eco-systems, is the development of industrial timber estates as the main source of raw materials for the wood processing industry. This followed a decision taken in July 1991 by the International Tropical Timber Organization (ITTO), of which Indonesia is a member, to phase out the trade in timber from natural forests by the year 2000.[78]

In line with this new policy, the government has begun to encourage both the State-owned forestry enterprise PT Inhutani and private investors, both domestic and foreign, to establish industrial forests and timber estates. As far as possible, these estates are to be developed in conjunction with the transmigration programme of population resettlement from Java to the "outer" islands, and are targeted to cover 1.5 million hectares by the end of the current Five-Year Development Plan period in March 1994. Despite a slow start, this target appears likely to be met. Several statements by the Minister for Forestry during the course of 1992 suggest that private sector applications for the creation of 291 timber estates with a total acreage 11.5 million hectares had been lodged with his ministry by the end of June 1992, and that PT Inhutani had been assigned to develop timber estates in transmigration areas in cooperation with 100 foreign companies.[79]

With most commercially important tropical timbers requiring 30-50 years to mature, the development and exploitation of timber estates will inevitably involve a long gestation period. While some attempts are being made to identify and propagate fast-growing trees for industrial uses, such as the production of plywood and blockboard, the emergence of timber shortages cannot be ruled out in the foreseeable future, and according to some recent reports are already becoming visible.[80] Such shortages are likely to become particularly severe in the transition period between the cessation of logging activities in natural forests and the commencement of timber estate harvesting. In this period, the wood processing industry may be faced with the need to operate well below capacity, or to depend increasingly on imported timber.[81]

Apart from the risk of environmentally based consumer rejection and the threat of a temporary raw material shortage, the plywood industry faces uncertain prospects for a variety of other reasons. Its competitiveness in its main market, Japan, continues to be hampered by the imposition of a variety of tariffs regarded by Indonesia as discriminatory and unfair,[82] while exports to another leading market, the United States, are threatened by the imposition of countervailing duties because of the alleged subsidization of the industry by the Government of Indonesia.[83] With the government already having imposed a ban on the establishment of further plywood mills since 1989, and with Indonesian plywood producers themselves having established an export rationalization scheme to stabilize international prices in 1986, it now appears certain that the industry has passed through its main expansionary phase, and the coming years will witness its streamlining and consolidation.

By contrast, the prospects for the sawmilling industry remain favourable, provided access to an adequate raw material base can be ensured. This relatively promising outlook is based on the expectation that the downstream processing industries will continue to grow rapidly in the short to medium term, and will generate continuing increases in demand for sawn timber. An indication of the likely growth of these industries is given by the extensive investment interest that they continue to attract. According to data published by the BKPM, seven projects in the wood-processing industry with a combined capacity of some 990,000 tonnes of various wood products were licensed during the first eleven months of 1992.[84]

The prospects for the rattan processing and rattan-goods manufacturing industry are also encouraging. In view of Indonesia's extensive and renewable raw material base and the continuing interest in rattan products in export markets, the industry is not likely to face any serious supply or demand constraints. Its favourable prospects are being reinforced, moreover, by its increasing sophistication, which is being reflected in progressive improvements in the design and quality of rattan goods manufactured in Indonesia.

PULP AND PAPER

The resource base

Indonesia's vast forestry resources provide the country with a strong base for the establishment of a pulp and paper industry. This is being substantially enhanced by the recently initiated programme to develop industrial timber estates, many of which are specifically intended to produce fast-growing softwood species, such as eucalyptus and acacia, for the manufacture of pulp and paper. According to official data released in mid-1992, 39 of the 291 private sector projects for the establishment of timber estates approved by that time were intended to support the pulp industry. More significantly, these 39 projects accounted for almost 8 million hectares of the total area of 11.5 million hectares to be covered by all of the 291 proposed estates.[85]

Past trends

Indonesia's potential as a producer of pulp and paper was recognized at a comparatively early stage, with a 1972 study arguing that "any successful export substitution policy based on forestry resources would have to include pulp and paper production, not only because of its favourable growth prospects but also because of its outstanding potential for contributing to accelerated industrialization".[86] This prompted substantial investments in the pulp and paper industry, which initially consisted of a relatively small number of State-owned firms but began to attract increased private interest during the 1980s. The result has been a dramatic increase in Indonesia's production of both pulp and paper since the 1970s, with the country's output of paper increasing from a mere 22,000 tonnes in 1970/71 to approximately 1.65 million tonnes by 1991/92, and its output of pulp increasing from insignificant levels in 1970 to more than 800,000 tonnes by 1991 (see Table III.30).

Table III.30. Production of pulp and paper, 1970-1991, selected years
(Thousand tonnes)

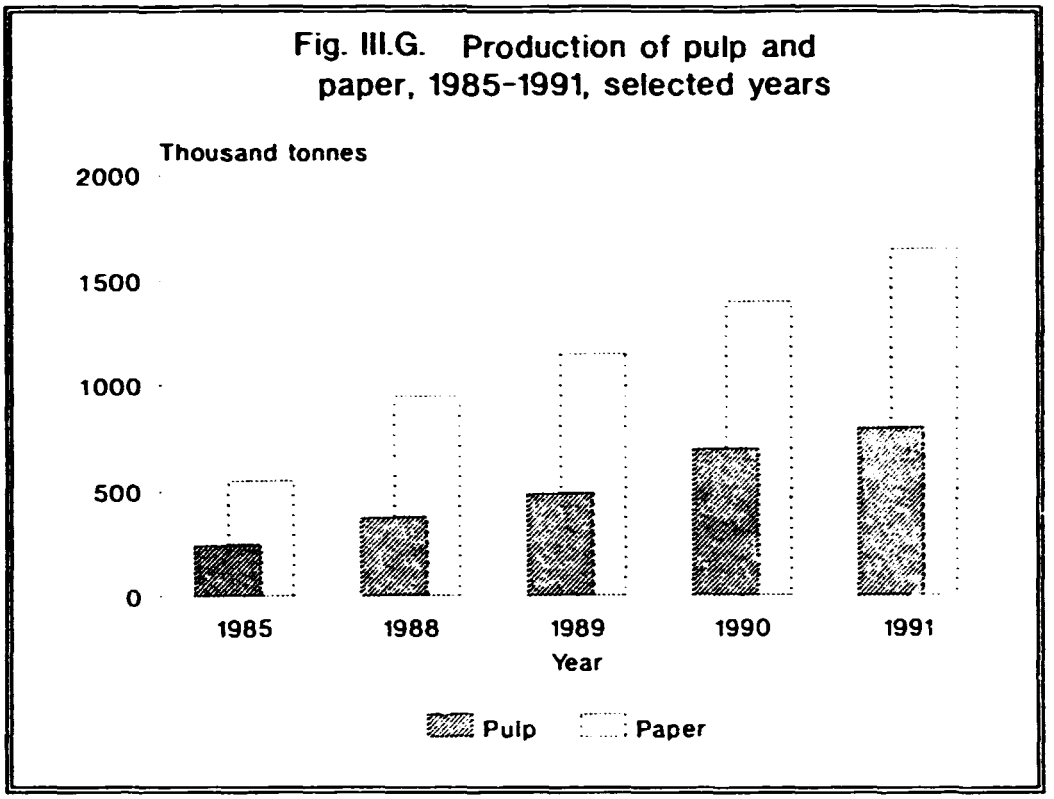
	1970	1975	1980	1985	1988	1989	1990	1991[a]
Pulp	-	-	-	245.8	378.3	490.8	701.0	801.6
Paper[b]	22.2	46.7	232.0	551.9	948.2	1,149.0	1,399.7	1,650.3

Sources "Several Industrial Pulp Projects to be Realized in the Near Future", *Indonesian Commercial Newsletter*, No. 73, 8 April 1991, Table 2, p. 46.
"Condition and Prospects of Indonesian Pulp Industry", *Indonesian Commercial Newsletter*, No. 108, 28 September 1992, Table 2, p. 10.
Government of Indonesia, *Nota Keuangan dan Rancangan Anggaran Pendapatan dan Belanja Negara*, various issues, and Supplement to the President's Report to Parliament, 15 August 1992.

a Preliminary.
b Fiscal years beginning 1 April of year indicated.

A particularly strong growth performance was recorded in 1980-1987, when a number of new publicly and privately owned manufacturing plants came on stream. These included two newsprint mills (operated by the State-owned PT Kertas Leces at Leces near Probolinggo in East Java and the privately owned PT Aspex Paper at Bogor in West Java respectively), two State-owned plants for the manufacture of kraft paper and cement sacks (PT Kertas Kraft Aceh located in the province of Aceh in northern Sumatra and PT Kertas Kraft Cilacap located in the city of Cilacap in Central Java), and a vast pulping plant established on the shores of Lake Toba in North Sumatra by the privately owned firm PT Inti Indorayon Utama. In addition, the privately owned firm PT Indah Kiat Pulp and Paper also increased its capacity significantly during this period.

A particularly ambitious project was proposed in 1987 by the Scott Paper Company of the United States and the Indonesian business group Astra International. This called for the cutting down of 200,000 hectares of virgin forest in Irian Jaya, and the establishment on this site of a plantation of a fast growing variety of eucalyptus and an integrated pulp mill. These plans prompted widespread protests by environmentalists both inside and outside Indonesia, however, which contributed to the Scott Paper Company's eventual decision to pull out of the project in October 1989.[87]



The ultimate withdrawal of the Scott Paper Company notwithstanding, the very fact that a project on such a scale had even been mooted provided a strong psychological boost to the industry. Within months of the project being aborted, industry and government spokesmen publicly declared their intention to make Indonesia the world's largest producer of pulp, paper and rayon by the end of the present century. At about the same time, a large private company announced plans to establish the world's largest single paper mill with 100 production lines, almost three times as large as the largest then existing paper mill.[88/]

The following years have witnessed a further substantial expansion and diversification of Indonesia's pulp and paper making capacity, with most major domestic conglomerates having entered the industry, often in joint ventures with foreign companies and sometimes in partnership with the State-owned enterprises in the industry.[89/] By the end of 1991, the number of pulp factories registered in Indonesia had risen to 14, with a total capacity of 1 million tonnes per year, while the number of paper mills had risen to 49, with a combined annual capacity of 3 million tonnes.[90/]

The varietal range of pulp and paper manufactured within Indonesia has expanded dramatically as a result of these investments. Whereas much of the pulp produced in the country prior to the mid-1980s was short-fibre pulp manufactured from such raw materials as rice straw, bamboo and sugar cane bagasse, the balance is gradually shifting towards the production of better-quality long-fibre pulp as a result of the establishment of the new enterprises using pulpwood as a raw material. The paper industry, which until the mid-1980s produced mainly writing and printing paper, has also diversified significantly in recent years, and now produces several different types of paper, including newsprint,[91/] kraft paper, corrugating medium, cigarette paper and tissue paper (see Table III.31).

Table III.31. Production of paper by type, 1987-1990
(Thousand tonnes)

	1987	1988	1989	1990
Type of paper:				
Newsprint	121.8	140.0	143.7	157.1
Printing and writing paper	283.8	317.7	417.7	503.8
Kraft paper	-	10.5	75.0	96.9
Kraft liner	100.7	102.0	165.5	191.5
Corrugating medium	137.3	144.2	157.9	173.6
Board	156.0	180.7	168.9	281.2
Cigarette paper	4.7	5.3	11.2	10.6
Wrapping paper	15.7	24.0	8.4	17.6
Paper tissue	6.5	6.9	6.5	5.8
Total[a/]	**826.5**	**931.4**	**1,154.8**	**1,438.1**

Source: "Condition and Prospects of Indonesian Pulp Industry", *Indonesian Commercial Newsletter*, No. 108, 28 September 1992, Jakarta, Table 9, p. 19.

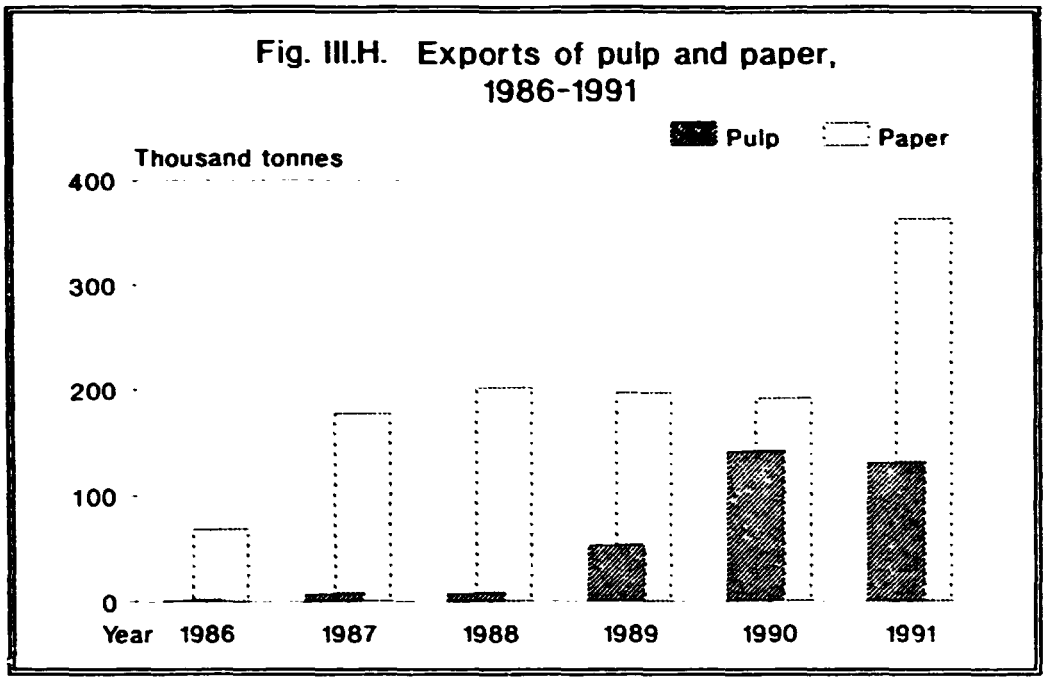
a Totals may be slightly inconsistent with those in Table III.30 due to different sources and accounting periods.

The pulp and paper industry is being developed as an import substituting industry in the first instance, albeit with the intention of tapping export markets once domestic demand for its output has been satisfied. Consequently, although Indonesia continues to import substantial quantities of pulp and paper products, it has also emerged as an increasingly important exporter, with most major domestic producers having begun to export a proportion of their output by the early 1990s. Between 1986 and 1991, Indonesia's total exports of paper consequently increased at an annual average rate of about 40 per cent from approximately 68,700 tonnes to almost 363,700 tonnes. During the same period, the country's exports of pulp increased by about 150 per cent per year, from 1,300 tonnes to 130,900 tonnes (see Table III.32).[92]

Table III.32. Exports of pulp and paper, 1986-1991
(Thousand tonnes)

	1986	1987	1988	1989	1990	1991
Paper	**68.7**	**177.1**	**202.1**	**196.8**	**192.0**	**363.7**
Printing/writing paper	36.8	96.1	113.8	124.7	112.0	224.6
Industrial paper	30.9	80.8	87.8	71.7	78.9	135.5
Tissue paper	1.1	0.1	0.4	0.4	1.1	3.6
Pulp	**1.3**	**7.5**	**7.9**	**53.3**	**141.7**	**130.9**

Sources: "Pulp and Paper Exports Up Significantly", *Indonesian Commercial Newsletter*, No. 88, 25 November 1991, Jakarta, Table 1, p. 28.
"Pulp and Paper to Become Major Export Commodities", *Indonesian Commercial Newsletter*, No. 107, 14 September 1992, Jakarta, Table 1, p. 48.



Constraints and prospects

Public concern over the risk of pollution and environmental damage poses the most severe threat to the future growth of the pulp and paper industry. As indicated above, the outrage provoked by the proposal to cut down 200,000 hectares of diversified natural forest and replace it with a monocultural timber plantation played a major part in the decision taken by the Scott Paper Company to withdraw from its intended venture in Irian Jaya in 1989. In the same year, the leading producer of pulp, PT Inti Indorayon Utama, was indicted by an environmentalist organization for the damage caused by the mill's effluent to the local environment. Although the court eventually ruled in the company's favour, the incident underlined the growing strength and awareness of the environmentalist movement in Indonesia.

In response to these mounting environmentalist pressures, the Government of Indonesia is now restricting the establishment of pulpwood estates to low-productivity grasslands and areas that have already sustained environmental damage through intensive logging operations. In addition, attempts are also being made to limit the damage caused by the waste materials generated by the pulp and paper manufacturing process. In October 1981 the national Environmental Impact Control Board (Badan Pengendalian Dampak Lingkungan, BAPEDAL) signed a cooperation agreement with the Swedish Environmental Research Institute IVL on the transfer of technology for the reprocessing of such wastes.

Hoping to overcome the environmental constraints to the future growth of pulp and paper manufacturing through measures such as these, the Government of Indonesia appears determined to promote the further development of the industry in the coming years. According to official projections revealed by the junior Minister for Industry in March 1992, the capacity of the pulp producing industry is targeted to increase from about 1 million tonnes in 1992 to almost 15 million tonnes by the end of the Seventh Five-Year Development Plan in March 2003. The capacity of the paper industry, meanwhile, is projected to increase from some 3 million tonnes to more than 7 million tonnes during the same period.[93/]

With both domestic and foreign demand for paper likely to continue increasing significantly in the foreseeable future, and with Indonesian producers likely to enjoy significant cost advantages over their foreign competitors, the prospects for the pulp and paper industry appear favourable. Even if the government's ambitious targets prove unachievable, there can be little doubt that it will expand significantly over the coming years as the large number of projects currently being implemented become operational. By the end of 1992, no fewer than 16 such projects, with a combined capacity of almost 6.5 million tonnes per annum and involving a total investment of more than $14 billion, were in progress in the pulp industry alone.[94]

D. PETROLEUM REFINING, PETROCHEMICALS, FERTILIZERS AND PESTICIDES

PETROLEUM REFINING AND PETROCHEMICALS

The resource base

Indonesia is a significant producer of petroleum. The latest available official estimates of the country's proven and probable reserves of crude oil suggested a total of about 11 billion barrels in mid-1991, but this figure is widely believed to understate its potential reserves by a substantial margin because only 36 of the country's 60 known basins have so far been explored.[95] Production has been running at approximately 1.3 million barrels per day in recent years, not far below the current estimated sustainable capacity of approximately 1.5 million barrels per day.

As well as crude oil, Indonesia also has substantial reserves of natural gas. Estimates published in mid-1991 indicated that Indonesia's reserves of natural gas amounted to approximately 91.5 trillion[96] standard cubic feet (tscf), or 15.8 billion barrels of oil equivalent (boe). Of this total, more than 67 tscf were proven deposits, with the remainder being regarded as potential reserves. Following the announcement of several further discoveries during 1992,[97] these reserves have now risen to almost 100 tscf.

The vast bulk of known reserves are located offshore around the Natuna islands in the South China Sea (41.4 per cent), and off the coasts of East Kalimantan (25.3 per cent) and northern Sumatra (15.9 per cent). So far only the latter two deposits, centred around the Arun and Badak fields, respectively, are being exploited. Negotiations on the development of the large Natuna field, which poses a number of serious technical problems,[98] were initiated in mid-1992. Approximately 71 per cent of the natural gas produced in Indonesia at present is marketed, with the remainder being used mainly by the producing companies themselves and only a small proportion being flared

OIL REFINING

Past trends

The discovery of crude oil in various parts of the Indonesian archipelago at the start of the twentieth century was soon followed by the establishment of a number of large refining complexes at Pangkalan Brandan (Aceh, northern Sumatra), Plaju and Sungai Gerong (near Palembang in South Sumatra), Cepu (Central Java), Wonokromo (near Surabaya in East Java) and Balikpapan (East Kalimantan).[99] These refineries, modernized and extended, form the basis of the Indonesian petroleum processing industry, which was augmented in the 1970s by three further refineries at Dumai and Sungai Pakning (Riau, eastern Sumatra), and Cilacap (Central Java).

During this period, the Plaju and Sungai Gerong refineries were also brought together to form the Musi refinery complex. With the exception of the Cepu refinery, which is owned by the Research and Technology Development Centre for Oil and Gas, Lemigas, all of these refineries are owned and operated by the State-owned petroleum company Pertamina. In 1991/92 the total installed capacity of these eight refineries amounted to 852,000 barrels per stream day (bsd) (see Table III.33).

Table III.33. Petroleum refining capacity by refinery, 1991/92

Refinery	Location	Installed capacity (Million barrels per day)
Pangkalan Brandan	Aceh	5.0
Dumai	Riau	110.0
Sungai Pakning	Riau	50.0
Musi	South Sumatra	123.3
Cepu	Central Java	4.0
Cilacap	Central Java	300.0
Wonokromo	East Java	2.0
Balikpapan	East Kalimantan	257.3

Source: Embassy of the United States of America, "*The 1991 Petroleum Report: Indonesia*", July 1991, Jakarta, Appendix 9.2, p. 113.

Indonesia's crude oil refining industry has historically been geared towards the production of lubricants, fuel oils and other petroleum-based products for the domestic market. Although its total capacity has traditionally exceeded local demand in overall terms, its product mix has not always matched the requirements of the domestic market, necessitating imports of a variety of petroleum products. This discrepancy between domestic demand and supply became particularly obvious in the early 1980s, when Indonesia was forced to import increasing amounts of kerosene and middle distillates while struggling to find a market for the low sulphur waxy residue produced by its existing refineries.

In order to restore a degree of balance between local production and consumption, the government initiated a major refinery expansion programme in the late 1970s and early 1980s. This resulted in the construction of secondary processing facilities at several of the existing refineries. In particular, two large hydrocrackers with a combined capacity of 145,000 bsd were installed at the Dumai and Balikpapan refineries to process residual fuel into kerosene and the middle distillates then in short supply in the country.[100]

Since the completion of this last refinery expansion programme in 1986, however, the rapid growth of economic activity has caused a new gap to open up between domestic supply and demand (see Table III.33). This has prompted a steady increase in imports of petroleum products from 5.4 million barrels in 1986 to 23.9 million barrels in 1990, with the bulk of these imports consisting of automotive diesel fuel and jet fuel. The inability of output growth to keep pace with the increase in demand has generated considerable consternation within Indonesia during recent years,[101] and caused Pertamina to consider initiating a new programme to expand the country's refinery capacity by about 600,000 bsd by 1996.[102]

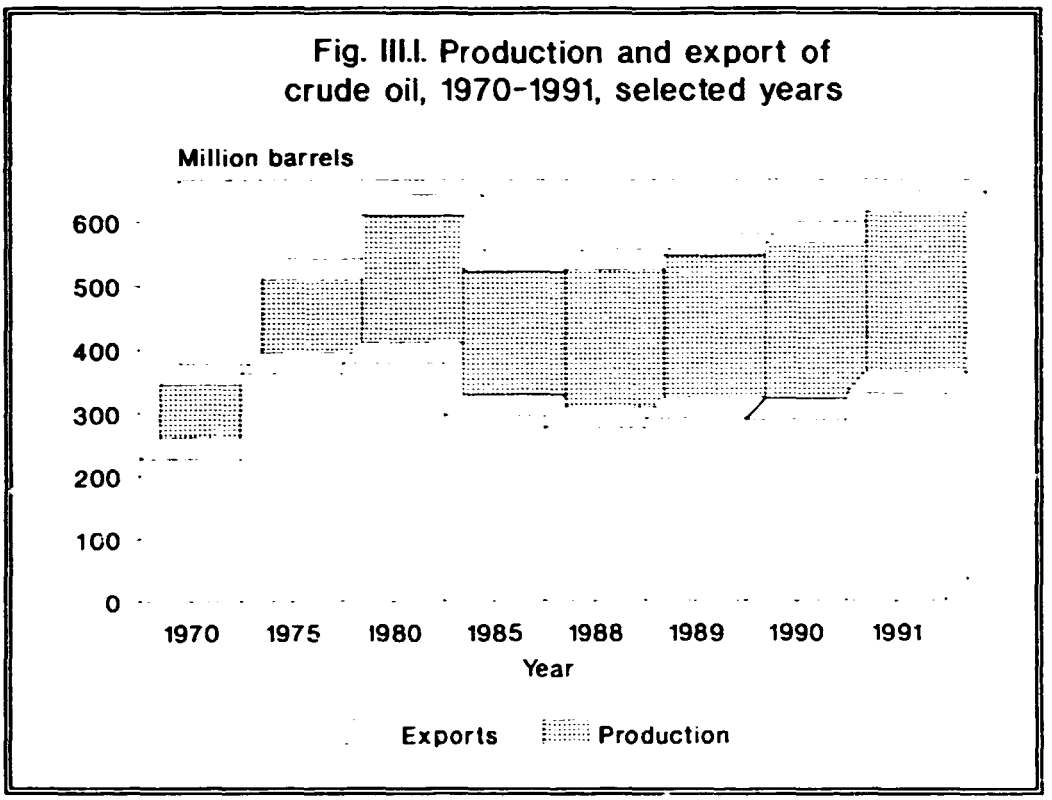
Table III.34. Petroleum supply and demand balance, 1970-1991, selected years
(Million barrels)

	1970	1975	1980	1985	1988	1989	1990	1991[a]
Crude oil								
Production[b]	311.6	476.9	577.0	489.9	491.5	514.2	533.7	581.0
Imports	0.8	2.6	32.9	32.1	31.2	28.1	47.1	54.0
Exports	228.1	363.1	378.8	295.1	276.6	291.5	288.3	330.5
Refinery inputs[c]	83.7	113.4	192.9	199.8	245.8	247.6	275.3	284.1
Refined products								
Refinery outputs	83.7	113.4	192.9	199.8	245.8	247.6	275.3	284.1
Of which:								
Kerosene			34.1	38.4	41.4	43.5	45.6	47.3
Waxy residue			55.7	25.7	47.2	40.6	41.8	44.3
Diesel			34.2	50.1	61.3	65.4	72.5	76.6
Fuel oil			18.9	19.0	18.4	18.4	26.9	27.0
Petrol			23.9	23.6	37.8	44.1	44.4	48.7
Others			12.6	29.9	26.0	21.9	28.9	24.3
Losses and fuel for refineries			13.5	13.1	13.7	13.7	15.2	15.9
Exports	36.3	36.6	53.4	47.3	63.7	55.4	57.8	56.0
Of which:								
Waxy residue	27.2	32.6	51.0	32.1	45.3	40.6	42.0	43.3
Others	9.1	4.0	2.4	15.2	18.4	14.8	15.8	12.7
Imports	2.1	15.0	21.1	2.7	13.3	21.3	23.9	21.8
Of which:								
Petrol					1.5	6.8	7.4	3.7
Diesel					8.6	13.8	13.8	15.7
Fuel oil					3.1	0.7	2.4	5.2
Others					0.1	-	0.3	0.5
Total supply	**42.0**	**85.1**	**147.1**	**142.1**	**182.4**	**199.6**	**226.2**	**234.0**
Domestic consumption	39.2	77.5	139.6	155.3	171.3	183.6	211.4	266.6
Change in stocks	2.4	7.6	7.5	-13.2	11.1	16.0	14.8	-32.6

Source Department of Mines and Energy, Directorate General of Oil and Gas, various publications.

a/ Preliminary
b/ Includes natural gas condensate
c/ Adjusted for swaps and changes in stock.

Apart from the need for additional refinery capacity generated by the continuing growth in domestic demand, there is also considerable scope for the establishment of export-oriented refinery capacity, since the bulk of Indonesia's petroleum production continues to be exported in the form of crude oil. In recognition of this potential for increasing the degree of domestic value added in Indonesia's petroleum exports, the construction was proposed in 1990-1991 of four major export-oriented refineries at Balongan (near Cirebon in West Java), Sorong (north-western Irian Jaya), Tanjung Uban (on Bintan island in the Riau archipelago some five kilometres southeast of Singapore) and in the vicinity of the Sungai Pakning and Dumai refineries in Riau. They are to be established with foreign equity participation, and will process both local and imported Middle Eastern crudes for export to Japan and the United States in particular.[103/] Originally intended to come on stream by the mid-1990s, their establishment is likely to be delayed for financial reasons, and the last of them is now expected to be inaugurated towards the end of the 1990s at the earliest.



Constraints and prospects

Since most of Indonesia's known reserves of crude oil are in relatively small fields, often of less than 200 million barrels, ongoing exploration activity is necessary to maintain the industry's capacity and sustain production levels. Such exploration is becoming increasingly difficult, however, as most of the remaining basins are located in remote areas, and often offshore in water depths of more than 200 metres. Fearing that the rate of new discoveries will not keep pace with the depletion of existing reserves, the government has taken a number of measures in recent years to conserve Indonesia's existing resources and encourage increased exploration. Significant efforts have consequently been made to introduce more fuel-efficient technologies into Indonesia and to diversify domestic energy sources. At the same time, a variety of incentives have been offered to oil companies to undertake exploratory work in frontier areas, and to adopt enhanced oil recovery (EOR) techniques to raise the yield of existing fields.

Opinions on the future of Indonesia's oil industry vary widely. Some analysts have suggested that the country's exportable surplus will disappear by the end of the 1990s as a result of stagnant production and increased domestic consumption, and that the following years will witness a gradual but steady decline in output. Others have argued that the increasing development of new fields and the adoption of EOR methods on existing fields will at the very least ensure that current production levels are maintained, and may even prompt an increase in Indonesia's production capacity.[104/] Which of these predictions proves to be more accurate will depend to a large extent on future price levels prevailing in international oil markets, and their impact on the viability of the necessary investments in exploration and development.

These uncertainties regarding the raw material supply prospects do not, however, act as a serious short term constraint on the development of the Indonesian petroleum refining industry. Indeed, a cessation of oil exports owing to increased domestic consumption would, if anything, increase the need for a domestic refining capacity, since the growth in domestic demand will inevitably be for refined petroleum products. Even a gradual decline in the production of crude oil need not necessarily threaten the short term growth of the refining industry, since a complete depletion of Indonesia's oil reserves is unlikely in the foreseeable future and the industry could in any case conceivably remain viable as a processor of imported oil.

A more binding short term constraint on the expansion of Indonesia's refining industry is posed by the shortage of financial resources in general and foreign exchange in particular. In order to overcome this constraint, the Government of Indonesia has actively sought to attract private sector involvement in the development of the petroleum refining industry, and all of the four export-oriented refinery projects proposed in recent years were intended to be set up and operated by consortia including both domestic and foreign private investors. Concerned about the burgeoning growth of Indonesia's short term commercial foreign debt in 1989-1990, the government was forced to initiate a wide-ranging rescheduling of its refinery development programme in 1991. Of the eleven large-scale refinery construction and expansion projects then under consideration, five were shelved indefinitely and the implementation of four of the remaining six was postponed to 1993/94 and 1994/95.[105/]

NATURAL GAS PROCESSING

Past trends

Indonesia's vast reserves of natural gas began to be exploited commercially in 1977/78, when plants to process the deposits of the Arun and Badak fields were installed at Lhokseumawe (Aceh) and Bontang (East Kalimantan) respectively. These plants, known as trains, liquefy the natural gas to about one-sixhundredth of its volume by cooling, thereby facilitating easier handling and transportation. From an initial complement of five trains (three at Arun and two at Badak) with a total capacity of 7.5 million tonnes per year, Indonesia's liquefaction facilities had increased to eleven trains (six at Arun and five at Badak) by the end of 1989, with a total effective capacity of more than 20 million tonnes per year. A sixth train is under construction at Badak, and expected to become operational by 1994.

The liquefied natural gas (LNG) produced at these facilities is intended entirely for export, and the growth of Indonesia's gas liquefaction industry has been linked directly to the signing of export contracts. The volume of exports has increased steadily during the past 15 years, from 620,000 tonnes when the industry was established in 1977 to an estimated 22.5 million tonnes in 1991. A particularly dramatic increase took place in the mid-1980s following the completion of four additional trains (two each at Arun and Badak) with a combined capacity of about 6.2 million tonnes per year. Since that time, Indonesia has been the world's largest exporter of LNG (see Table III.35).

In the initial stages, all of the LNG produced in Indonesia was supplied under long term contracts of 20 years or more to a consortium of Japanese utilities. Similar long term contracts, albeit on a smaller scale, were signed with utility companies in the Republic of Korea in 1983 and Taiwan Province in 1987, and became operational in 1986 and 1990 respectively. Since 1987, Indonesia has also signed several short term contracts with utilities in Japan and the Republic of Korea (see Table III.36).

Table III.35. LNG capacity and exports, 1977-1991, selected years
(Million tonnes)

	1977	1980	1985	1988	1989	1990	1991[a]
Capacity	3.20	9.60	17.10	20.10	20.10	22.60	23.00
Exports	0.62	8.60	15.47	18.51	18.69	20.64	22.50

Source: Embassy of the United States of America, *"The 1991 Petroleum Report: Indonesia"*, July 1991, Jakarta, Appendix 12.8, pp. 128-129.

a/ Estimate.

Table III.36. LNG export contracts signed 1973-1992

Year signed	Contract period	Buyers	Thousand tonnes/year
Long-term			
1973	1977/1999	Japan	8,423
1981	1983/2004	Japan	3,317
1981	1984/2003	Japan	3,303
1983	1986/2007	Republic of Korea	1,997
1987	1990/2010	Taiwan Province of China	1,540
1990	1994/2014	Japan	2,000
1991	1994/2014	Republic of Korea	2,000
1991	1992/2007	Republic of Korea	300
1992	1996/2000	Japan	200
1992	2001/2015	Japan	400
Short-term			
1987	1987/1990	Japan	699
1988	1988/1993	Japan	279
1988	1988/1997	Japan	83
1989	1990	Japan	360
1990	1991/1994	Japan	2,800
1990	1990/1993	Japan	855
1990	1990/1991	Republic of Korea	784
1991	1991	Japan	470
1991	1992/1995	Republic of Korea	2,600
1991	1992/1993	Japan	350

Sources: Embassy of the United States of America, *"The 1991 Petroleum Report: Indonesia"*, July 1991, Jakarta, Table 6, p. 48, and supplementary information

In addition to the liquefaction industry, Indonesia has also established a substantial capacity for the production of LPG from its natural gas resources (see Industrial Map). From approximately 355,000 tonnes in 1977, produced mainly as a by-product of the crude oil refining process at several of Indonesia's petroleum refineries, the volume of LPG production increased fitfully to about 800,000 tonnes in 1985-1987. A dramatic increase in output was recorded in the following years as two new LPG extraction plants with a combined capacity of 2.25 million tonnes per annum were completed at the Arun and Badak LNG processing complexes.

Although some LPG has traditionally been used as a domestic fuel within Indonesia, the bulk of the country's output has always been exported (see Table III.37). The large LPG production facilities brought on stream in the late 1980s, for example, were built specifically to enable Indonesia to fulfil a ten year contract for the shipment of 1.95 tonnes per year to Japan, which accounts for some 87 per cent of Indonesia's total LPG exports. Modest volumes are also shipped to the Republic of Korea, several neighbouring ASEAN countries, Australia, Hong Kong, and the United States.

Table III.37. Production, domestic sales and exports of LPG, 1977-1990, selected years
(Thousand tonnes)

	1977	1980	1985	1988	1989	1990	1991
Production	353.5	564.3	815.4	1,253.1	2,572.7	2,738.6	2,737.9
Domestic sales	38.2	59.6	145.6	235.1	265.2	317.4	361.6
Exports	197.7	520.4	635.4	943.8	2,481.4	2,602.1	2,528.8

Sources: Embassy of the United States of America, "*The 1991 Petroleum Report: Indonesia*", July 1991, Jakarta, Appendix 13.2, pp. 130-131.
Embassy of the United States of America, "*Petroleum Report - Indonesia - 1992*", August 1992, Jakarta, Appendix 13.1, p. 83.

Apart from producing LNG and LPG for export, Indonesia is increasingly beginning to utilize its natural gas resources to meet its domestic fuel requirements and as a feedstock for the rapidly expanding domestic petrochemical industry.[106] Several cement plants and power stations have been converted to operate on natural gas in recent years, and the consumption of city gas rose from 1,674 million scf in 1987 to 12,522 mscf in 1990. Since 1987 the government has also been promoting the use of compressed natural gas (CNG) to fuel public transport vehicles, and a number of taxi companies in Jakarta have already re-equipped a part of their fleet to run on CNG.

Constraints and prospects

The large number of export contracts for LNG signed in recent years reveal a strong overseas demand for Indonesia's natural gas, which is widely appreciated as an efficient and non-polluting fuel. Domestic demand for natural gas also appears set to rise significantly in the coming years in response to the numerous recent efforts of the government to diversify domestic fuel consumption patterns, and in particular to promote the use of natural gas. These trends clearly augur well for the continued growth of the gas processing industries.

To meet the growing demand for its natural gas resources, Indonesia will have to invest heavily in the development of new sources of supply, since the Arun and Badak fields currently being exploited do not have sufficient reserves to fulfil Indonesia's export obligations for the next two decades. The development of the Natuna field with its estimated reserves of 45 tscf has therefore become a particularly urgent priority, and negotiations on the matter were initiated between Pertamina and the United States firm Exxon in 1992. By the end of the year it was announced that agreement had been reached in principle, paving the way for the field's development at an estimated cost of some $17 billion.[107]

The discovery in April 1992 of a new natural gas field at Kuala Langsa in northern Sumatra provides an additional source of raw materials. This field is located near the existing Arun processing complex, and has estimated reserves of about 7 tscf. If the evaluation procedures currently in progress yield positive results, this field could provide Indonesia with an easily accessible gas stream sufficient to meet most of its external obligations and domestic needs for the foreseeable future, and obviate the need for an early development of the Natuna field.[108]

Apart from these possible raw material problems, the natural gas processing industry is also faced with the same financial constraints that confront the oil refining industry. Of the three projects in this field under consideration at the time of the 1991 rescheduling exercise, only one, the construction of the sixth liquefaction train at Badak, was permitted to proceed without delay. The other two, a debottlenecking project covering the first four LNG trains at Badak and a project for the construction of an LPG plant in southern Sumatra, have been postponed indefinitely.[109]

PETROCHEMICALS

Past trends

The establishment of a comprehensive petrochemical industry based on Indonesia's extensive oil/gas resources has been an important objective of the government of Indonesia since the mid-1970s. In pursuing this goal, the government has sought both to reduce Indonesia's dependence on imports of such products, and to increase the degree of domestic value added in the country's exports of oil and natural gas. From the outset, however, the achievement of this objective has been hampered by the heavy capital requirements of this component of the industrialization process. With the exception of a then still modest chemical fertilizer industry, which will be discussed separately below, Indonesia's capacity for the production of petrochemicals was therefore limited to a polypropylene plant at the Plaju refinery in South Sumatra until the late 1970s.[110]

Spurred by the large windfall earnings generated by the rise in oil prices in 1979-1981, the government of Indonesia drew up a number of large-scale industrial and infrastructural projects, among which two upstream petrochemical projects took pride of place. One was a $1.5 billion aromatics centre proposed for Plaju, which was intended to produce substantial quantities of benzene, paraxylene, orthoxylene, toluene and purified terephthalic acid (PTA) from naphtha produced at the Plaju and Sungai Gerong oil refineries. The other was a $1.6 billion olefin centre proposed for the Lhokseumawe natural gas processing complex in Aceh, which was intended to produce ethylene from locally obtained natural gas and process this further into both low- and high-density polyethylene and vinyl chloride monomer (VCM), with caustic soda being produced as a by-product.[111] However, budgetary and balance of payments pressures arising from the accelerating decline in oil prices after 1981 caused the government to review its development priorities in 1983, when these and 45 other capital and import intensive projects with a total value of some $21 billion were shelved.[112]

Despite persistent shortages of financial resources, the petrochemical industry experienced a steady growth in the mid-1980s, with a domestic manufacturing capacity being established for a number of products including alkyl benzene, PTA and methanol during this period (see Table III.38). A significant revival of the government's plans to develop a petrochemical industry did not take place until mid-1988, however, when an ambitious programme comprising 21 separate projects with a combined investment value of $4.5 billion was announced by the Minister for Industry.[113] By this time a progressive liberalization of industrial and investment regulations had also paved the way for a much larger involvement by the private sector, which was actively encouraged to invest in the industry.

This programme has had to be modified frequently since its announcement in 1988 to accommodate changing investor interests and the government's concern to restrain the growth of Indonesia's foreign commercial debt.[114/] In spite of these changes, however, the petrochemical industry has begun to show some growth in recent years. In December 1990 a paraxylene plant, which also produces benzene, was inaugurated at the Cilacap refinery in Central Java.[115/] This was followed by the inauguration of a polyester plant in Purwakarta in West Java in November 1991, and of Indonesia's second polypropylene factory in Cilegon in West Java in June 1992.[116/]

Table III.38. Production of selected petrochemicals, 1986-1990
(Tonnes)

	1986	1987	1988	1989	1990
Purified terephthalic acid (PTA)	56,000	122,245	120,969	116,920	127,500
Polypropylene	-	1,750	6,000	3,700	6,137
Polyvinyl chloride (PVC)	87,465	83,131	80,828	108,414	161,902
Polystyrene	13,333	11,860	13,155	12,802	14,121
Vinylchloride monomer	-	-	-	62,504	57,000
Methanol	100,000	183,724	253,157	289,535	291,331
Alkyl benzene sulphonate	-	55,300	66,000	69,089	76,794

Sources: "Humpuss Group takes part in Partamina's Petrochemical Project", *Indonesian Commercial Newsletter*, No. 63, 12 November 1990, Jakarta, Table 1, p. 43
"Construction of a Private-run PTA Project Starts", *Indonesian Commercial Newsletter*, No. 84, 23 September 1991, Jakarta, Table 1, p. 40.
"Condition and Prospects of Plastic Raw Material Industry", *Indonesian Commercial Newsletter*, No. 77, 10 June 1991, Table 6, p. 17.
"PT Asahimas Subentra Chemical to Double its PVC Production Capacity", *Indonesian Commercial Newsletter*, No. 87, 11 November 1991, Table 3, p. 49.
"Humpuss Group Again Strengthens its Position in the Methanol Industry", *Indonesian Commercial Newsletter*, No. 98, 27 April 1992, Table 2, p. 39
"Domestic Consumption of Alkyl Benzene Sulfonate Increases", *Indonesian Commercial Newsletter*, No. 114, 21 December 1992, Table 1, p. 35

In addition to the increasing production of upstream and intermediate petrochemicals, recent years have also witnessed a significant expansion of industries manufacturing end-use products (see Table III.39) from petrochemical raw materials, many of which are still imported. One of the first of these industries to be established in Indonesia was the PVC pipe industry, which began on a modest scale in the early 1970s, but by 1990 had expanded to include ten large manufacturers with a total capacity of 62,150 tonnes per year and a large number of smaller producers with an estimated combined capacity of about 43,000 tonnes per year.[117/] The plastic bag industry is similarly well established, comprising 54 producers with a total capacity of 490 million bags per year, and has also recorded a strong growth in output since the mid-1980s. In contrast to many other petrochemical-based industries, which play a largely import-substituting role, this industry has also been extremely successful in penetrating overseas markets, with the volume of exports rising from 11 tonnes in 1985 to an estimated 11,700 tonnes in 1991.[118/] The polyurethane foam industry is also relatively well established, and currently comprises seven firms with a total annual capacity of almost 5,000 tonnes.[119/]

More recently, a considerable capacity has been established for the production of oriented polypropylene (OPP) film, polyethylene terephthalate (PET) bottles, and plywood adhesive (urea formaldehyde and phenol formaldehyde). OPP film, which is used mainly as a packaging material, first began to be produced in Indonesia in 1983, and is now manufactured by four companies with a combined annual capacity of about 30,600 tonnes.[120] PET bottles, which are increasingly being used as containers for mineral water and soft drinks, began to be produced in Indonesia in 1986, and are now manufactured by two companies.[121] The plywood glue industry, finally, also had its origins in the early 1980s, and currently comprises some 20 companies with a total annual capacity of 995,000 tonnes.[122]

Table III.39. Production of petrochemical-based end-use products, 1986-1990
(Tonnes except as indicated)

	1986	1987	1988	1989	1990
Oriented polypropylene film	7,564	10,045	12,054	15,050	17,300
PVC pipes	55,400	57,196	60,170	61,800	74,670
Plastic bags (Million units)	376	400	430	442	468
Plywood glue	442,920	543,500	618,143	727,961	833,700

Sources: "Condition and Prospects of OPP (Oriented Polypropylene) Film Industry", *Indonesian Commercial Newsletter*, No. 82, 26 August 1991, Jakarta, Table 3, p. 15.
"Condition and Prospects of PVC Pipe Industry in Indonesia", *Indonesian Commercial Newsletter*, No. 80, 22 July 1991, Jakarta, Table 3, p. 12.
"Receipts from Exports of Plastic Bags from Indonesia Continue to Increase", *Indonesian Commercial Newsletter*, No. 83, 9 September 1991, Jakarta, Table 1, p. 29.
"High Utilization of Plywood Glue Production Capacity Encourages New Investments", *Indonesian Commercial Newsletter*, No. 81, 12 August 1991, Jakarta, Table 1, p. 40.

Constraints and prospects

As with the oil refining and natural gas processing industries, the petrochemical industry has also been subjected to government restraints as a result of the project rescheduling measures initiated in 1991.[123] These required the postponement of three major petrochemical projects: an aromatics centre at the Arun complex at Lhokseumawe intended to produce paraxylene and benzene;[124] a residual catalytic cracker at the Cilacap oil refinery intended to produce polypropylene and a number of other materials; and an olefin centre at Cilegon in West Java proposed by a local company, PT Chandra Asri, belonging to a group of well-connected businessmen, which is intended to produce ethylene, polyethylene, pyrolysis gasoline and polypropylene.

Not all of these restrictions have been binding, however, and the more astute investors have found ways of proceeding with their projects. The most celebrated example of such an adjustment to changed circumstances has been provided by PT Chandra Asri, which avoided an officially mandated rescheduling of its project to 1994 by reconstituting itself as a wholly foreign-owned venture held by offshore companies owned by the Indonesian investors.[125] With construction having commenced in February 1991, this plant is expected to come on stream by 1994.

In addition to these large-scale upstream projects, a number of smaller-scale downstream projects for the manufacture of intermediate petrochemical products are also currently in progress. These include several plants for the production of polystyrene, polyester resin, acrylic resin, polyvinyl chloride, polypropylene, polyethylene, methyl tertiary butyl ether, methanol, butylene, butadiene, toluene diisocyanate, pyrogas, PTA, caustic soda, soda ash and ammonium chloride.[126] While not all of these projects will necessarily be implemented on schedule,[127] a sufficiently large number are expected to be completed within the next few years to ensure a dramatic expansion and diversification of Indonesia's petrochemical production.

Many of the end-use products industries are also in the process of substantial further expansion. The PVC pipe industry has attracted considerable investment interest in recent years, for example, and fifteen projects with a combined capacity of almost 70,000 tonnes per year were approved by the investment authorities in 1991 and the first eight months of 1992.[128] Similarly, the plastic bag industry has also continued to attract high levels of investment interest, with 20 projects having been approved in 1991.[129] The plywood glue industry, which at present faces occasional raw material constraints because of Indonesia's limited methanol production capacity, is also projected to experience a further expansion following the granting of investment licences to four companies in the eighteen months to the end of June 1992.[130]

AGROCHEMICALS - FERTILIZERS AND PESTICIDES

The resource base

Indonesia produces both inorganic and organic fertilizers, and a variety of chemical pesticides. The petroleum and natural gas industries provide the principal raw materials for the production of inorganic fertilizers, and are also an important source of the raw materials used by the manufacturers of pesticides. The production of organic fertilizers, meanwhile, is based principally on the large volumes of compostable plant waste produced in Indonesia, and on local deposits of phosphates and dolomite.

FERTILIZERS

Past trends

The establishment and evolution of the inorganic fertilizer industry is closely linked to the long-standing efforts of the government to attain self-sufficiency in the production of rice. It received its main growth impetus from the introduction and rapid diffusion of highly fertilizer-intensive "green revolution" cultivation technologies from the early 1960s onwards, which prompted the government to initiate a number of wide-ranging programmes to provide rice farmers with subsidized fertilizer. In order to be able to meet the growing demand for chemical fertilizers stimulated by these programmes, and supported by the ready availability of the necessary raw material resources, the government has invested heavily in the industry since the 1960s, which has resulted in the establishment of a large and diversified domestic manufacturing capacity.[131]

The Indonesian chemical fertilizer industry had its origins in 1963, when a then still relatively small firm with an annual production capacity of 100,000 tonnes of urea, PT Pupuk Sriwijaya (PUSRI), was inaugurated at Palembang in South Sumatra. This was followed in 1972 by the establishment of manufacturing facilities for ammonium sulphate, triple super phosphate (TSP) and diammonium phosphate (DAP) at PT Petrokimia Gresik, a company located at Gresik on the outskirts of Surabaya in East Java. After another hiatus of seven years, four new urea factories were

inaugurated in quick succession between 1979 and 1985: PT Pupuk Kujang in Cikampek, West Java; PT Pupuk Kalimantan Timur (Kaltim) at Bontang in East Kalimantan; and two plants at Lhokseumawe in Aceh, PT ASEAN Aceh Fertilizer and PT Pupuk Iskandar Muda. As a result of the opening of these plants and subsequent capacity expansions, the industry grew very rapidly during the 1980s, and by 1992 had the capacity to produce more than 5 million tonnes of urea and 1.8 million tonnes of TSP, DAP and ammonium sulphate.

Because of the critical importance of chemical fertilizers in supporting the achievement of the goal of self-sufficiency in rice production, the government of Indonesia has historically regarded fertilizer production as a strategic industry. From the outset, therefore, it has imposed strict controls on the production and distribution of fertilizers, and five of the six fertilizer manufacturing enterprises currently in operation are consequently State-owned. The sixth, PT ASEAN Aceh Fertilizer, is an ASEAN Industrial Project jointly owned by the governments of Indonesia, Malaysia, the Philippines, Singapore and Thailand.

Production trends since the 1970s have followed the growth in capacity (see Table III.40). From a mere 103,000 tonnes of urea in 1970, the output of Indonesia's chemical fertilizer industry increased to a peak of some 5 million tonnes of urea, almost 1.3 million tonnes of TSP/DAP and more than 650,000 tonnes of ammonium sulphate in 1990. Although a modest fall in output was registered in 1991, this represented a temporary phenomenon caused by unfavourable climatic conditions, which prompted a drop in agricultural demand for fertilizer.[132]

Table III.40. Production of chemical fertilizers, 1970/71-1991/92, selected fiscal years
(Thousand tonnes)

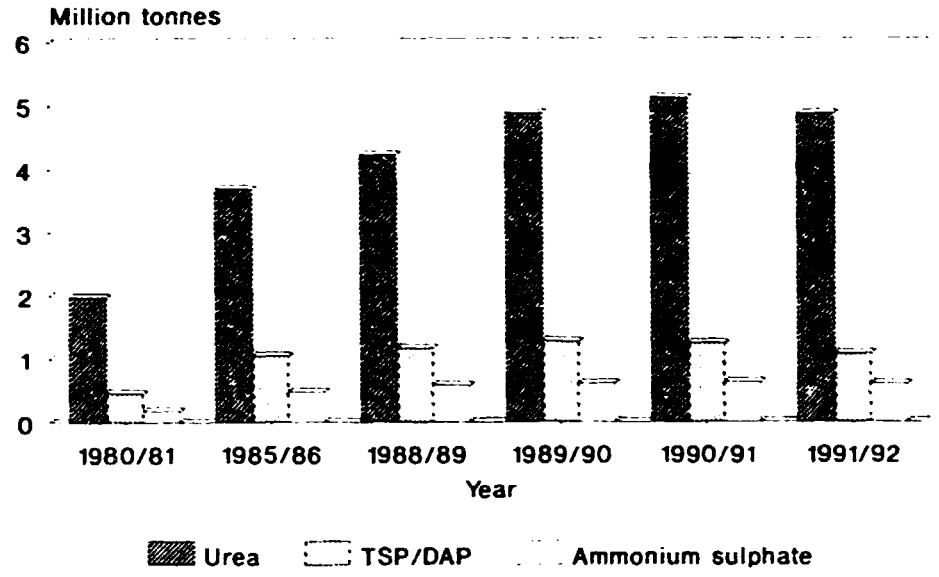
	1970/71	1975/76	1980/81	1985/86	1988/89	1989/90	1990/91	1991/92[a]
Urea	102.9	387.4	1,985.1	3,690.0	4,245.9	4,891.6	5,131.1	4,881.2
TSP/DAP	-	-	465.0	1,051.0	1,166.0	1,273.2	1,244.7	1,088.3
Ammonium sulphate	-	113.8	180.8	482.0	586.1	614.9	636.3	602.5

Sources Government of Indonesia, *Nota Keuangan dan Rancangan Anggaran Pendapatan dan Belanja Negara*, various issues, and Supplements of the President's Reports to Parliament, 16 August 1988 and 15 August 1992

a/ Preliminary

The bulk of Indonesia's output of chemical fertilizer has traditionally been utilized by the domestic agricultural sector, although the development of the plywood adhesive industry during the 1980s has provided an additional market for locally produced urea. As domestic production has expanded in recent years, moreover, Indonesia has also emerged as a significant exporter of urea. Since 1977, when the first small shipments were despatched to some neighbouring ASEAN countries, India and Australia, Indonesia's urea exports have risen steadily, and by 1991 amounted to more than 1.8 million tonnes. Exports of other fertilizers have remained modest, however, fluctuating between a few hundred and a few thousand tonnes per year in the latter half of the 1980s.

Fig. III.J. Production of chemical fertilizers, 1980/81-1991/92, selected years



In addition to its large chemical fertilizer industry, Indonesia has also begun to develop a manufacturing capacity for natural fertilizers. The first of these firms, which has a production capacity of 144,000 tonnes of compost per year, was established in 1975 in Medan, North Sumatra. Between 1980 and 1987 eight further plants were established in Medan and at various locations in East and West Java. They have a combined annual capacity of 160,000 tonnes of phosphatic and dolomite-based fertilizers.[133]

Constraints and prospects

With all of Indonesia's chemical fertilizer plants now operating at close to full capacity, a further expansion of production is hampered by capacity constraints in the short term. Anticipating a substantial increase in both domestic and overseas demand for fertilizer in the coming years, the government has therefore launched a major programme to expand, or optimize the use of, Indonesia's existing capacity. This programme, which covers all of the country's six manufacturers of fertilizer, is being supported by a number of international donor organizations, including the World Bank.[134]

At PT PUSRI, capacity is to be increased from 1.52 million tonnes per year to 2.2 million tonnes per year during the course of 1993 as a result of the completion of a new production unit with a capacity of 570,000 tonnes per year and improvements in the productivity of several other units. PT Petrokimia Gresik, which has hitherto only produced TSP, DAP and ammonium sulphate, is currently in the process of establishing a plant for the production of ammonia with a capacity of some 460,000 tonnes per year. In addition, PT Pupuk Kujang, PT ASEAN Aceh Fertilizer, PT Pupuk Kaltim and PT Pupuk Iskandar Muda, are all engaged in measures to enhance production efficiency, which will increase their combined output capacity by about 500,000 tonnes per year.

In recognition of the constraints on the expansion of the fertilizer industry imposed by the high degree of control exercised by the State, which resulted in an effective exclusion of private entrepreneurs from the industry, the government permitted private investment in the production of fertilizers from 1990 onwards. This resulted in a joint venture being established between PT Pupuk Kujang and several private firms, including the large and diversified Humpuss conglomerate, for the construction of a new urea plant, Pupuk Kujang II, with an installed capacity of 570,000 tonnes per year. Although the implementation of this project has been delayed by the restrictions on overseas commercial borrowing introduced by the government in 1991, it is expected to be completed by 1996 or 1997.

PT Pupuk Kaltim, which with a capacity of 1.7 million tonnes is already the world's largest producer of urea, has also drawn up plans for the establishment of a new production unit with an annual capacity of 570,000 tonnes. This project has likewise been delayed as a result of the foreign borrowing restrictions imposed by the government. There is a strong likelihood that this project will be started by the mid-1990s, however, and that it will be completed by the end of the 1990s.

Indonesia's small natural fertilizer industry, which experienced its last major expansion in 1988 when a plant with an annual capacity of 30,000 tonnes was brought on stream, also appears set to grow further. By mid-1991, the National Investment Coordination Board had approved four major investment projects with a total capacity of 550,000 tonnes per year. These involve three entirely new plants, and an expansion of an existing plant.[135]

PESTICIDES

Past trends

Indonesia's pesticide formulation industry, which manufactures end-use pesticides, dates back to 1972, when the Indonesian subsidiary of the German chemicals firm Bayer established a production facility at Cibubur on the outskirts of Jakarta. Boosted by the government's active promotion of "green revolution" production technologies for rice, this industry expanded rapidly throughout the 1970s and early 1980s, attracting large numbers of new investors and recording a steady and substantial output growth. By 1986/87, production had increased to more than 58,000 tonnes.

The strong growth performance of the pesticide formulation industry, which was based on the local mixing of imported inputs, encouraged the emergence of a domestic industry for the production of active ingredients in the early 1980s. The first plant for the production of these materials, operated by the State-owned firm PT Petrosida Gresik, was inaugurated in October 1984. Located at the Petrokimia Gresik complex near Surabaya in East Java, it has the capacity to produce some 4,000 tonnes of various active agents per year. Over the following two years, manufacturing facilities for these products were installed by two private companies, which initially had a combined production capacity of 300 tonnes per year. Over the years, this has been expanded to more than 5,000 tonnes per year.

The growth of the pesticide industry suffered a severe setback in 1986, however, when the appearance of a new pesticide-resistant biotype of the *wereng* leafhopper pest prompted a review of the government's policy towards the use of chemical pesticides. In response to recommendations from experts of the International Rice Research Institute, who argued that the excessive use of unsuitable pesticides had upset the ecological balance by killing off the leafhopper's natural predators, the government banned the use of 57 varieties of pesticides in late 1986.[136] Since then, it has promoted the concept of "integrated pest management", which calls

for the use of chemical pesticides to be minimized and for natural predation to play a much greater role in pest control. This policy shift culminated in the withdrawal of the subsidy on chemical pesticides in 1989, which made them unaffordable for most of Indonesia's peasant cultivators.

These developments have arrested the growth of pesticide production in Indonesia (see Table III.41). After peaking at approximately 58,000 tonnes in 1986/87, the production of pesticide formulations has fluctuated at significantly lower levels in the past few years. The production of active ingredients similarly peaked at 3,500 tonnes in 1986/87 before dropping to a low of only 1,400 tonnes in 1989/90, from which it is gradually recovering.

Table III.41. Production of pesticides, 1970/71-1991/92, selected fiscal years
(Thousand tonnes)

	1970/71	1975/76	1980/81	1985/86	1988/89	1989/90	1990/91	1991/92[a/]
Pesticide formulations	-	2.3	25.7	54.8	36.3	21.0	35.5	29.0
Active ingredients	-	-	-	3.3	3.0	1.4	1.7	2.8

Sources: Government of Indonesia, *Nota Keuangan dan Rancangan Anggaran Pendapatan dan Belanja Negara*, various issues, and Supplements of the President's Reports to Parliament, 16 August 1988 and 15 August 1992.

a/ Preliminary.

Faced with the sharp contraction of domestic demand, the Indonesian pesticide industry has increasingly turned towards export markets in recent years. The volume of exports thus increased from 2,093 tonnes in 1986 to 7,473 tonnes in 1990, and in 1991 was registered at 3,584 tonnes and 420,660 litres. Brazil has been the most important destination of these exports, with significant quantities also being shipped to Belgium, Luxembourg and Malaysia.[137/]

Constraints and prospects

The prospects of the pesticide industry continue to be clouded by the effective cessation of pesticide use in Indonesia's domestic agriculture. The ability of several major Indonesian pesticide producers to penetrate overseas markets has restored some confidence to the industry, however, which is now beginning to expand again. Three new privately owned companies manufacturing active ingredients commenced production in 1991, and proposals by another to establish a plant in Bekasi near Jakarta were approved by the investment licensing authorities in 1990. Although no dramatic growth is likely in the coming years, there is some scope for further expansion associated with the relocation of plants from the developed countries, where pesticide producers are coming under increased pressure from environmentalists.

E. NON-METALLIC MINERAL PRODUCTS (BUILDING MATERIALS)

CEMENT

The resource base

Indonesia is well endowed with the non-metallic minerals required for the development of a cement industry, including limestone, quarz sand and clay. Substantial deposits of these materials,

of which only a relatively small proportion have so far been exploited for the manufacture of cement, are scattered throughout the archipelago. Recent reports suggest, for example, that the Kotabaru and Sungai Selatan areas of the province of South Kalimantan alone have unutilized limestone reserves of almost 950 million tonnes, while the Bohorok area of North Sumatra has limestone reserves of some 870 million tonnes.[138/]

In addition to the mineral inputs, the other principal resource required for the production of cement is energy, substantial quantities of which are needed to fuel the kilns used for heating these materials as part of the cement manufacturing process. With its abundant reserves of crude oil, natural gas and coal, Indonesia is well placed in this regard as well. Coal, in particular, has emerged as an important energy source for the cement industry in recent years, with a number of existing coalfields having been modernized and several large new fields having been discovered and developed since the mid-1980s.[139/]

Past trends

The Indonesian cement industry dates back to 1910, when a relatively small manufacturing facility was established at Indarung in the town of Padang, West Sumatra. This company, now State-owned and known as PT Semen Padang, remained the only cement producer in Indonesia until 1957, when a second State-owned company, PT Semen Gresik, began manufacturing cement in the industrial town of Gresik near Surabaya in East Java. By 1969, when the New Order government launched its long-term programme for Indonesia's economic development with the inauguration of the First Five-Year Development Plan, the total number of cement plants had increased to three. All of these were State-owned, and had a combined capacity of 645,000 tonnes per year.

The intervening years have witnessed a considerable expansion of the industry, which by mid-1992 consisted of nine widely dispersed companies with a total number of 27 production units and an overall capacity of 20.4 million tonnes. Of the nine companies, four are owned entirely by the State, and a fifth, PT Semen Gresik, was partially privatized in mid-1991 when it floated 40 million shares on the Jakarta Stock Exchange. In addition, the government also has a significant stake in two of the remaining four companies, PT Indocement Tunggal Prakarsa and PT Semen Cibinong, both of which are officially classified as domestically-owned private enterprises. The other two of these four companies, PT Semen Andalas Indonesia and PT Semen Nusantara, comprise joint ventures between local and foreign business interests (see Table III.42).

Production has increased in line with the growth in capacity since 1970 (see Table III.43). From less than 570,000 tonnes in 1970/71, Indonesia's output of cement rose steadily to more than 16.4 million tonnes in 1991/92. Although more than 90 per cent of the cement produced in Indonesia consists of grey cement (Portland type I), the country now also has a modest capacity for the production of several other varieties, such as white cement, flyash cement and oil-well cement.

The cement industry has been developed on an essentially import substituting basis protected by substantial tariffs, which were only abolished in October 1990 in response to a temporary cement shortage in the domestic market. By this time a sufficiently large capacity had been established to meet domestic demand in all but the most exceptional of circumstances, however, and only marginal quantities of cement have been imported since the tariffs were lifted. Exports have also been tightly regulated since the 1970s, with shipments being permitted only if any surpluses remained after domestic demand had been met. Despite these restrictions, Indonesia's cement exports have risen substantially since the 1980s, from an annual average of about 425,000 tonnes in 1981-1985 to 2.6 million tonnes in 1986-1991.[140/]

Table III.42. The cement industry, 1992

Name of company	Status	Location/ province	Production units	Capacity (Thousand tonnes/year)
PT Semen Padang	State-owned	Padang, West Sumatra	5	2,730
PT Semen Gresik	State-owned	Gresik, East Java	4	1,500
PT Semen Tonasa	State-owned	Tonasa, South Sulawesi	2	1,180
PT Semen Cibinong	Private domestic	Narogong, West Java	3	3,000
PT Indocement Tunggal Perkasa	Private domestic	Citeureup, West Java and Cirebon, West Java[a/]	9	9,400
PT Semen Nusantara	Foreign joint venture	Cilacap, Central Java	1	1,000
PT Semen Baturaja	State-owned	Baturaja, South Sumatra	1	500
PT Semen Andalas Indonesia	Foreign joint venture	Belawan, Aceh, Sumatra	1	1,000
PT Semen Kupang	State-owned	Kupang, East Nusa Tenggara	1	120
Total			**27**	**20,430**

Source: "Condition and Prospects of Cement Industry", *Indonesian Commercial Newsletter*, No. 105, 10 August 1992, Jakarta, Table 1, p. 17.

a/ Following the takeover in 1992 of another privately owned domestic company, PT Tridaya Manunggal Perkasa Cement, with an annual capacity of 1.2 million tonnes.

Table III.43. Cement production, 1970/71-1991/92, selected fiscal years
(Million tonnes)

	1970/71	1975/76	1980/81	1985/86	1988/89	1989/90	1990/91	1991/92[a]
Cement	0.6	1.2	5.9	10.0	13.3	14.2	15.9	16.4

Sources: Government of Indonesia, *Nota Keuangan dan Rancangan Anggaran Pendapatan dan Belanja Negara*, various issues, and Supplements of the President's Reports to Parliament, 16 August 1988 and 15 August 1992.

a/ Preliminary.

Constraints and prospects

The Indonesian cement industry faces no significant input constraints. The availability of substantial untapped reserves of raw materials in many parts of the country provides it with a firm basis for expansion, and a widespread shift to the use of coal as a low-priced fuel has greatly enhanced its international competitiveness.[141/] The demand prospects are also perceived to be broadly favourable, with the domestic market expected to continue to absorb growing quantities in the coming years as Indonesia's economic development proceeds, and export markets also believed to have a substantial scope for expansion.

This generally optimistic appraisal of the industry's outlook has prompted a number of Indonesian investors to draw up plans for the establishment of new cement factories. Between the beginning of 1991 and mid-1992 the licensing authorities approved no less than 12 new investment projects with a combined capacity of approximately 18.5 million tonnes per year, all of which are scheduled to become operational by 1995.[142/] In addition, three existing producers - PT Semen Gresik, PT Semen Padang and PT Sement Tonasa - are in the process of establishing new production units with a total capacity of about 6 million tonnes per year.[143/] Finally, a recently mooted plan to construct a bridge linking the coast of East Java with the offshore island of Madura has prompted one business group to reconsider an earlier proposal for the construction of a cement plant with an annual capacity of 1.2 million tonnes per year on Madura.[144]

Despite the encouraging demand prospects noted above, there must be some doubt about the marketability of the proposed increase in production if all of the intended investment projects are implemented on schedule, since this will result in more than doubling the cement industry's existing capacity within the next five years. It is widely acknowledged that the domestic market will not immediately be able to absorb all of the additional output, and that much of it will therefore have to be exported. Although several of the new plants have been consciously planned to be export-oriented in recognition of this fact, it remains uncertain whether they will be able to penetrate export markets with sufficient speed and on a sufficient scale to be able to utilize fully the new capacity that they are installing. There is a distinct likelihood, therefore, that the industry will operate with a considerable degree of excess capacity in the latter part of the 1990s, while markets are developed for the newly established plants.

CERAMICS

The resource base

Indonesia possesses abundant reserves of the raw materials required to support a ceramics industry, including common clay, white clay (kaolin), calcspar, feldspar and quartz. These deposits are spread throughout the country, and can be mined or quarried with relative ease.[145/] The only raw materials that need to be imported in any significant quantities are outer lining materials, such as glaze, colour stains and gypsum.

Past trends

Although some manufacturing facilities exist in Sumatra and Kalimantan, the Indonesian ceramics industry is confined largely to Java, where it benefits both from the adequate availability of raw materials and the highest concentrations of demand in the country. It is highly diversified in terms of its output mix, however, with products ranging from traditional handicrafts to tableware, sanitary fittings, tiles and bricks. The scale of the production units also varies enormously from modest cottage establishments to large commercial enterprises.

In terms of both manufacturing value added and gross output, the manufacturers of sanitary fittings and wall and floor tiles constitute the most important segments of the ceramics industry. Although both have existed in Indonesia for a comparatively long time, the volume and quality of their output remained modest until after the early 1980s, when an accelerating growth in the construction of residential and commercial buildings generated a boom in demand for high-quality sanitary fittings and tiles (see Table III.44). These products are now increasingly displacing the terrazzo and cement floors, walls and fittings that characterized earlier construction practices.

By 1990 the sanitary fittings industry had grown to include eight major companies with a combined production capacity of 2.4 million units per year. It is dominated by two foreign joint ventures, with partners from Japan and the United States, respectively, which together accounted for almost 60 per cent of the industry's total capacity in 1990. Except for one medium-sized plant in Sumatra, the industry is located entirely in Java, with three of the five largest plants being located on the outskirts of Jakarta.

The floor and wall tile industry consisted of 22 separate firms with a total capacity of 48.5 million square metres in 1991. Most of these producers were relatively small, however, with annual production capacities ranging from 100,000 square metres to about 2.5 million square metres, and the industry was dominated overwhelmingly by one company, the Jakarta-based PT Serinco Djaya Marmer Industries, which had an annual production capacity of 26.1 million square metres.[146] As in the sanitary fittings industry, the floor and wall tile industry is also located predominantly in Java, with only three of its 22 firms in 1991 being sited elsewhere.

Both industries have exhibited a rising production trend in recent years, although the actual rate of production growth has varied considerably between the two industries. Official data thus show that the output of the sanitary fittings industry increased at an annual average rate of only 1.3 per cent between 1985 and 1990, from approximately 1.1 million units to less than 1.2 million units. During the same period the output of the floor and wall tiles industry expanded at an impressive average annual rate of 17.1 per cent, from about 12 million square metres to almost 26 million square metres.

Table III.44. Production of principal ceramic products, 1985-1990

	1985	1986	1987	1988	1989	1990
Sanitary fittings (Thousand units)	1,104	1,106	1,110	1,114	1,129	1,176
Floor and wall tiles (Thousand square metres)	11,996	12,831	13,550	15,718	19,800	25,970

Source: "Condition and Prospects of Ceramic Industry in Indonesia", *Indonesian Commercial Newsletter*, No. 74, 29 April 1991, Jakarta, Table 3, p. 10.

Table III.45. Exports of principal ceramic products, 1985-1990

	1985	1986	1987	1988	1989	1990
Sanitary fittings (Thousand units)	185	734	2,699	5,642	5,889	5,621
Floor and wall tiles (Thousand square metres)	130	69	401	7,484	14,795	9,046

Source: "Condition and Prospects of Ceramic Industry in Indonesia", *Indonesian Commercial Newsletter*, No. 74, 29 April 1991, Jakarta, Tables 5 and 7, pp. 14 and 16.

Though established primarily to serve an import substituting function, both the sanitary fittings and the floor and wall tiles industries have begun to export a proportion of their output (see Table III.45 above). From negligible levels in the first half of the 1980s, these exports increased rapidly in the second half to reach almost 5 million tonnes in the case of sanitary fittings and 15 million tonnes in the case of tiles by 1989. This was followed by a decline in 1990, which is believed to have been caused mainly by a surge in domestic demand as the economic boom of that year triggered a sharp increase in the construction of hotels, office buildings, shopping centres and residential housing.

Constraints and prospects

With large quantities of raw materials readily available, the Indonesian ceramics industry faces no significant input constraints, and with the rapid rates of economic growth recorded by Indonesia in recent years expected to persist, it is likely to enjoy a strong growth of domestic demand in the foreseeable future. As a result of increased efforts to enhance the quality of locally produced ceramic products and meet the specifications prevailing in overseas markets, exports could also expand significantly. Attracted by these relatively favourable prospects, a number of Indonesian entrepreneurs have sought, and obtained, licences to invest in the ceramics industry. In the first eight months of 1991 alone, the BKPM approved 16 projects in the floor and wall tiles industry with a combined capacity of more than 64 million square metres and 96 million units.[147/]

GLASS

The resource base

As noted in relation to the cement industry, Indonesia has extensive deposits of quartz sand in relation to sand, which constitutes the main raw material for the production of glass. In addition, it also possesses an abundance of the energy resources required for processing. The ready availability of these resources provides Indonesia with the basis for a viable glass industry, even though the necessary production machinery and a number of supplementary materials continue to have to be imported.

Past trends

Indonesia's glass industry has two distinct components, one of which is concerned with the production of glass bottles and other forms of glassware, while the other is concerned with the production of sheet glass. Of these, the former dates back to the mid-1950s, when a State-owned enterprise, PT Iglas, was established at Surabaya in East Java. The latter came into being in 1973, when a plant with an annual capacity of approximately 28,000 tonnes established by Japanese and Indonesian business interests became operational.

Both sections of the glass industry have expanded significantly since the 1970s. The output of bottles and glassware rose from 11,000 tonnes in the early 1970s to more than 152,000 tonnes by 1991/92, while the output of the sheet glass industry rose from 22,300 tonnes in 1973/74 to almost 400,000 tonnes by 1991/92 (see Table III.46). The number of firms in both branches also increased substantially during this period, with the bottle and glassware branch comprising 12 firms by 1991 and the sheet glass industry comprising four.[148/]

Though produced mainly for the domestic market, some output of the bottles and glassware industry has also been exported since 1986. From some 9,500 tonnes in that year, the volume of exports rose to almost 54,200 tonnes in 1990 as Indonesian producers stepped up their efforts to develop external markets amid fears of a slowdown in the growth of domestic demand. The sheet

glass industry has also sought actively to enhance its exports, which recorded a particularly sharp increase from about 45,500 tonnes to almost 118,300 tonnes in 1988, when the output of its principal producer, PT Asahimas Flat Glass Co., was recognized as fulfilling the Japanese Industrial Standard. Although its exports have been restrained by growing demand in the domestic market since then, the industry remains keen to diversify its markets as and when circumstances allow.

Table III.46. Glass production, 1970/71-1991/92, selected fiscal years
(Thousand tonnes)

	1970/71	1975/76	1980/81	1985/86	1988/89	1989/90	1990/91	1991/92[a/]
Bottles and glassware	11.0	32.3	77.3	125.1	127.9	137.2	145.6	152.2
Sheet glass	-	29.5	106.2	182.2	312.6	319.7	353.9	397.9

Sources: Government of Indonesia, *Nota Keuangan dan Rancangan Anggaran Pendapatan dan Belanja Negara*, various issues, and Supplements of the President's Reports to Parliament, 16 August 1988 and 15 August 1992.

a/ Preliminary.

Constraints and prospects

There has been a growing fear among Indonesia's manufacturers of glass bottles and other glassware since the latter half of the 1980s that domestic demand for their products has already passed through its most rapid growth phase, and will only expand relatively slowly in the coming years. This concern is based in part on the recognition that the basic requirements of households and industrial users for glass bottles and essential glassware have been met, so that the bulk of future demand will consist of replacement demand. In addition, it reflects a realization of the threat posed by plastic bottles and other containers, which have already displaced glass bottles in a number of uses and especially in the packaging of drinks.

The export-promoting strategy adopted by the industry in response to this threat has proved very successful, and is likely to be retained. Significant markets have been developed in a number of neighbouring countries and areas, including Australia, Hong Kong, the Philippines, Singapore and Sri Lanka, and considerable volumes are also shipped to Canada and the United States. With the prospects for these markets remaining promising, and with the slowdown in domestic demand expected to be eased by the rapid rates of economic growth projected for the coming years, the bottle and glassware industry is likely to experience some further expansion in the short to medium term. In 1991 alone, the BKPM licensed three new firms with a total production capacity of 288,300 tonnes per annum.

The sheet glass industry, by contrast, faces no significant constraints in the domestic market and is struggling to meet the surge in local demand generated by several years of steady economic growth at rates exceeding 5 per cent per annum. The industry has consequently attracted significant investments in recent years, both in the establishment of new plants and in the expansion and modernization of existing plants. Five major new projects were reported to be in progress in July 1992, with a total capacity of 500,000 tonnes per year. With the establishment of this new capacity reducing the demand pressure from the domestic market, the industry is likely to resume exports on a significant scale in the coming years, and may in time emerge as a leading supplier in the Asian market.

F. IRON AND STEEL

THE UPSTREAM INDUSTRY

The resource base

Indonesia's domestic raw material base for the establishment and operation of an upstream iron and steel industry is seriously deficient. Despite a widespread belief in the 1950s that the province of Lampung at the southern tip of Sumatra was endowed with substantial reserves of iron ore, no significant exploitable deposits of iron-bearing ores have so far been found in the country. Some reserves of iron sand do exist near Cilacap in Central Java, but they can only be processed in very specialized production facilities and have hitherto mainly been exported to Japan. For its own requirements the Indonesian steel industry therefore depends heavily on imports of suitable iron ores or their derivative, sponge iron (see Table III.47).

The principal alternative raw material for the production of iron and steel, scrap metal, is also only available in limited quantities because of the still relatively small size and youth of Indonesia's inventory of metal-based goods available for scrapping. An attempt to overcome this constraint (and at the same time to strengthen Indonesia's maritime transport infrastructure and the domestic shipbuilding industry) was made in the mid-1980s, when the government launched a programme to scrap all Indonesian-registered cargo vessels above a maximum age of 25 years and replace them with a standardized fleet of locally built freighters. Delays in the delivery of the new ships and their comparatively high cost aroused the opposition of the shipping industry, however, and forced the abandonment of the programme in September 1988. Since then, the Indonesian iron and steel industry has come to depend increasingly on imported scrap, which has become its most important raw material.[149/]

Table III.47. Imports of scrap metal and sponge iron, 1985-1991
(Thousand tonnes)

	1985	1986	1987	1988	1989	1990	1991
Scrap metal	190.9	475.6	461.5	612.6	703.4	1,177.7	1,187.1
Sponge iron	..	..	54.1	75.9	104.9	157.9	161.2

Sources: "Import of Scrap Iron on the Rise", *Indonesian Commercial Newsletter*, No. 65, 10 December 1990, Jakarta, Table 1, p. 24.
"Condition of Steel Industry Prior to Deregulation", *Indonesian Commercial Newsletter*, No. 101, 8 June 1992, Jakarta, Table 4, p. 13.
"Scrap Imports Amounting to US$168 million", *Indonesian Commercial Newsletter*, No. 106, 24 August 1992, Jakarta, Table 1, p. 22.

Past trends

Indonesia's iron and steel industry is dominated by PT Krakatau Steel, a fully integrated State-owned steelworks located at Cilegon to the west of Jakarta. The establishment of this facility was originally proposed in the 1950s as part of a package of projects to be implemented with financial assistance from the former USSR. Its completion was prevented by the political and economic dislocations of the late 1950s and early 1960s, however, which culminated in the departure of the technicians from the former USSR in early 1966 after the assumption of power by the New Order

Government. The project was revived in 1970 and, after several further delays prompted by financial constraints its first production units, became operational in 1983.[150]

PT Krakatau Steel now manufactures a wide range of iron and steel products, and accounts for about 75 per cent of Indonesia's total steel output. At the upstream end, it is equipped with a direct reduction unit based on the Mexican *hojalata y lamina* (HYL) process for the production of sponge iron, as well a slab plant and a billet plant. These three units currently have annual production capacities of two million tonnes, one million tonnes and 500,000 tonnes, respectively.

Although PT Krakatau Steel is the only producer of sponge iron and steel slabs in Indonesia at present, the Indonesian iron and steel industry comprised 13 other manufacturers of billets and ingots in 1992. Of these, six produced only billets, three produced only ingots, and four produced both billets and ingots. The total production capacity of these 13 firms amounted to more than 1.6 million tonnes of billets and 312,000 tonnes of ingots per year.

Most of these firms were established during the 1980s, which also saw a significant expansion in the capacity of the few firms dating back to the 1970s and beyond. This growth in capacity has allowed a substantial increase in output since the mid-1970s, with the production of sponge iron and the combined output of billets and ingots having increased by almost 130 per cent between 1983/84 and 1991/92, and the output of slabs having increased by almost 750 per cent (see Table III.48). At the same time, however, the increased adoption of continuous casting methods in the production of billets and slabs has prompted a gradual decline in the production of ingots from 189,900 tonnes in 1987/88 to an estimated 83,650 tonnes in 1991/92.

Table III.48. Upstream iron and steel production, 1983/84-1991/92, selected fiscal years
(Thousand tonnes)

	1983/84	1985/86	1988/89	1989/90	1990/91	1991/92[a]
Sponge iron	541.0	1,086.0	984.8	1,210.4	1,356.9	1,239.9
Steel billets and ingots	882.0	1,023.0	1,360.6	1,583.1	1,988.1	2,006.4
Steel slabs	108.0	429.0	721.6	800.0	904.0	914.8

Sources: Government of Indonesia, Supplements of the President's Reports to Parliament, 16 August 1988 and 15 August 1992.

a Preliminary.

As a result of the considerable expansion in production capacity for steel billets, Indonesia has begun to produce an exportable surplus since the mid-1980s. With the exception of 1989, when a boom in the Indonesian construction sector stimulated a strong growth in domestic demand, this surplus has increased steadily during the past five years. From less than 26,500 tonnes in 1987, Indonesia's exports of billets rose to almost 207,400 tonnes in 1991, of which some 111,900 tonnes were shipped to Japan.[151]

Constraints and prospects

The economic rationale of establishing an upstream iron and steel industry in Indonesia, and in particular a large-scale steelworks such as PT Krakatau Steel, has always been a matter of some

debate. On the one hand economists have argued that the high capital-intensity and relatively limited employment-generating capacity of the steel industry render it inconsistent with the mix of factors of production available in Indonesia at the present stage of its economic development, especially since the country has no significant raw material base for such an industry. On the other hand, there has long been a politically influential body of opinion arguing that a domestic steel industry forms an indispensable basis for securing Indonesia's future industrial development, and must therefore be established irrespective of any considerations of short-term comparative advantage.

Indonesia's decision makers have for the most part chosen to accept the latter argument, which regards the production of upstream steel products as a strategic imperative. The government is therefore actively continuing to promote the growth of the industry. In 1989 it transferred official control over PT Krakatau Steel from the Department of Industry to the newly established Agency for the Development of Strategic Industries (Badan Pengembangan Industri Strategis, BPIS).[152] In 1990 it launched a major development programme for PT Krakatau Steel, which calls for the installation of blast and basic oxygen furnaces in the company's smelting unit, and a modernization and expansion of its sponge iron, slab and billet producing facilities by 1999.[153] This was followed in 1991 by the initiation of a project for the construction of a second integrated steel plant to augment the facilities available at PT Krakatau Steel, the feasibility of which is now being assessed with technical assistance from UNIDO.

The government's policy has resulted in the establishment of a relatively high-cost industry, which has only been able to maintain itself because of a high degree of protection in the domestic market. Although there has been a gradual shift from the use of quantitative import restrictions to tariffs in recent years, the available indicators suggest that this protection is unlikely to be lifted entirely in the foreseeable future. With the captive domestic market expected to sustain its growth momentum of recent years, the prospects for the upstream iron and steel industry therefore remain favourable, and it is continuing to attract a high degree of private investment interest as well.

Applications for a number of major projects have thus been approved in recent years by the BKPM. These include a proposal by PT Ispat Indo, a joint venture enterprise between Indonesian interests and the Indian Ispat group, to establish a subsidiary for the production of sponge iron with a designed capacity of 2,000 tonnes per year by 1994. In addition, several companies have been licensed to establish billet plants with a combined capacity of some 1.2 million tonnes, the output of which is intended to be used mainly by their own downstream units.[154]

Table III.49. Imports of crude steel products, 1987-1991
(Thousand tonnes)

	1987	1988	1989	1990	1991
Billets	17.3	9.8	4.0	75.7	20.8
Ingots	1.5	-	0.6	28.1	18.1
Slabs	183.3	308.5	267.5	500.2	276.3
Blooms	2.9	-	58.6	95.6	49.0

Source. "Condition of Steel Industry Prior to Deregulation", *Indonesian Commercial Newsletter*, No. 101, 8 June 1992, Jakarta, Table 6, p. 15

THE DOWNSTREAM INDUSTRY

The resource base

Although the upstream industry provides Indonesia's manufacturers of downstream steel products with a significant proportion of their raw materials, is unable to produce these materials in sufficient quantities to cover all of the downstream producers' requirements. These producers therefore continue to rely on imports of a variety of crude steel products such as billets, ingots, slabs and blooms for at least a part of their needs. The volume of these imports has varied widely from year to year, however, in response to fluctuations in domestic supply and demand.

Past trends

Indonesia's downstream iron and steel industry has established a diversified manufacturing base since the 1970s, and now produces an extensive range of flat and round products. The most important of these are steel sheets, pipes, bars, profiles, rods and wires (see Table III.50). These are produced to a variety of specifications, with a proportion of the flat products being processed further into galvanized iron sheet (GI sheet).

Table III.50. Downstream iron and steel production, 1983/84-1991/92, selected fiscal years
(Thousand tonnes)

	1983/84	1985/86	1988/89	1989/90	1990/91	1991/92[a]
Steel sheet (HRC)[b]	127.0	342.0	944.2	1,300.5	1,325.2	1,246.8
Steel sheet (CRC)[c]	-	-	451.8	453.8	475.0	444.4
Galvanized iron sheet	332.0	274.0	159.4	144.5	159.0	200.9
Welded pipes	246.2	258.5	1,443.3	142.6	184.3	202.3
Profiles	724.0	671.0	829.9	928.1	1,391.3	1,338.1
Wire rods	300.0	321.0	452.1	449.0	537.0	582.0

Sources: Government of Indonesia, Supplements to the President's Reports to Parliament, 16 August 1988 and 15 August 1992

a. Preliminary
b. Hot rolled coil
c. Cold rolled coil

The bulk of Indonesia's output of steel sheet consists of thick steel sheet produced by the hot rolling process. The manufacture of this product is dominated by PT Krakatau Steel, which has a unit for the production of hot-rolled coil (HRC) with an annual capacity of 1.2 million tonnes. Relatively modest quantities of HRC are also produced by two privately owned companies: PT Jaya Pari Steel company, which has an annual production capacity of 100,000 tonnes, and PT Gunawan Jaya Steel, which only commenced production in 1992. In response to rising domestic demand the output of HRC has increased substantially in recent years, resulting in high levels of capacity utilization.[155]

A cold rolling mill with an annual production capacity of 850,000 tonnes of cold rolled coil (CRC) was established in the mid-1980s by PT Cold Rolling Mill Indonesia Utama (PT CRMIU), a joint venture between PT Krakatau Steel, a private Indonesian company, and the Franco-Spanish

company Sestiacier S. A. This plant, which came on stream in 1987, was intended to process the HRC produced by PT Krakatau Steel into thin steel sheet for further use in the GI sheet and motor vehicle industries. The plant has been troubled by poor efficiency and low capacity utilization from the outset, however, and has suffered considerable financial losses despite being offered a high level of protection by the government. This has prompted several shifts in ownership, with Sestiacier relinquishing its equity stake in October 1990, and PT Krakatau Steel taking over the company as a wholly-owned subsidiary in October 1991.[156]

Indonesia's GI sheet industry comprises some 25 different companies producing both zinc-coated and paint-coated GI sheet. During most of the late 1980s the performance of this industry was restrained by weak demand and high production costs, with the former arising both out of low levels of domestic economic activity and increased competition from substitutes such as plastic, fibreglass and asbestos cement, and the latter arising from the high degree of protection given to PT CRMIC. The industry's performance has begun to improve in more recent years as a result of the recovery of domestic economic activity, however, the effects of which were reinforced by a partial liberalization of the domestic market for CRC in June 1991.[157]

The production of steel pipes is another important activity of Indonesia's downstream steel products industry. Welded pipes, with both straight and spiral seams, have been produced in the country since the mid-1970s for use in the oil drilling industry and the distribution of water and gas. More recently, a number of private companies have begun to establish a capacity for the production of more sophisticated pipes. In December 1990 Indonesia's first plant for the production of stainless steel pipes was opened by a joint venture between Japanese and Indonesian companies. The first two plants manufacturing seamless pipes were opened in July 1991 and April 1992, respectively.[158]

Table III.51. Exports of downstream iron and steel products, 1991
(Thousand tonnes)

Product	Tonnes
Cold rolled coils (CRC)	2,897
Hot rolled coils (HRC)	178,876
Steel plates	5,261
Wire rods	31,840
Reinforcing rods	122,535
Iron strips	6,512
H-Beams	43,641
Nails	7,148
Pipe joints	268
Iron profiles	11,259
High-carbon wire/barbed wire	3,278
Galvanized iron sheets	22,687
Stainless steel pipes	717

Source. "Indonesia's Steel Exports up Again in 1991", *Indonesian Commercial Newsletter*, No. 94, 24 February 1992, Jakarta, Table 2, p. 30.

Although the downstream iron and steel industry is intended primarily to fulfil an import-substituting role, it has begun to export a significant proportion of its output. From negligible

levels in the first half of the 1980s, Indonesia's exports of downstream steel products rose dramatically in 1987-88 as weakening domestic demand and fears that a severe drop in foreign exchange earnings would result from the 1986 oil price collapse prompted the adoption of a variety of measures to promote non-oil gas exports. Although the volume of these exports has varied considerably since then as exportable surpluses have fluctuated, it has nevertheless remained relatively high and in 1991 was estimated at almost 437,000 tonnes (see Table III.51 above).

The available data indicate, moreover, that the composition of these exports was highly diverse, including hot and cold rolled coils, steel plates and strips, GI sheets, wire rods and reinforcing rods for concrete, H-beams and profiles, pipes and pipe joints, and nails and wire. By far the most important export item was HRC, with reinforcing rods, H-beams and GI sheet also accounting for significant export shares. Not surprisingly in view of its dominance of the industry, PT Krakatau Steel was the single largest exporter, accounting for all exports of hot and cold rolled coils and steel plates, and a substantial share of the exports of wire rods, reinforcing rods and iron profiles.[159]

Constraints and prospects

Although the development of the downstream steel products industry since the 1970s has been impressive, its pattern has been distorted by the extensive protection given to the upstream industry and to downstream producers of some intermediate goods such as HRC and CRC. While promoting the growth of these industries, this policy has raised costs for manufacturers of products using these goods as inputs, thereby preventing them from realizing their full growth potential as efficient players capable of holding their own against foreign competition in the domestic and world markets. Increasing pressure from the domestic business community and external donor agencies for the dismantlement of the high-cost economy and the establishment of an outward-looking and competitive industrial base has resulted in a degree of liberalization since mid-1991, however, and many of the physical controls imposed on imports of steel products are now being replaced by tariffs, which are in turn likely to be lowered gradually over the coming years.

Anticipating these changes towards a more market-oriented regulatory framework, a large number of private entrepreneurs have expressed an interest in investing in the downstream steel products industry. Several projects have been put forward for the establishment of new HRC plants, which if realized on schedule will raise Indonesia's production capacity to more than 3 million tonnes by the mid-1990s from less than 2 million tonnes at the beginning of the 1990s.[160] The production of seamless and stainless steel pipes is also continuing to attract the interest of investors, with one of the two existing producers of seamless pipes having announced plans to expand its capacity in August 1992 and another private company having proposed the establishment of a new stainless steel pipe plant in May of that year.[161] In addition, four companies were reported to have been licensed in 1991 and the first three months of 1992 to establish plants for the manufacture of a wide range of downstream (and some upstream) products, including rods, bars, wire, profiles and pipes.[162]

Meanwhile, the output prospects for the State-owned sector also appear favourable. PT Krakatau Steel's current expansion project calls for a substantial increase in the capacity of its hot strip mill from its 1991 level of 1 million tonnes of HRC per year to 1.8 million tonnes per year by 1995, and for a smaller increase in its production capacity for wire rods from 200,000 tonnes per year to 270,000 tonnes per year. In addition, the proposed second integrated steel plant expected to come on stream by the end of the 1990s will also involve the establishment of a manufacturing capacity for a range of downstream products.

G. NON-FERROUS METALS

TIN

The resource base

Indonesia is located at the southern tip of the southeast Asian tin belt, which stretches from southern China through Myanmar, Thailand and peninsular Malaysia to southern Sumatra, and its extensive deposits of tin ore have been exploited commercially since 1815. Official estimates published in mid-1991 indicate that the country's total reserves could exceed 1.58 million tonnes, of which some 735,000 tonnes are known reserves and the remainder are indicated or hypothetical reserves. Although these reserves are scattered over several locations in western Indonesia, mining has hitherto been concentrated on the islands of Bangka, Belitung and Singkep off the southeastern coast of Sumatra, which have substantial on- and offshore deposits.[163]

Past trends

As a result of its favourable resource endowments, Indonesia has traditionally been one of the world's leading producers of tin. In spite of the collapse of international tin prices in October 1985 from more than $12,000 per tonne to about $5,300 per tonne,[164] which resulted in the closure of tin mining capacity throughout the world, the Indonesian tin industry was able to retain its viability through the adoption of a comprehensive restructuring and rationalization programme (see Table III.52). Although prices have recovered only marginally in the interim, Indonesia has been able to sustain comparatively high output levels. In 1991 it became the world's largest producer of the metal, well ahead of its traditional rivals, Malaysia and Thailand, and its more recent competitors, Brazil and China. The Indonesian tin mining industry is dominated by the State-owned enterprise PT Tambang Timah, which accounts for some 80 per cent of Indonesia's total output of tin ore. The remaining 20 per cent are produced by two comparatively small foreign joint venture companies, PT Koba Tin and PT Gunung Kikara Mining. A third private company, PT Riau Tin, was forced to shut down its operations in the wake of the 1985-86 tin crisis.

PT Tambang Timah is the sole processor of tin ore in Indonesia, and operates a smelter at Mentok on the island of Bangka. This facility, which dates back to the colonial period, had fallen into a serious state of disrepair by the late 1960s, when it was only able to process some 13,500 tonnes of ore per year even though its installed capacity was nominally rated at 25,000 tonnes per year. The smelter was extensively overhauled in the early 1970s and expanded to an annual capacity of 39,000 tonnes in the early 1980s. It produces ingots of tin metal, both for export and for use by domestic manufacturers of tin products. The vast bulk of Indonesia's tin metal production is exported without further processing. Domestic consumption remains relatively limited, and has exhibited only a modest growth trend since the mid-1980s. During this period the share of domestic absorption in total consumption has averaged about 5 per cent (see Table III.53).

The principal domestic user of tin is the electronics industry, which uses it as a soldering material. Its dominance as a tin consumer is a relatively recent phenomenon, however, and is associated with its own dramatic growth during the latter half of the 1980s. Another major user is a tinplate manufacturing enterprise, PT Pelat Timah Nusantara (PT Latinusa), established jointly by PT Krakatau Steel and PT Tambang Timah in the vicinity of the PT Krakatau Steel complex at Cilegon in West Java. This plant, which supplies the Indonesian can manufacturing industry,[165] came on stream in 1985, and has an annual production capacity of 130,000 tonnes of tinplate. It has used an average of about 520 tonnes of tin per year between 1986 and

1990).[166/] In addition, small quantities of tin are also used by a number of other industries, of which the manufacturers of pewter ware and babbitts are the most important (see Table III.54).

Table III.52. Production of tin, 1970/71-1991/92, selected fiscal years
(Thousand tonnes)

	1970/71	1975/76	1980/81	1985/86	1988/89	1989/90	1990/91	1991/92[a/]
Tin ore	17.9	25.1	33.6	20.9	30.5	31.5	29.8	..
Tin metal	-	18.8	31.2	20.4	29.0	30.0	30.1	30.5

Sources: Government of Indonesia, *Nota Keuangan dan Rancangan Anggaran Pendapatan dan Belanja Negara*, various issues, and Supplements of the President's Reports to Parliament, 16 August 1988 and 15 August 1992.

a/ Preliminary.

Table III.53. Exports and domestic consumption of tin metal, 1970/71-1991/92, selected fiscal years

	1970/71	1975/76	1980/81	1985/86	1988/89	1989/90	1990/91	1991/92[a/]
Exports (Thousand tonnes)	17.4[b/]	20.9[b/]	31.3	21.6	23.3	25.8	24.9	25.4
Domestic use (Tonnes)	-	440.1	367.5	877.0	1,491.0	1,257.0	1,379.6	1,358.5

Sources: Government of Indonesia, Supplements to the President's Reports to Parliament, 15 August 1974, 11 March 1978, 15 August 1981, 16 August 1988 and 15 August 1992.

a/ Preliminary.
b/ Tin ore and tin metal.

Table III.54. Domestic tin consumption by principal industry,1986-1990
(Tonnes)

	1986	1987	1988	1989	1990
Solder	341	147	540	905	625
Babbitt	96	49	38	41	37
Pewter	149	74	77	42	49
Tinplate	410	600	670	390	520
Others	170	10	13	23	120
Total	**1,166**	**880**	**1,338**	**1,401**	**1,387**

Source: "Global Tin Price Down Steadily", *Indonesian Commercial Newsletter*, No. 99, 11 May 1992, Jakarta, Table 4, p. 29.

Constraints and prospects

Although the Indonesian tin industry has been able to survive the shock of the 1985-86 tin crisis, it has only done so at the expense of a very painful, and still ongoing, World Bank-supported restructuring exercise. This has required it to shut down all but the most efficient of its mining operations, with the extraction of tin on the island of Singkep having ceased altogether in 1991 after more than a century. Some 50 per cent of PT Tambang Timah's staff have had to be redeployed or laid off, and the company itself has had to relocate its administrative operations from Jakarta to Pangkal Pinang on the island of Bangka.[167] At the same time, it has also been required to restrain its exports, and hence implicitly its output, under the terms of a series of supply rationalization schemes agreed since March 1987 by the Association of Tin Producing Countries (ATPC) in an effort to reduce the international stock overhang of tin metal and permit the achievement of a more favourable balance between international production and consumption.

While the ATPC strategy has had some success, and global tin stocks have been substantially diminished, a number of other developments during the past few years have greatly reduced the likelihood of a strong recovery in international tin markets in the foreseeable future. On the one hand, the emergence of Brazil and China as large-scale low-cost producers since the mid-1980s has rendered the prospect of a supply-based firming of market fundamentals highly unlikely, and is also inhibiting Indonesia's scope for an expansion of its market share. On the other hand, the increasing shift from tin cans to aluminium cans and other packaging materials derived from plastics, paper and glass suggests that a significant firming of international demand for tin is also unlikely.

By contrast, the domestic market still has considerable growth potential, especially as the growth of the export oriented electronics and canning industries generate an increase in domestic demand for solder and tinplate. The experience of PT Latinusa has not been entirely happy so far, however. Despite the local availability of tin, it has been unable to compete with external producers and has had to be given a high degree of protection, initially through physical import controls and since June 1992 through the imposition of a 22.5 per cent levy on imports. While potential for the expansion of the domestic tinplate industry consequently exists, it remains to be investigated whether such an expansion would be economically feasible.

ALUMINIUM

The resource base

Indonesia possesses significant quantities of bauxite, the basic raw material for an upstream aluminium industry. According to the latest available estimates, the country's total known reserves of bauxite amount to almost 500 million tonnes, of which 78 million tonnes are located on the island of Bintan in the Riau archipelago and its surrounding islets of Angkut, Dendang, Kelong, and Koyang, and the remainder in the province of West Kalimantan. Because of the remoteness of the West Kalimantan deposits and the absence of a suitable local infrastructure, however, only the deposits in the Riau islands have so far been exploited. The State-owned company for general mining, PT Aneka Tambang, is responsible for all bauxite mining operations.

An industry to extract the alumina from these bauxite deposits has not yet been established in Indonesia. Only a small proportion of the country's bauxite output is consequently used domestically, mainly by the cement and brick industries for the manufacture of special cements and fire-proof bricks. The bulk of Indonesia's bauxite production is exported (see Table III.55). Until 1989 Japan was the main market for these exports, but since that year the Norwegian firm Norsk Hydro has also accounted for a significant share.[168]

Table III.55. Production and exports of bauxite, 1970/71-1991/92, selected fiscal years
(Thousand tonnes)

	1970/71	1975/76	1980/81	1985/86	1988/89	1989/90	1990/91	1991/92[a]
Production	1,182.2	935.8	1,269.9	712.8	514.1	994.8	1,324.5	1,241.8
Exports	-	919.8	1,223.3	807.3	703.0	1,044.5	1,170.2	..

Sources: Government of Indonesia, Supplements to the President's Reports to Parliament, 15 August 1974, 11 March 1978, 15 August 1981, 16 August 1988, 16 August 1991 and 15 August 1992.

a/ Preliminary.

Past trends

The establishment of a comprehensive upstream and downstream aluminium industry has been a long standing objective of Indonesian policy-makers. Upstream, the government's plans called for the construction of two large-scale production facilities: an alumina refining plant on Bintan to process the local bauxite reserves, and an aluminium smelter on the Asahan river in North Sumatra to process the alumina obtained from the Bintan plant. Downstream, the government has encouraged private investment in industries producing a wide range of aluminium products.

The government's plans to establish the alumina refining facility date back to 1982, when an agreement for the construction of such a plant with an annual capacity of 600,000 tonnes per year was signed with a German company, Kaiser Aluminium. Tightening resource constraints in the mid-1980s prevented the realization of this project, however. It was reactivated in the early 1990s, when Norsk Hydro was commissioned to undertake a feasibility study, but was then permitted to lapse again because of the high investment costs involved.[169/]

The aluminium smelter, located at Kuala Tanjung in North Sumatra, was built in the late 1970s and early 1980s and had already commenced production in 1982. It is operated by PT Indonesia Asahan Aluminium (PT Inalum), a joint venture between the government of Indonesia and a consortium of twelve Japanese companies incorporated into a single business entity, the Nippon Asahan Aluminium Co. Ltd. (NAA). The plant has a total installed capacity of 225,000 tonnes of aluminium ingots per year, and is powered by its own hydroelectric generation plant on the Asahan river. It uses imported alumina, and under the terms of the joint venture agreement exports the bulk of its output to Japan (see Table III.56).

The downstream aluminium products industry is far more diversified, and produces an extensive range of intermediate and end-use products, including extruded goods, sheet, foil, wire rods, castings and slugs (see Table III.57). It is almost entirely privately owned, and widely dispersed throughout Java and some parts of Sumatra.[170/] Because of PT Inalum's export commitments, however, it depends almost entirely on imports of unwrought aluminium and aluminium scrap for its raw material requirements.[171/]

The most important downstream industry in terms of volume of output is the aluminium sheet industry, which rolls aluminium slabs into sheets. At the end of 1990 this consisted of 11 firms, of which six had begun producing and the remaining five were in the process of being set up. The six operational firms had a combined production capacity of more than 68,000 tonnes per annum, and produced sheet of varying thickness for a variety of uses, including the manufacture of

aluminium cans, household articles and roofing materials. All of these firms produced their own aluminium slabs from imported ingots or ingots supplied by PT Inalum.

Table III.56. Production and exports of aluminium ingots, 1986-1991
(Thousand tonnes)

	1986	1987	1988	1989	1990	1991
Production	219.1	191.1	199.5	196.4	206.9	170.4
Exports	174.1	164.9	127.9	142.9	125.2	123.0

Sources: "Foreign Exchange Earnings from Aluminium Exports Down", *Indonesian Commercial Newsletter*, No. 88, 25 November 1991, Jakarta, Table 1, p. 30.
"Condition and Prospects of Aluminium Industry in Indonesia", *Indonesian Commercial Newsletter*, No. 90, 23 December 1991, Jakarta, Table 1, p. 15 and Table 10, p. 27.
"Indonesia's Aluminium Exports Down", *Indonesian Commercial Newsletter*, No. 112, 23 November 1992, Jakarta.

Table III.57. Production of selected downstream aluminium goods, 1986-1991
(Thousand tonnes)

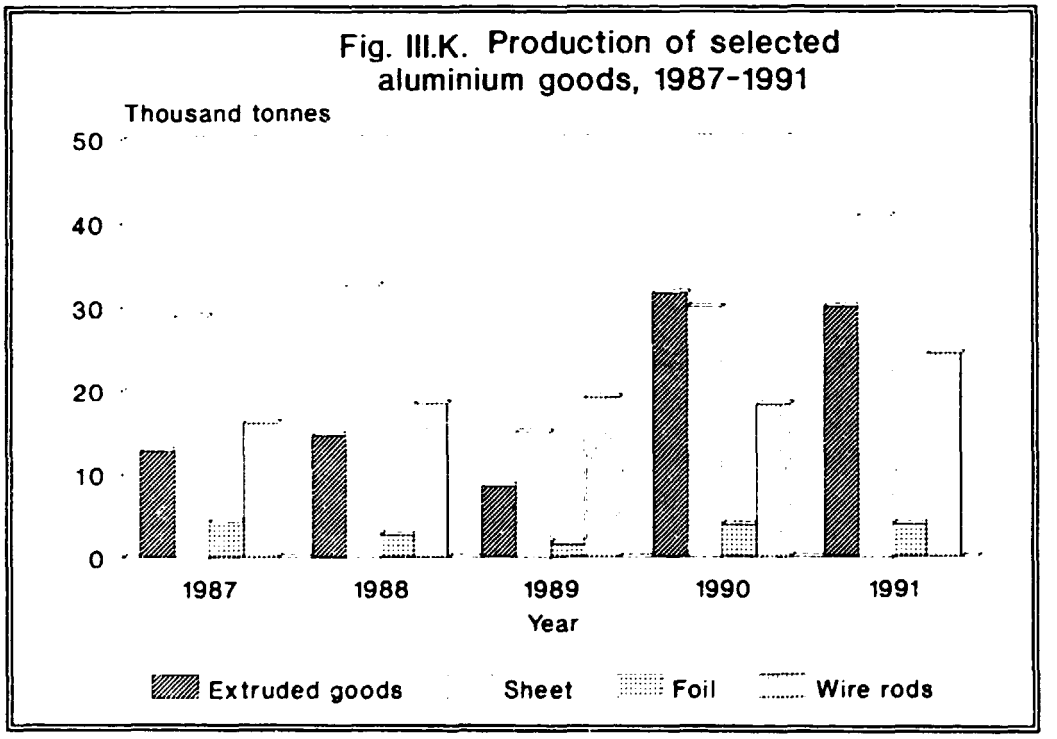
	1986	1987	1988	1989	1990	1991
Extruded goods	12.4	12.8	14.7	8.6	31.7	30.0
Sheet	20.7	29.0	32.7	15.1	30.0	40.8
Foil	1.6	4.3	2.7	1.7	3.9	3.9
Wire rods	-	16.2	18.5	19.2	18.3	24.4

Sources: "Condition and Prospects of Aluminium Industry in Indonesia", *Indonesian Commercial Newsletter*, No. 90, 23 December 1991, Jakarta, Tables 3, 5 and 6, pp. 17, 19 and 21.
"Foreign Exchange Earning from Aluminium Down", *Indonesian Commercial Newsletter*, No. 95, 9 March 1992, Jakarta, Table 4, p. 33.
"PT Alumindo Light Metal Industry to Increase its Aluminium Sheet and Aluminium Foil Production Capacity", *Indonesian Commercial Newsletter*, No. 98, 27 April 1992, Jakarta, Table 4, p. 47.
"Most of Demand for Basic Material for Downstream Aluminium Products Still has to be Met with Imports", *Indonesian Commercial Newsletter*, No. 101, 8 June 1992, Jakarta, Table 3, p. 48.
"Indonesia's Aluminium Exports Down", *Indonesian Commercial Newsletter*, No. 112, 23 November 1992, Jakarta, Table 3, p. 34.

Another very important downstream industry is the extruded goods industry, which produces long products of various shapes and profiles by passing molten aluminium through pressing and drawing machines at high pressure. This industry currently comprises 12 companies producing items such as window and door frames, railings, ceiling strips and a variety of automotive body parts. Most producers have their own anodizing and fabricating facilities, and are therefore able to meet specific orders for anodized and fabricated aluminium extrusions. The total capacity of these producers amounts to almost 58,000 tonnes per annum.

The production of wire rods constitutes another important downstream aluminium processing activity. In 1990 the industry consisted of four producing companies with a combined capacity of more than 39,000 tonnes per year. The bulk of the industry's output is sold to local producers of electric and telecommunications cables.

The output of the aluminium foil industry, which so far consists of a single producer with an installed capacity of 12,000 tonnes, is still relatively limited. The company, located at Sidoarjo in East Java, produces foils of varying thickness and hardness for use in the manufacture of packaging materials, disposable plates and cups, and insulating barriers in automotive air conditioners. The production performance of this company has been erratic in recent years, with output having fallen sharply in 1988-1989 before rising dramatically in 1990 and stagnating in 1991.



Other downstream industries include the production of castings and slugs. Castings of various types are manufactured by both small- and large-scale producers, with the latter often being involved in the manufacture of motorcycle components, such as engine blocks, coupling rods and brakes. Aluminium slugs, which are used in the manufacture of tubes and other collapsible containers are produced by three companies, all of which also manufacture tubes. In addition, there are seven other manufacturers of aluminium tubes.

Although Indonesia remains a net importer of downstream aluminium products and the domestic industry is intended to fulfil a predominantly import substituting role, several manufacturers have begun to export a part of their output in recent years (see Table III.58). As domestic output expanded between the mid-1980s and the early 1990s, so the volume of exports increased significantly in overall terms. This overall growth trend was not shared evenly by all product categories, however, with exports of several products experiencing substantial year-to-year fluctuations as a result of shifting patterns in domestic demand and supply.

Table III.58. Exports of downstream aluminium products, 1986-1991
(Tonnes)

	1986	1987	1988	1989	1990	1991
Extruded products	12	527	1,929	6,607	6,516	6,556
Sheet	237	851	895	1,472	1,518	560
Foil	197	245	417	842	616	712
Wire rods	536	553	786	454	300	19
Others	57	893	2,966	7,522	8,721	..

Sources: "Condition and Prospects of Aluminium Industry in Indonesia", *Indonesian Commercial Newsletter*, No. 90, 23 December 1991, Jakarta, Tables 10, p. 27.
"Foreign Exchange Earning from Aluminium Down", *Indonesian Commercial Newsletter*, No. 95, 9 March 1992, Jakarta, Table 1, p. 31.
"Indonesia's Aluminium Exports Down", *Indonesian Commercial Newsletter*, No. 112, 23 November 1992, Jakarta, Table 1, p. 32.

Constraints and prospects

The prospects for the development of an indigenous alumina refining industry remain highly uncertain. In February 1993 a State-owned enterprise, PT Aldecom, was reported to have signed a joint-venture agreement with several foreign partners to reassess the feasibility of establishing an alumina refining plant on Bintan, this time with an installed annual capacity of 900,000 tonnes. In view of the high costs involved in such an undertaking, however, the likelihood of this project proceeding is judged by most informed observers to be remote.[172/]

It has been rendered even more unlikely by a decision taken in 1990 to develop Bintan as a commercial and tourist centre in order to enable it to take advantage of its close proximity to Singapore. This has resulted in all mining being banned in the northern half of the island, which contains some 42 million tonnes of the island's total bauxite reserves of 78 million tonnes. The remaining deposits are deemed to be insufficient for the establishment of an alumina plant, unless they are supplemented by additional supplies of bauxite shipped in from West Kalimantan. Because of the remoteness of these alternative reserves and the poor infrastructural facilities available in West Kalimantan, however, this option is likely to be prohibitively expensive.[173/]

The Asahan aluminium smelter, meanwhile, has had financial difficulties from the outset. Partly because of inherent inefficiencies and the high cost of importing the required alumina, PT Inalum has persistently suffered operating losses during the 1980s. In 1991 it was also forced to operate well below capacity because of a drought-induced drop in the Asahan river's water flow, which hampered the operation of the hydroelectric generating units serving the plant.

More serious and permanent damage to the company's viability has been done by the steady appreciation of the yen during the past ten years. This has significantly increased the burden of servicing its debts, which are denominated almost entirely in yen while its revenues are denominated in dollars. An early rationalization of this industry does not appear likely, as a result of which the government has indefinitely postponed its erstwhile plans to take over the whole ownership of the plant during the early 1990s.

In contrast, the prospects for the downstream sections of the industry appear broadly favourable. With import regulations governing aluminium raw materials having been liberalized in 1990,[174] and no protectionist restrictions being imposed on the procurement of such materials, the aluminium products industry has developed a comparatively high degree of efficiency and competitiveness. As the anticipated steady expansion of the Indonesian economy stimulates a continuous growth in domestic demand for the industry's products in the coming years, the industry itself is likely to enjoy a rapid expansion.

The relatively favourable prospects for the industry have given rise to a high level of private investment interest. According to the latest available data, more than ten companies have been authorized to establish or expand downstream aluminium production facilities since the beginning of 1991. If all of their projects are implemented on schedule, the total production capacity of the downstream aluminium industry will rise from about 189,000 tonnes per year in 1991 to almost 329,000 tonnes per year by 1995.[175]

OTHER NON-FERROUS METALS

The resource base

Indonesia has large known deposits of copper, nickel, gold and silver. Copper is mined mainly in the province of Irian Jaya, where the United States firm Freeport McRoran has operated a large mining complex since the late 1960s. Nickel is currently mined at two major sites on the island of Sulawesi; by a subsidiary of the Canadian firm International Nickel Corporation (Inco) at Soroako in South Sulawesi, and by the State-owned corporation for miscellaneous mining activities, PT Aneka Tambang, at Pomalaa in Southeast Sulawesi. Gold and silver are found and mined at various locations throughout Indonesia, with particularly large quantities being extracted at the Freeport McRoran mining complex in Irian Jaya.

COPPER

Past trends

The development of Indonesia's copper mining industry began in April 1967, when the Freeport Sulphur Co. of the United States, the parent company of Freeport McRoran, became the first foreign company to sign a major investment agreement under the newly enacted Foreign Investment Law of 1967. Under the terms of the agreement, the company was required to invest $75 million in exploring and exploiting the significant copper reserves then believed to exist in Irian Jaya. After establishing an appropriate mining infrastructure in the remote area of Irian Jaya, where its copper deposit was located, the company commenced production at the beginning of 1973.

As a result of continued investments, the company's output has expanded considerably since the 1970s. It is not processed to any significant degree within Indonesia, with the bulk of it being exported (see Table III.59), mainly to Japan, after having been concentrated through flotation. The establishment of a domestic smelting industry has so far been prevented by the Japanese customers' preference for concentrate and the insufficient level of local demand for refined copper to permit the efficient operation of a smelter oriented entirely towards the domestic market.[176] This deadlock may be broken in the foreseeable future, however, following recent negotiations with the Metallgesellschaft subsidiary of the German group Lurgi AG for the establishment of a smelter at the petrochemicals complex in Gresik in East Java.[177]

Despite the absence of an upstream copper processing industry, Indonesia has a modest but significant downstream copper products industry using imported copper as a raw material. Its most important activity is the manufacture of electric and telecommunications cables, for which there are more than ten major and several smaller producers, whose output and exports have been rising steadily during the past years. Although these producers manufacture a wide variety of cables using both copper and aluminium, most of their output consists of electric cables made of copper (see Table III.60).[178]

Table III.59. Production and exports of copper ore concentrate, 1973-1991, selected years
(Thousand tonnes)

	1973	1975	1980	1985	1988	1989	1990	1991
Production	145.8	201.3	178.7	223.5	294.7	331.5	398.6	656.5
Exports	122.3	194.2	132.8	114.5	231.1	305.8	374.5	498.5

Sources: Government of Indonesia, Supplements to the President's Reports to Parliament, 15 August 1974, 11 March 1978 and 15 August 1981.
Central Bureau of Statistics, *Indikator Ekonomi*, April 1992.

Table III.60. Production and exports of cables, 1987-1991
(Thousand tonnes)

	1987	1988	1989	1990	1991
Production	58.7	58.9	64.6	72.4	81.2
Exports	-	0.5	0.2	1.4	4.4

Source: "Investor Interest in Cable Industry Quite High Despite Increasingly Tough Competition", *Indonesian Commercial Newsletter*, No. 103, 13 July 1992, Jakarta.

Constraints and prospects

Although ongoing investments in the Irian Jaya copper mine will ensure a continuous increase in Indonesia's production of copper ore in the foreseeable future, the development of a smelting industry continues to be hampered by the high investment costs involved and the large minimum efficient scale of such an industry. As a result of these constraints, the establishment of a local smelter was not even seriously considered until 1990, when talks first initiated with the Metallgesellschaft consortium regarding the establishment of a smelter at Gresik. While all parties involved claim to be committed to the project, its execution has, nevertheless, been postponed on several occasions, and the implementation schedule still remains unclear.

Further downstream, the continued development of the copper products industry based on imported supplies of copper appears to have good prospects. The relatively rapid growth of domestic economic activity projected for the coming years will generate a steadily rising demand

for a variety of copper based products, and cable in particular. Furthermore, the relative youth of much of the Indonesian copper products industry helps to ensure its efficiency, since it employs comparatively modern plant, equipment and production technologies. It therefore enjoys a high degree of international competitiveness, and should be able to expand its share of export markets significantly in the short to medium term.

NICKEL

Past trends

The Pomalaa mine operated by PT Aneka Tambang is Indonesia's oldest nickel producing centre. In mid-1976 it was equipped with plant for the production of ferro-nickel, and since then has produced both nickel ore and ferro-nickel. The Soroako mine operated by PT Inco, which was inaugurated in 1977, is equipped with a smelter in which it converts all of its ore output into nickel matte. The output of both of these facilities has increased significantly during the past fifteen years and the bulk of it is intended for export (see Table III.61). The nickel ore and ferro-nickel produced at Pomalaa is shipped to both Japan and Europe, while the nickel matte produced at Soroako is exported exclusively to Japan under a long term contract. Only a relatively small proportion of total output is used domestically, mainly in the production of stainless steel.

Fig. III.L. Production and exports of nickel ore, 1980/81-1991/92, selected fiscal years

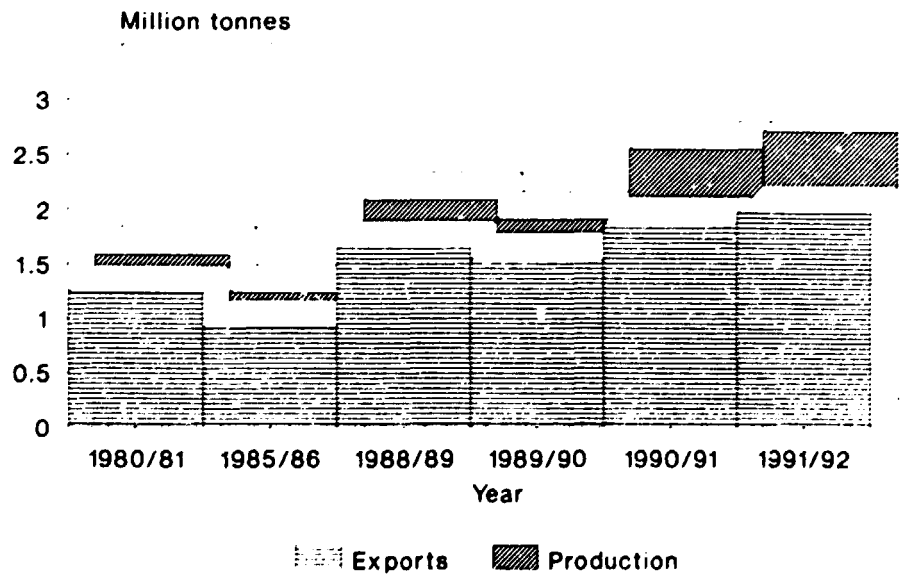


Table III.61. Production and exports of nickel, 1970/71-1991/92, selected fiscal years
(Thousand tonnes)

	1970/71	1975/76	1980/81	1985/86	1988/89	1989/90	1990/91	1991/92
Production								
Nickel ore	689.0	751.2	1,339.3	986.9	1,830.3	1,652.4	2,296.7	2,459.1
Ferro-nickel	-	-	4.5	4.8	4.8	5.0	5.1	5.4
Nickel matte	-	-	17.8	20.1	30.0	30.0	26.7	34.7
Exports								
Nickel ore	675.6	707.6	1,238.7	916.8	1,648.2	1,534.2	1,861.2	1,962.3
Ferro-nickel	-	-	4.4	4.5	4.2	4.6	5.7	5.1
Nickel matte	-	-	19.9	26.8	28.6	31.9	26.4	31.0

Sources: Government of Indonesia, Supplements to the President's Reports to Parliament, 15 August 1972, 11 March 1978, 15 August 1981, 16 August 1988 and 15 August 1992

Constraints and prospects

As in the case of all primary commodities, nickel is subject to wide price fluctuations in international markets, which can have a significant impact on the profitability of the mining and processing industries. By international standards, however, the two Indonesian producers are believed to be relatively efficient, with PT Inco able to break even at a price of $2.45 per pound of nickel.[179] Despite the relatively weak prices currently prevailing in international markets, both firms are therefore in the process of expansion. PT Aneka Tambang was officially authorized by the investment licensing agency BKPM to expand the capacity of its ferro-nickel plant at Pomalaa from the current level of 5,000 tonnes per year to 10,000 tonnes per year in 1992. The project is now beginning to be implemented, and will be completed by the end of 1995.[180] PT Inco, meanwhile, has been overhauling and expanding its three smelting furnaces at Soroako since 1990. While this has resulted in the plant operating significantly below capacity for the past three years, it will provide the company with a firm base for future growth once the programme is completed by 1996.[181]

GOLD AND SILVER

Past trends

The mining of gold and silver has a long history in Indonesia, but until the mid-1970s was carried out almost exclusively by PT Aneka Tambang (see Table III.62). From 1975 onwards, PT Freeport Indonesia Incorporated began to extract significant quantities of both metals from associated deposits at its copper mine in Irian Jaya, and became Indonesia's largest producer. Since the mid-1980s, when other private companies were attracted into the gold and silver mining industry, these independent producers have also begun to play an important role. As a result of these developments, gold production has risen particularly rapidly during recent years, from 2,000 kilogrammes in 1985 to 17,000 kilogrammes in 1991.

Although the bulk of Indonesia's production of gold and silver is exported, a significant proportion is also processed domestically. PT Aneka Tambang operates a precious metals unit in Jakarta

Table III.62. Production of gold and silver by principal producers, 1970-1990, selected years
(Kilogram)

	1970	1975	1980	1985	1988	1989	1990
Gold							
PT Aneka Tambang	237	331	248	249	165	209	139
PT Freeport Indonesia	-	2,048	1,568	2,385	3,734	4,347	9,335
Others	-	-	-	14	832	1,491	1,642
Total	**237**	**2,379**	**1,816**	**2,648**	**4,731**	**6,047**	**11,116**
Silver							
Pt Aneka Tambang	8,803	4,755	2,196	2,231	2,819	2,222	2,180
PT Freeport Indonesia	-	27,894	19,604	36,099	54,746	67,014	61,359
Others	-	-	-	-	3,973	4,811	3,614
Total	**8,803**	**32,649**	**21,800**	**38,330**	**61,538**	**74,049**	**67,153**

Source: Yusuf, Muhammad, "Gold and Silver Mining in Indonesia, Part I", *Business News*, No. 5182/5183, 13 November 1991, Jakarta, Table 1, p. 3B.

with smelting and purifying facilities, which also has the capacity to manufacture a variety of industrial products. These include silver filaments and silver tape fuses for electrical uses, white gold, gold and silver solder, plating solutions for jewellery production, nitrate silver and silver and gold bars. Further downstream, craft based industries play a significant role in the manufacture of gold and silver products, producing jewellery and ornaments as well as tableware and cutlery. Particularly important centres of these activities are located in Yogyakarta in Central Java, Kendari in Southeast Sulawesi, and, to a lesser extent, Celuk in Bali.[182]

Constraints and prospects

The physical output of gold and silver is likely to increase substantially over the coming years as a result both of the continuing expansion of the Freeport Indonesia copper mine and the gradual start-up of mining operations at a number of private mines licensed in the mid-1980s. According to the best available estimates, every tonne of copper ore concentrate produced by PT Freeport Indonesia contains 10-15 grammes of gold and 100-150 grammes of silver. Meanwhile, only a handful of the 103 private companies licensed to prospect for gold between 1987 and 1988, when investments in the gold mining industry were temporarily permitted, have so far begun to produce gold. While not all of them will find exploitable reserves, some further expansion of output from this source appears inevitable in the coming years.

The prospects for the downstream industries also appear broadly favourable. Indonesia's rapid industrialization will almost certainly stimulate a continuing increase in demand for industrial products made from precious metals. In addition, the continued growth of the jewellery industry in particular will be supported by the increasing income and wealth of the Indonesian population, and its traditional preference for holding at least a part of its assets in the form of gold bullion or jewellery. With tourists already constituting a major market for the jewellery industry and the handicraft industries producing such products as ornaments and cutlery, moreover, the projected rapid growth of tourism in the coming years will also provide significant benefits for these industries.

H. MACHINERY, TRANSPORT EQUIPMENT AND ELECTRICAL ENGINEERING

MACHINERY

The resource base

The principal resource upon which Indonesia can rely to build an engineering industry is its large pool of comparatively well educated, low-cost labour. As in the case of the Republic of Korea, Malaysia, Singapore and Taiwan Province at an earlier stage in their economic development, Indonesia is in a favourable position to attract investments in relatively simple machinery assembling industries, which in turn will help to develop the skills needed for the production of progressively more complex engineering goods. While these industries should primarily be oriented towards export markets in order to ensure that they are efficient and competitive, the size of Indonesia's domestic market compared with those of its industrializing neighbours offers its engineering industries much greater scope for local expansion.

Indonesia is also in the process of establishing appropriate support industries for the development of an engineering industry. As the development of the petrochemicals, plastics, and basic metals industries proceeds, local manufacturers of machinery and equipment will be able to meet a greater share of their physical input requirements from these sources. However, care is needed to ensure that these domestically produced intermediate goods are competitive in price and quality with those available in external markets, however, and that access to these external markets is not denied to the domestic producers of engineering goods.

MACHINE TOOLS

Past trends

Indonesia's machine tool industry is still comparatively small and unsophisticated. For the most part it produces only relatively simple equipment, which usually incorporates antepenultimate technology and does not rely on computerized control systems. Because of its modest size the industry is able to cover only a very small proportion of domestic demand for these conventional machine tools, which is in any case contracting. Indonesian demand for these products has mostly to be satisfied with imports (see Table III.63).[183/]

Constraints and prospects

The growth of the machine tool industry is likely to be restrained for some time to come. This will be due mainly to the relatively weak, and progressively weakening demand for the simple machines it is able to produce, and the high investment cost of establishing a manufacturing capacity for the state-of-the-art machinery that is increasingly being demanded both within Indonesia and outside. Some evolutionary change is likely to be brought about by transfers of technology through foreign investment and cooperation agreements with foreign manufacturers. However, the overall outlook remains one of only slow development and growth in the coming years.

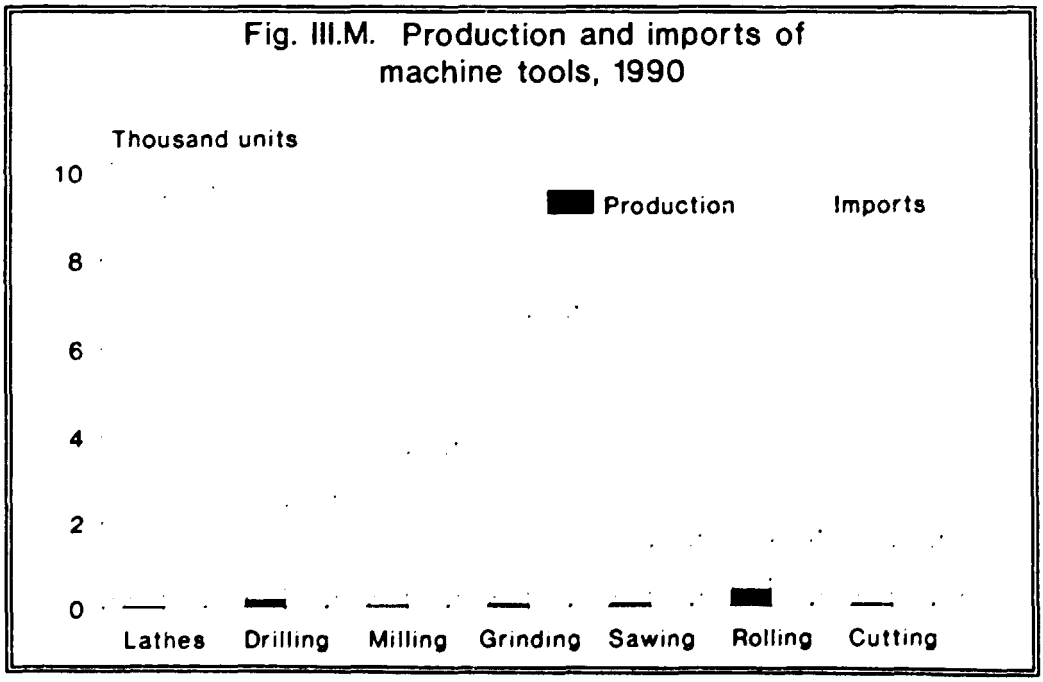
As in the recent past, Indonesia's production of machine tools is expected to fluctuate from year to year because the country's machine tool manufacturers produce almost exclusively to order. Most will also continue to rely on government procurements for the bulk of their orders since it

appears unlikely that they will be able to compete either in terms of price or quality with imported products, which will be preferred by private entrepreneurs. This will be especially true for joint venture investment projects with foreign companies and for public projects partially financed with overseas development aid, where foreign funds will usually be made available to finance the purchase of imported machine tools.

Table III.63. Production and imports of machine tools, 1986-1990
(Units)

	1986	1987	1988	1989	1990
Production					
Lathes	136	241	19	30	33
Drilling machines	280	286	177	110	180
Milling machines	133	232	24	27	41
Grinding machines	116	18	36	60	67
Sawing machines	300	260	170	50	76
Folding and rolling machines	420	186	90	111	370
Cutting machines	150	54	80	45	46
Imports					
Lathes	1,294	1,782	3,034	5,274	9,430
Drilling machines	1,668	3,280	5,342	2,964	2,371
Milling machines	2,114	946	1,709	943	3,591
Grinding machines	2,653	3,885	3,136	508	6,676
Sawing machines	2,085	1,410	2,036	334	1,404
Folding and rolling machines	1,296	1,456	1,075	1,684	1,509
Cutting machines	1,805	225	1,838	1,236	1,376

Source: "Domestic Market of Machine Tools Dominated by Import Products", *Indonesian Commercial Newsletter*, No. 93, 10 February 1992, Jakarta, Tables 1 and 2, pp. 36-37.



DIESEL ENGINES AND GENERATORS

Past trends

The production of diesel engines is emerging as an increasingly important component of the engineering industry. It had its origins in the early 1970s, with the earliest officially published statistical data indicating an output of some 2,000 units in 1972/73. From 1985/86 a distinction began to be made in official statistics, between automotive and non-automotive diesel engines following the establishment of a domestic manufacturing capacity for the former. Since that time there has been a significant expansion of output, with the combined volume of both categories of engine almost doubling from some 53,000 units to nearly 102,000 units by 1991/92 (see Table III.64).

Table III.64. Production of automotive and non-automotive diesel engines, 1970/71-1991/92, selected fiscal years
(Thousand units)

	1970/71	1975/76	1980/81	1985/86	1988/89	1989/90	1990/91	1991/92[a/]
Automotive diesel engines	-	-	-	11.5	47.8	35.9	45.9	50.0
Non-automotive diesel engines	-	8.0	34.1	41.6	32.4	44.3	49.7	51.8

Sources: Government of Indonesia. Supplements to the President's Reports to Parliament. 11 March 1978, 15 August 1981, 16 August 1988 and 15 August 1992.

a/ Preliminary.

With the growth of the industrial sector outpacing the growth of electricity production by a substantial margin since the late 1980s, there has been a particularly sharp surge in demand for diesel-powered generating equipment in recent years. This, in turn, has stimulated extensive investment in the industry, and a correspondingly rapid increase in output. By 1990 it comprised thirteen medium- and large-scale enterprises with a combined production capacity of 35,000 units per annum, as well as an unknown number of small-scale enterprises and workshops.[184/]

This increase in domestic production has succeeded in meeting the bulk of the increase in Indonesia's demand for such captive generating capacity. Though imports of generating sets have continued, and been eased through the gradual lifting of restrictions on the import of large-capacity units, they have continued to account for only a relatively modest share of total domestic demand. At the same time, however, the generating set industry has evolved almost entirely as an assembling industry on the basis of imported components. Even the domestically produced equipment consequently has a very high import content (see Table III.65).

Table III.65. Production and imports of diesel-powered generating sets, 1985-1989
(Units)

	1985	1986	1987	1988	1989
Production					
Low capacity:					
10 KVA - 15 KVA	5,561	3,392	4,985	5,846	6,543
Medium capacity:	2,553	2,236	2,978	5,724	6,474
15 KVA - 100 KVA	1,618	1,492	1,698	2,667	2,697
101 KVA - 500 KVA	935	744	1,280	3,057	3,777
Large capacity:	289	288	308	385	535
501 KVA - 1,000 KVA	235	231	261	342	529
> 1,000 KVA	54	57	47	43	6
Total	**8,403**	**5,916**	**8,271**	**11,955**	**13,552**
Imports	**2,573**	**5,138**	**2,394**	**1,025**	**3,924**

Source: "Demand for Generating Sets in Indonesia: Condition and Prospects". *Indonesian Commercial Newsletter*, No. 69, 11 February 1991, Jakarta, Tables 3 and 4, pp. 13 and 15.

Constraints and prospects

The prospects for the diesel engine industry appear favourable in the short to medium term. With the anticipated growth of domestic economic activity likely to stimulate a continuing rapid increase in demand for transport services and power, Indonesia's requirements for such engines, both as propulsion units for transport equipment and as generators of electricity, are bound to increase. As it acquires greater experience and skills, moreover, the industry is likely to move towards the production of increasingly large and complex units, as indicated by a recently announced plan to establish a plant for the manufacture of marine engines.[185/] However, in view of the heavy investments in capital, technology and human resources required in the production of many of the basic components of such engines, the industry is expected to mainly involve assembling for the foreseeable future.

AGRICULTURAL MACHINERY AND EQUIPMENT

Past trends

As a still predominantly rural country with a large agricultural sector, Indonesia has a considerable demand both for the tools needed for agricultural cultivation and the equipment needed to process the agricultural output (see Table III.66). This demand remained strong throughout 1970s and 1980s in line with the rapid growth in the volume of agricultural production and the increasing emphasis on domestic processing in order to add value to Indonesia's resource-based exports. Responding to the stimulus generated by this growth in demand, local manufacturers of farming and agricultural processing equipment have sustained a relatively high level of production during the past ten years for which data are available.

Table III.66. Production of agricultural equipment, 1983/84-1991/92, selected fiscal years

	1983/84	1985/86	1988/89	1989/90	1990/91	1991/92[a/]
Units						
Hand tractors	1,065	973	2,490	5,533	6,330	8,500
Mini tractors	68	43	14	14	20	15
Large tractors	-	27	188	51	200	409
Rice threshers	467	2,771	830	1,263	1,337	2,000
Rice hullers	248	420	500	826	909	1,200
Rice polishers	235	413	150	362	665	750
Rice milling units	392	516	400	301	468	550
Irrigation pumps	3,065	1,971	10,800	6,728	7,973	9,000
Tonnes						
Tea processing machinery	650	1,000	800	800	934	1,000
Palm oil processing machinery	3,400	10,200	5,600	6,650	8,000	7,500
Sugar processing machinery	5,850	8,500	6,000	5,200	6,000	7,000
Coffee processing machinery	30	1,050	211	240	250	260
Rubber processing machinery	200	1,675	1,600	1,200	1,400	1,500

Sources: Government of Indonesia, Supplements to the President's Reports to Parliament, 16 August 1988 and 15 August 1992.

a/ Preliminary.

Constraints and prospects

Although it has lost its overall primacy, the agricultural sector (including forestry and fisheries) is likely to remain one of the most important sources of output growth in the Indonesian economy for some time to come. As a result it will continue to inspire strong growth in demand for a wide range of agricultural machinery and processing equipment, including threshing and milling machinery for rice; crushing equipment for oilseeds and sugar; and sawing and plywood-making machinery for the timber industry. The projected high levels of demand for agricultural tools and machinery will, in turn, almost certainly continue to evoke a favourable supply response from local manufacturers, resulting in a continuing high level of domestic production of such equipment. The relative simplicity of much of this equipment permits it to be manufactured by small- and medium-scale enterprises without access to technologically sophisticated production facilities, and therefore renders it eminently suitable for a country at Indonesia's stage of industrialization.

CONSTRUCTION MACHINERY

Past trends

Since the 1970s Indonesia has established an extensive construction machinery industry producing most kinds of commonly used construction equipment (see Table III.67). These include both light machinery, such as concrete mixers and asphalt sprayers, and heavy equipment, such as excavators, bulldozers and cranes. The industry produces almost entirely to order, however, and the volume of its output has varied considerably in recent years as these orders have fluctuated. These fluctuations have themselves been caused by variations in the level of construction activity, and by changes in Indonesia's external trade regulations, which have altered the degree of competition between locally produced and imported equipment.

Table III.67. Production of construction equipment, 1983/84-1991/92, selected fiscal years (Units)

	1983/84	1985/86	1988/89	1989/90	1990/91	1991/92[a/]
Stone crushers	18	39	26	18	43	20
Concrete mixers	1,080	1,460	406	532	616	310
Plate compactors	385	325	14	8	8	4
Asphalt mixers	5	9	2	3	5	4
Asphalt sprayers	15	30	60	25	70	35
Road rollers	404	340	46	10	50	97
Wheel loaders	1	64	154	150	187	265
Motor graders	-	54	61	108	135	156
Excavators	-	196	366	632	428	421
Bulldozers	22	150	475	449	643	711
Forklifts	50	183	513	425	1,248	803
Cranes	400	1,200	120	60	81	45

Sources: Government of Indonesia. Supplements to the President's Reports to Parliament. 16 August 1988 and 15 August 1992.

a/ Preliminary.

A particularly important development in terms of foreign competition has been the re-establishment of Indonesia's trading links with China in the latter half of the 1980s. Its impact has been felt especially severely by producers of some of the lighter items of construction equipment, who have been unable to match the prices accepted by Chinese suppliers and have consequently suffered a sharp loss of orders in recent years. According to one recent study, the only significant product in this category which the Indonesian industry can produce competitively is asphalt mixing machinery, which it has even exported to Malaysia.[186/]

The heavy equipment industry enjoys a higher degree of protection, and has experienced a more robust output growth since the 1970s. At the end of 1991 it consisted of seven operational firms, including three joint ventures with foreign companies, which had a combined annual production capacity of 2,700 forklifts, more than 1,600 bulldozers, 1,000 road rollers, and several hundred excavators, motor graders and wheel loaders.[187/] Most of this equipment is produced under licence from foreign manufacturers, such as Komatsu, Caterpillar, Sakai and Mitsubishi. To a considerable extent, therefore, the industry is based on the assembly of imported parts, although the growing ability of local foundries to produce an expanding range of components is resulting in a gradual increase in the local content of this equipment.

Constraints and prospects

The construction machinery industry has mixed prospects. While it has been established primarily as an import-substituting industry and is generally accepted to be uncompetitive in an international context, only a relatively small proportion of it is exposed to the rigours of international competition. This component, producing such goods as concrete mixers and asphalt sprayers, is likely to continue to face strong pressure from imported equipment. For the remainder of the industry, the heavily protected and rapidly expanding domestic market will provide considerable growth opportunities, which several companies are already preparing themselves to exploit. One

firm, PT Komatsu Indonesia, has recently completed a substantial expansion of its existing capacity, for example, while another, PT Hitachi Construction Machinery Indonesia, has been licensed to establish a production facility in Indonesia.[188]

TEXTILE MACHINERY

Past trends

Although the production of traditional spinning and weaving equipment has a long history in Indonesia, the development of a manufacturing capacity for industrial textile machinery has lagged well behind the growth of the country's textile and garment industry. Significant investment in the production of modern automated textile manufacturing equipment dates back no further than 1990, at which time the textiles and garments industry had become a leading force in the Indonesian economy. According to the latest available data, upstream textile machinery was produced by only five firms in mid-1991, with an additional four firms producing parts and components.[189]

Demand for domestically produced machinery has been patchy, especially since local manufacturers are not able as yet to manufacture the sophisticated machinery, such as open-end spinning machines and water-jet looms, which the Indonesian textile industry increasingly wants. Even the conventional machinery manufactured by local producers, embodying less up-to-date technology, is unable to compete in price or quality with similar equipment available from foreign suppliers. The textile producers therefore continue to prefer to install imported machinery in their mills, with Chinese weaving equipment having become particularly popular in recent years. Recognizing the importance of maintaining the competitiveness of Indonesia's growing textile exports, the government has facilitated the use of more efficient foreign machinery by liberalizing the import controls previously imposed on such equipment in a package of deregulatory economic reforms introduced in July 1992.[190]

Within the textile and garments machinery industry, the production of sewing machines plays a particularly important role (see Table III.68). Comparatively cheap sewing machines, specified for domestic rather than industrial use, have been assembled or manufactured in Indonesia for several decades. At present the industry consists of three major enterprises with a combined annual production capacity of almost 700,000 units. It has been hard hit by the restoration of trade relations with China, however, which has resulted in the import of large volumes of Chinese goods and prompted a substantial decline in local production to less than 29,000 units in 1991.[191]

Table III.68. Production and imports of sewing machines, 1987-1991
(Thousand units)

	1987	1988	1989	1990	1991
Production	148.6	51.8	34.0	29.3	28.6
Imports	33.2	56.9	85.0	100.1	..

Source: "Locally Produced Sewing Machines Less Competitive than Import Products", *Indonesian Commercial Newsletter*, No. 99, 11 May 1992, Jakarta, Tables 1 and 2, pp. 45-46.

[188] United Nations Industrial Development Organization

Constraints and prospects

The continuing growth of the textile and garments industry provides considerable opportunities for investments in the production of machinery and equipment used by the industry. Several potential investors have responded to these opportunities in the recent past, and in 1981 alone three new firms with a joint production of about 16,000 units of various kinds of machinery were licensed by the BKPM. In order to fully exploit these opportunities, however, the domestic textile machinery industry will have to overcome the clear preference for imported machinery exhibited in the past by local textile producers, who through the import liberalization measures of July 1992 have been given even greater freedom to express this preference. Increasing the competitiveness of their products sufficiently to persuade the textile industry to acquire them remains the principal challenge facing domestic textile machinery producers.

TRANSPORT EQUIPMENT

The resource base

As in the case of the machinery industry, Indonesia's resource base for the manufacture of transport equipment is tenuous. The continued absence of an adequate upstream iron and steel industry and the still embryonic state of the country's broader engineering industry precludes the availability of an efficient and competitive raw material and component supply structure. The principal resource at the disposal of Indonesia's transport equipment industry is the country's large pool of labour, with its comparatively high level of basic education and impressive capacity to acquire new industrial skills. With the increasing automation of the transport equipment industry, however, the utility of this resource is being eroded.

Despite the absence of an obvious resource base, the Government of Indonesia has long regarded the establishment of a comprehensive transport equipment industry as a strategic imperative because of the country's vast size and geographical peculiarities. The transport equipment industry has therefore been devised as a quintessentially import-substituting industry, and nurtured at considerable cost behind a variety of direct and indirect protective barriers. Its development has therefore not been based on the premise of exploiting available resources, but on the perceived need to establish an industry deemed politically necessary irrespective of the economic cost.

MOTOR VEHICLES AND AUTOMOTIVE COMPONENTS

Past trends

The Indonesian motor vehicle industry dates back to the late 1920s, when a plant for the assembly of such vehicles was established by General Motors in the Tanjung Priok area of Jakarta. In its present form, however, the industry has its origins in a number of decisions taken by the government in the late 1960s and early 1970s, which regulated its structure and activities on the one hand and established a blueprint for its further development.[192] In particular, these policies sought to maximize the degree of local assembly and the use of local components. To achieve these objectives the government imposed a series of increasingly restrictive import controls, which eventually resulted in the prohibition of imports of completely built up (CBU) motor vehicles in favour of completely knocked down (CKD) motor vehicle kits, and in 1976 announced a "deletion" programme for the progressive reduction of the share of imported components in locally assembled vehicles.

The currently prevailing official regulations governing the Indonesian motor vehicle industry distinguish between commercial vehicles and sedans, with both of these broad groups further subdivided into several smaller categories. Commercial vehicles are classified by gross vehicle weight (GVW) as follows:

Category I:	GVW	< 2.5 tonnes
Category II:	GVW	2.5 - 8.9 tonnes
Category III:	GVW	9.0 - 23.9 tonnes
Category IV:	General purpose vehicles, jeeps	
Category V:	GVW:	> 24.0 tonnes.

Passenger vehicles, meanwhile, are classified by engine cylinder capacity (measured in cubic centimetres) as follows:

Category I:	Cylinder capacity < 1,000 cc
Category II:	Cylinder capacity 1,000 - 1,499 cc
Category III:	Cylinder capacity 1,500 - 1,999 cc
Category IV:	Cylinder capacity > 2,000 cc.

As presently constituted, the motor vehicle industry consists of 16 assemblers producing all of the above categories of vehicles. Between them, these 16 assemblers have a combined production capacity of more than 410,000 units per year, comprising vehicles of 23 marques and a plethora of different models and variants. Although the actual volume of the industry's output remains well below its installed capacity, and has tended to fluctuate from year to year in response to cyclical effects, the production of motor vehicles has nevertheless exhibited a dramatically rising long-term trend since the 1970s. From 2,900 units in 1970/71, output rose to a peak of more than 270,000 units in 1990/91 before falling back subsequently in the following years as a result of the contraction in demand induced by the tight monetary policy pursued by the government between mid-1990 and mid-1992 (see Table III.69).[193/]

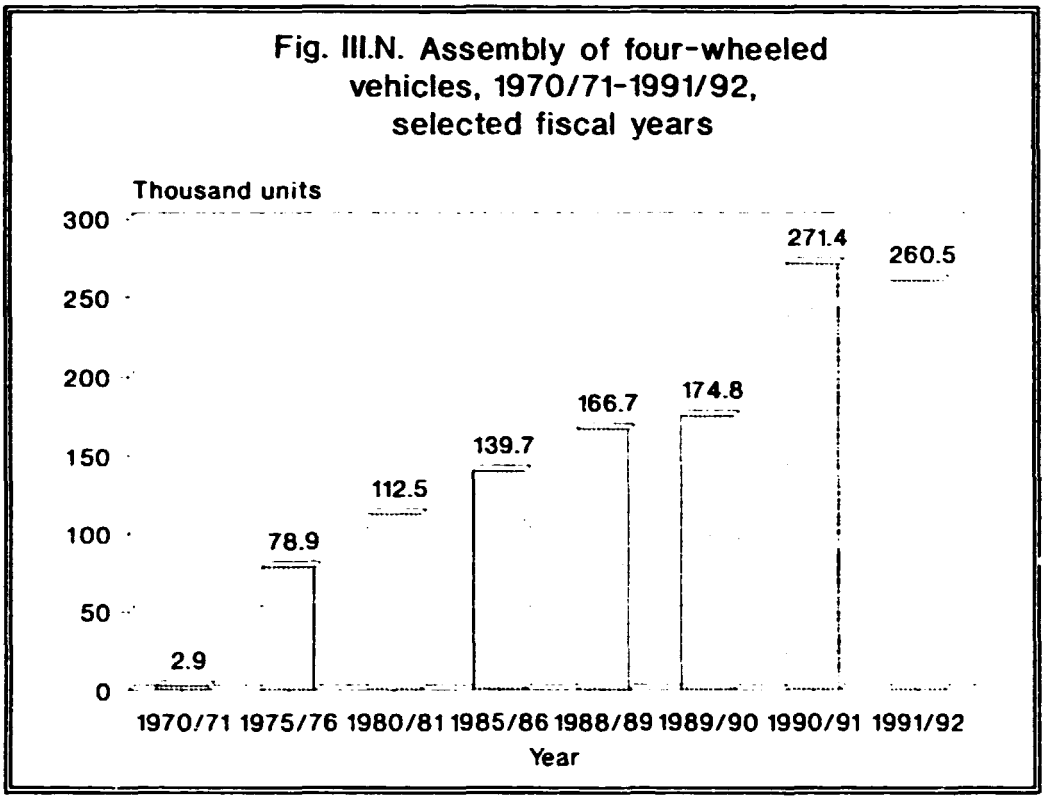
Table III.69. Assembly of four-wheeled motor vehicles, 1970/71-1991/92, selected fiscal years (Thousand units)

	1970/71	1975/76	1980/81	1985/86	1988/89	1989/90	1990/91	1991/92[a/]
Motor vehicles	2.9	78.9	112.5	139.7	166.7	174.8	271.4	260.5

Sources: Government of Indonesia, Supplements to the President's Reports to Parliament, 15 August 1974, 11 March 1978, 15 August 1981, 16 August 1988 and 15 August 1992.

a/ Preliminary.

The government has sought to promote the development of the commercial car industry in particular, and has placed special emphasis on the production of Category I commercial vehicles.[194/] This preference for commercial cars is based on the view that they are more suitable than sedans for Indonesia's road conditions, especially in rural areas, and because their lack of technological sophistication renders them more easy to manufacture at the present stage of Indonesia's industrial development. In order to encourage the growth of the commercial vehicle industry, the government has imposed duties of 100 per cent on imports of CKD kits of sedan cars.



These policy measures have been very effective in channelling market demand, and have resulted in Category I commercial vehicles assuming a share of more than 60 per cent of the total Indonesian market (see Table III.70). Many, if not most, of these ostensibly commercial vehicles are configured for use as passenger cars and equipped accordingly, however, with high-quality accessories of various kinds including air conditioners and tinted windows. This segment of the market is dominated by vehicles of Japanese lineage, with the Toyota Kijang, a locally developed model using Toyota components, accounting for the largest single share.

Table III.70. Domestic sales of four-wheeled motor vehicles by principal category, 1987-1991
(Thousand units)

	1987	1988	1989	1990	1991
Category I commercial vehicles	110.3	58.4	108.9	157.4	161.2
Category IV commercial vehicles	3.9	4.7	4.3	7.0	6.5
Other commercial vehicles	16.6	22.8	33.5	54.6	49.6
Sedans	28.9	37.4	32.2	58.9	45.8
Total[a/]	**159.7**	**163.2**	**178.8**	**277.8**	**263.1**

Source: "Condition and Prospects of Automotive Industry in Indonesia", *Indonesian Commercial Newsletter*, No. 100, 25 May 1992, Jakarta, Table 6, p. 16.

a/ Totals may not add due to rounding.

Government efforts to promote the development of a full manufacturing capacity have been less successful. The target for full domestic manufacture, originally set for the late 1980s, had to be postponed on several occasions because entrepreneurs were unable to undertake the necessary investments in the recessionary conditions prevailing at the time. Even the latest deadline, set in 1987 for the end of 1990, has not been met entirely, with official estimates of the local content ratio in 1991 ranging from a mere 14 per cent for Category V commercial vehicles to a maximum of about 71 per cent for the particularly promoted Category I commercial vehicles (see Table III.71). These estimates themselves significantly overstate the actual degree of local content in domestically produced vehicles, moreover, since many of the locally produced components are only assembled in Indonesia from imported kits as a result of the imposition of import duties of up to 50 per cent on components imported in CBU form.[195]

Even though the ambitious local content targets set by the government have not yet been met, the automotive components industry has nevertheless recorded a significant growth in recent years (see Table III.72). According to the latest available data, this industry now comprises some 120 firms producing or assembling 33 different types of automotive components.[196] Several domestic companies, including the local assemblers of Toyota, Mitsubishi, Daihatsu and Isuzu, have established subsidiaries for the machining of various engine components, such as cylinder blocks and heads, intake and exhaust manifolds, cam shafts and crank shafts, connecting rods, shift forks and flywheels. A number of independent companies also produce an extensive range of other components, including chassis frames, body panels, steering assemblies, axles and propeller shafts, shock absorbers, electrical components including batteries, exhaust systems, fuel tanks, spark plugs, wheel rims and automotive air conditioning systems.[197]

Fig. III.Q. Production of selected automotive components, 1988/89 and 1991/92

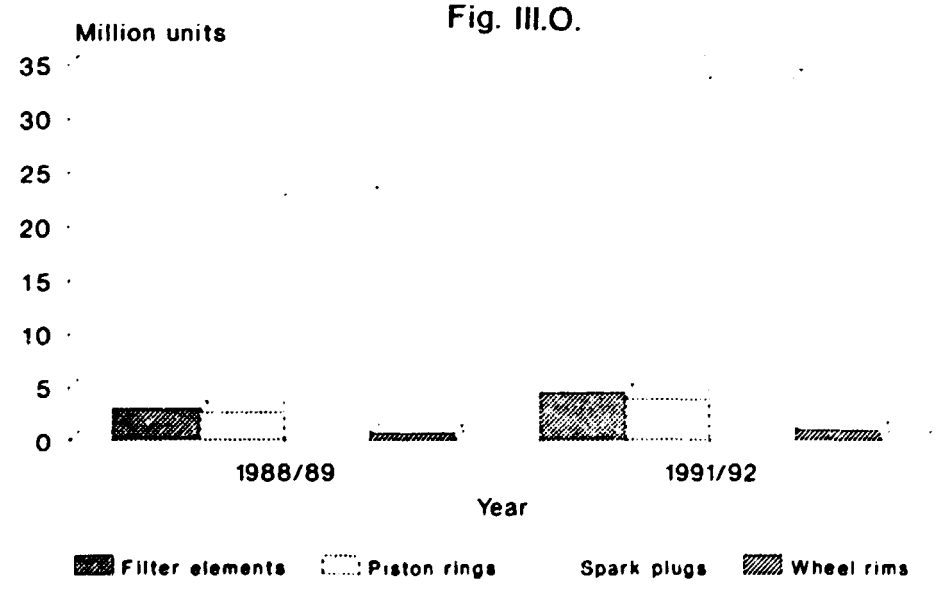


Table III.71. Local content of domestically produced motor vehicles by category, 1991
(Percentage)

Vehicle category	1991
Commercial vehicles	
- Category I	70.6
- Category II	42.8
- Category III	38.7
- Category IV	40.6
- Category V	14.0
Passenger vehicles	
- Sedans	27.1

Source: "Condition and Prospects of Automotive Industry in Indonesia", *Indonesian Commercial Newsletter*, No. 100, 25 May 1992, Jakarta, Table 4, p. 14.

Table III.72. Production of automotive components, 1980/81-1991/92, selected fiscal years
(Thousand units/sets, except as stated)

	1980/81	1985/86	1988/89	1989/90	1990/91	1991/92[a/]
Shock absorbers	288.3	819.3	756.6	1,202.3	1,491.2	1,550.9
Radiators	111.9	121.1	143.8	170.6	244.0	256.2
Exhaust systems	286.9	209.5	233.6	311.5	225.7	239.3
Filter elements	1,299.0	3,586.0	2,998.6	3,558.6	4,216.7	4,554.0
Pistons	-	326.8	718.1	570.0	627.8	609.5
Piston rings	-	2,372.8	2,725.5	3,010.3	3,664.3	3,957.5
Spark plugs	10,529.0	12,497.0	22,971.9	27,195.7	30,806.0	33,886.5
Diesel engines	-	11.5	47.8	35.9	45.9	50.0
Petrol engines	-	48.0	19.6	156.6	136.7	160.0
Cabins	-	103.6	115.0	128.2	138.7	136.0
Chassis	-	115.5	122.3	183.0	235.6	231.0
Axles	-	62.4	120.3	138.2	196.0	192.2
Propeller shafts	-	62.4	120.3	138.2	196.0	192.2
Rear bodies	-	83.9	48.2	53.0	66.9	65.6
Brake systems	-	15.0	291.9	273.2	319.6	313.4
Wheel rims	-	447.4	695.7	759.8	995.6	1,015.5
Fuel tanks	-	88.5	135.3	143.7	157.2	161.9
Leaf springs (Thousand tonnes)	-	8.9	19.0	22.2	25.3	25.5
Seat assemblies	-	114.9	380.5	244.4	199.7	207.6
Clutch systems	-	-	119.5	129.5	144.8	141.9
Transmissions	-	-	126.4	146.8	209.4	205.3
Steering systems	-	-	158.0	133.8	153.6	150.6

Sources Government of Indonesia, Supplements to the President's Reports to Parliament, 15 August 1981, 16 August 1988 and 15 August 1992.

a/ Preliminary

Constraints and prospects

Having been established and developed as essentially import substituting industries, the Indonesian motor vehicle and components industries are relatively inefficient by international standards. Their survival in the domestic market is due almost entirely to the high level of protection they enjoy, and their ability to compete in external markets is very limited. Exports of built-up four-wheeled motor vehicles, which commenced in 1987 when small numbers were shipped to neighbouring countries such as Brunei Darussalam and Papua New Guinea, have therefore remained below 1,000 units per year.

Although a further expansion of the domestic market is almost certain as economic development proceeds, this expansion will inevitably be constrained by the prevailing inequalities in the distribution of income and wealth in Indonesia, and by the comparatively high price of domestically produced motor vehicles. With export growth also likely to be restrained by the Indonesian motor industry's lack of international competitiveness, the next major surge in the industry's growth is only likely to be achieved on the basis of reduced production costs and prices, which will widen the pool of prospective domestic buyers while at the same time enhancing export prospects. Such a growth surge therefore depends crucially on the achievement of significant improvements in the industry's efficiency.

Such efficiency improvements are currently prevented by two principal factors. First, the high degree of protection offered to the domestic industry reduces the industry's incentives to raise its efficiency to match that of potential foreign competitors, who are denied access to the Indonesian market. Second, the large number of marques and models produced in Indonesia prevents any single producer/assembler from achieving a minimum efficient scale of production. The achievement of the desired efficiency gains therefore requires a significant liberalization of the domestic market, which would increase the degree of foreign competition faced by local producers and help to bring about a consolidation of the domestic industry.

The need for such deregulation has been recognized by the Government of Indonesia, which temporarily relaxed import controls on some categories of completely built up commercial vehicles in the beginning of 1991, and announced an impending, but as yet not implemented, liberalization of the industry in late 1992.[198] At the same time, however, the adoption of such deregulatory policies is complicated by the fact that the resulting restructuring of the Indonesian automotive industry will inevitably be painful in the short term, and may prompt an initial contraction of the industry as inefficient capacity is shut down. With the automotive industry being dominated by politically influential vested interests, and with economic nationalism continuing to represent a significant current of Indonesian political thinking, the introduction of these policies will almost certainly be a slow and gradual process.

MOTORCYCLES AND BICYCLES

Past trends

In addition to its four-wheeled motor vehicle industry Indonesia also has an active motorcycle industry, which in its present form dates back to the late 1960s when several local business groups began assembling motorcycles and scooters imported in CKD form from several Japanese manufacturers and the Italian firm Piaggio. In subsequent years the industry was expanded by the entry of a small number of other firms, the most important of which was the Indian producer of scooters and three-wheeled motor rickshaws, Bajaj. More recently, it has been forced by intense competition to shrink back to only four marques: Honda, Suzuki, Vespa (Piaggio) and Yamaha.

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[198] United Nations Industrial Development Organization

Abstracting from the usual cyclical fluctuations, production of such two- and three-wheeled motor vehicles exhibited a steadily rising trend until early mid-1980s. Sales slumped in 1983-1985, as many first-time buyers were forced to defer their purchases because of economic recession while many existing owners upgraded to four-wheeled motor vehicles. The latter half of the 1980s and the early 1990s have witnessed a strong recovery, as the improved economic environment and increased disposable incomes have permitted a larger number of first-time buyers to enter the market. The total volume of output, estimated at some 435,500 units in 1990, nevertheless remains well below the industry's installed capacity of more than one million units (see Table III.73).

Table III.73. Production of motorcycles, 1970/71-1991/92, selected fiscal years
(Thousand units)

	1970/71	1975/76	1980/81	1985/86	1988/89	1989/90	1990/91	1991/92[a/]
Motorcycles[b/]	31.1	300.0	410.0	226.8	259.9	281.0	410.0	435.5

Sources: Government of Indonesia, *Nota Keuangan dan Rancangan Anggaran Pendapatan dan Belanja Negara*, various issues, and Supplement of the President's Report to Parliament, 15 August 1992.

a/ Preliminary.
b/ Includes 3-wheeled scooters/rickshaws.

As in the four-wheeled motor vehicle industry, the motorcycle industry has also been subject to government protection and control. In particular, it has also been required to implement a phased local-content programme, with a decree issued in 1983 stipulating that it must use entirely locally-made engines from 1987. Although this target has not been met, local components now account for some 75 per cent of domestically produced motorcycles. The importation of motorcycle engines, even in the form of CKD kits, ceased in 1989, and only selected engine parts not manufactured locally have been imported since that time. Scooter engines are still imported in CKD form, however, since the relatively small volume of their sales does not justify the establishment of a local manufacturing capacity.[199/]

The production of bicycles and tricycle-rickshaws known as *becaks* has a long history in Indonesia dating back to the colonial period. Although precise statistics are unavailable, these vehicles represented the single most important means of personal transport throughout the country until about the 1970s, and remain very important in a number of provincial towns and rural areas. According to the latest available official data, the industry consists of 29 enterprises located in various parts of Indonesia with a combined annual production capacity of almost 3.1 million units. Most of these manufacturers are comparatively small firms with individual capacities of less than 10,000 units per year and produce traditional bicycles and *becaks* for local markets using domestic components to low specifications (see Table III.74). This segment of the industry has experienced only modest growth in recent years, however, as a result of a growing shift in demand towards motorcycles and increasing legislative curbs on *becaks* in major urban areas, where they were beginning to be regarded as a traffic hazard.

Table III.74. Regional distribution and production capacity of bicycle industry, 1992

Province	Number of producers	Production capacity (Unit/year)
Jakarta	1	500,000
West Java	9	1,273,600
East Java	9	1,182,000
North Sumatra	9	102,000
South Sulawesi	1	5,000
Total	**29**	**3,062,600**

Source: "Condition and Prospects of Bicycle Industry in Indonesia", *Indonesian Commercial Newsletter*, No. 114, 21 December 1992, Jakarta, Table 1, p. 11.

Since the late 1980s, there has been a significant new development in the bicycle industry, involving the emergence of a growing manufacturing capacity for sophisticated recreational bicycles. These include racing bicycles, mountain and trekking bicycles, and bicycle motor cross (BMX) bicycles, which are assembled mainly from imported components. Though at present still produced predominantly for local use, these bicycles have also begun to penetrate export markets, with more than 411,000 units having been shipped in 1991. The main external markets are the United States and western Europe, although significant quantities have also begun to be shipped to Saudi Arabia and the United Arab Emirates in recent years (see Table III.75).[200/]

Table III.75. Production and exports of bicycles, 1986-1991
(Thousand units)

	1986	1987	1988	1989	1990	1991
Production	1,364.9	1,400.0	1,450.7	1,494.1	1,608.4	1,873.8
Exports	-	127.0	97.5	126.3	308.6	411.3

Sources: "Indonesia's Bicycle Production Up Steadily", *Indonesian Commercial Newsletter*, No. 91, 13 January 1992, Jakarta, Tables 1 and 2, p. 50.
"Condition and Prospects of Bicycle Industry in Indonesia", *Indonesian Commercial Newsletter*, No. 114, 21 December 1992, Jakarta, Tables 3 and 9, pp. 14 and 20.

Constraints and prospects

With economic growth expected to be sustained, and the resulting growth of income permitting an increasing number of first-time buyers in particular to enter the market, the prospects for the motorcycle industry remain favourable. The outlook is improved further by the rapid pace of infrastructural improvement, which is permitting the development of increasingly remote rural markets. Though also likely to be uncompetitive in international markets, the industry has a sufficiently large potential domestic market to be able to enjoy substantial further expansion for many years to come.

The bicycle industry, after several years of stagnation caused by the weakening demand for traditional bicycles and *becaks*, has been given a new lease of life as a result of its shift towards the production of recreational bicycles. Since the manufacture of basic components, such as frames, forks and handlebars, is a relatively simple process for all but the most sophisticated of bicycles, and since the assembly of bicycle components also requires relatively little specialist machinery or technical skill, the expansion of the industry faces no significant supply constraints. Demand is also likely to continue to grow strongly both within Indonesia and overseas as consumers become more health conscious. Investment interest is responding strongly to this favourable outlook, with five major projects for the production of bicycles and bicycle components having been approved by the Indonesian authorities in the first ten months of 1992.

SHIPBUILDING

Past trends

Traditional shipbuilding, involving the construction of wooden fishing and cargo vessels as well as river boats and ferries, has been practised in most parts of Indonesia since time immemorial. Because of the diffuse and small-scale nature of much of this industry, however, its growth and development is not monitored on a regular basis, either quantitatively or qualitatively, by any official agency. While lack of information hampers analysis of this segment of the shipbuilding industry, it nevertheless continues to play an important local, regional, and even national role in generating employment and facilitating the movement of goods and people.

The more modern segment of the shipbuilding industry, involving primarily the construction and repair of steel hulled vessels, has grown rapidly in recent years but remains relatively small. According to data published in late 1992, this part of the industry comprises some 135 firms, including shipyards involved in the construction and refurbishment of a variety of vessels, firms providing auxiliary services for shipbuilders and offshore mining companies, and firms providing other maritime services. The combined annual production capacity of the industry is estimated at 130,000 dead weight tonnes (DWT).

The bulk of the industry consists of relatively small-scale enterprises not capable of building ships with a capacity exceeding 1,000 gross registered tonnes (GRT). Only 20 of the existing firms are able to build medium-sized vessels of 1,000-3,000 GRT, and only two are large-scale companies with the ability to build vessels of up to 30,000 GRT. These two firms, PT Dok & Perkapalan Kodja Bahari and PT PAL Indonesia, are both State-owned, with the former based in Jakarta and the latter in Surabaya. Of these, PT PAL Indonesia has historically been the more important with PT Dok & Perkapalan Kodja Bahari only having been formed in December 1990 through the merger of three relatively small shipyards, PT Dok & Perkapalan Tanjung Priok, PT Kodja and PT Pelita Bahari.[261]

The Indonesian shipbuilding industry recorded a patchy production performance in the mid-1980s as a result of weakening demand in the domestic market and its inability at that time to compete internationally. It has begun to expand markedly in more recent years, however, partly as a result of a recovery in domestic demand and partly due to its success in winning a number of export orders. The latest official data indicate a steady growth in domestically built shipping tonnage from 17,400 GRT in 1988/89 to 36,300 GRT in 1991/91 (see Table III.76).

In an attempt to accelerate the development of the domestic shipbuilding industry, the government launched an ambitious freighter construction programme in the early 1980s. This called for the domestic manufacture of a family of standardized cargo vessels of 1,000, 2,000 and 3,000 DWT

known as Caraka Jaya I, II and III, respectively. In order to ensure a market for these locally designed freighters, domestic shipowners were prohibited from importing comparable vessels from 1984 onwards.

Table III.76. Output of shipbuilding industry, 1975/76-1991/92, selected fiscal years

	1975/76	1980/81	1985/86	1988/89	1989/90	1990/91	1991/92[a/]
Shipbuilding (Thousand GRT)	15.0	17.5	18.2	17.4	22.5	32.6	36.3
Ship repairs (Thousand GRT)	-	-	892.6	4,276.0	3,965.3	5,181.1	4,396.8
Offshore structures (Thousand tonnes)	-	-	30.3	7.4	4.2	15.8	13.4

Sources: Government of Indonesia. Supplements to the President's Reports to Parliament, 11 March 1978, 15 August 1981, 16 August 1988 and 15 August 1992.

a/ Preliminary.

This attempt to promote the growth of the industry by coercion proved less than successful. The shipyards chosen to handle the construction programme proved unable to meet their production schedules, not least because stringent local content regulations imposed by the government required them to rely heavily on domestic component suppliers, who themselves were unable to provide the necessary inputs on time. In addition, local shipowners were reluctant to buy the few Caraka Jaya freighters that were built because their price exceeded by a substantial margin those of the second-hand imported vessels that they had traditionally procured. This reluctance was compounded by the recessionary conditions prevailing in Indonesia during the mid-1980s, which resulted in a significant weakening of the shipping industry's profitability.

The government has responded to these weaknesses of the original Caraka Jaya programme by liberalizing the regulations governing the shipping and shipbuilding industry. In order to help local shipbuilders reduce their production costs, the government has progressively eased the once rigorous controls on imported inputs in a series of policy measures introduced since 1985.[202/] The prohibition on the purchase of foreign vessels was also lifted in the late 1980s, providing the domestic shipbuilding industry with a further impetus to improve its efficiency and international competitiveness.

Thus, as a result the Caraka Jaya programme is now being implemented in a much less rigid manner. This has prompted Japan and Germany to provide financial and technical assistance for the programme, much of which is being disbursed in the form of machinery and components. The rate of production has consequently accelerated substantially. After only five Caraka Jaya vessels had been built during the first stage of the project, which lasted until the end of 1990, the second stage was launched in mid-1991, when five shipyards were contracted to build a further 24 ships of this kind. The latest available information suggests that the implementation of this phase of the programme is proceeding well, and that all 24 ships will be delivered by 1993-94. In the meantime, the government has also announced that it will soon invite tenders for the third stage of the programme, starting in July 1993 and calling for the construction of 32 Caraka Jaya freighters.[203/]

A particularly important result of the measures introduced in recent years to enhance the shipbuilding industry's efficiency has been its ability to attract a steadily increasing flow of export orders. The first of these, for a 6,000 DWT trailer ship, was awarded in May 1990 by the Swedish shipping firm Rederi AB Gotland to the three firms subsequently merged into PT Dok & Perkapalan Koja Bahari. Since then this and other Indonesian shipyards have received orders for two tugboats each from the Islamic Republic of Iran and Singapore, two tankers of 16,000 DWT each from another Swedish firm, United Tankers AB, three LPG tankers with a capacity of 5,200 cubic metres each from Germany, a log carrier of 8,000 DWT from Japan and 35 CKD fishing vessels from Mauritania.[204] According to recently issued official statistics, the value of Indonesia's ship exports increased from $8.4 million in 1989 to $57.4 million in 1990 and $95.4 million in 1991.[205]

Constraints and prospects

Although much has been done in the past few years to improve the efficiency and competitiveness of the Indonesian shipbuilding industry, it continues to suffer from a high degree of excess capacity. Many of the 135 registered firms are reported to be inactive, and only about 50-60 per cent of the industry's estimated capacity of 130,000 DWT is actually in use under normal circumstances. The situation is exacerbated by the fact that most of the operational shipyards have a relatively small capacity, and are therefore prevented from building vessels of about 30,000 DWT, for which there is particularly high demand in both local and overseas markets.

The future development of the shipbuilding industry therefore depends both on the rationalization and the expansion of its existing capacity. In particular, the capacity of individual shipyards needs to be increased to enable them to accept orders for the larger vessels, which they are currently unable to build. Some steps are already being taken in this direction, with both PT PAL Indonesia and PT Dok & Perkapalan Koja Bahari currently in the process of acquiring substantially enlarged docking facilities.[206]

The recent abandonment of a command-based attempt to develop the shipbuilding industry, and its replacement by a policy aimed at creating the right framework for it to grow efficiently in response to market signals, has already reaped substantial benefits. This has been underlined by the improved implementation of the Caraka Jaya freighter programme as well as the growth of export orders since the beginning of the 1990s. With recent changes in comparative advantage having resulted in a significant shutdown of shipbuilding capacity in western Europe and North America, and with the shipbuilding industries of Japan and the Republic of Korea being threatened by rising labour costs, the prospect for a further shift of global shipbuilding capacity towards newly industrializing countries remains favourable.

Indonesia, with its ample supplies of comparatively well-educated labour, is particularly well placed to develop an essentially labour intensive industry such as shipbuilding. In addition, its growing technical sophistication provides it with a firm basis for the development of the wide range of supporting industries supplying all the necessary material and technical inputs required by the shipbuilding industry. With its own ageing merchant fleet in urgent need of replacement, finally, Indonesia also has a sufficiently large domestic market to provide the industry with the necessary economies of scale to reinforce its growing international competitiveness.

AERONAUTICAL ENGINEERING

Past trends

Indonesia's fledgling aeronautical engineering industry is based on the State-owned firm PT Industri Pesawat Terbang Nusantara (PT IPTN). This firm, located in the city of Bandung in West Java, was founded in 1976 as PT Nurtanio. Over the years it has entered into cooperation agreements with several foreign aerospace companies for the production of both fixed-wing aircraft and helicopters (see Table III.77). In addition, it has been appointed as a component supplier by a number of such firms, often as a result of offset agreements signed in connection with the purchase of civilian and military aircraft by the State-owned Indonesian airlines and the Indonesian armed forces.

A particularly close relationship was struck up during the early 1980s between the then PT Nurtanio and the Spanish firm Construcciones Aeronauticas SA. This resulted in the joint development and production of two small passenger aircraft, the NC 212 and the CN 235, of which the former is a twin-engine transporter capable of landing on unpaved strips and the latter a 44-seat commuter aircraft. IPTN has also produced or assembled a variety of helicopters under licence from foreign companies, including the German firm Messerschmitt-Bölkow-Blohm (MBB), the French firm Aerospatiale and Bell Helicopters of the United States. Since the late 1980s IPTN has begun to develop a new 50 seat aircraft, the N 250. This aircraft, the first to be designed, developed and produced exclusively by the Indonesian company, is expected to become operational in 1994-95.

By 1991 IPTN had already manufactured or assembled some 220 aircraft. Most of these were sold in the domestic market, where they were acquired either by official agencies or by some of the smaller air transport firms, who were obliged to buy them in preference to imported alternatives. About 50 of these aircraft have been exported, however, mainly to neighbouring countries such as Thailand and Malaysia.[207]

Table III.77. Production of aircraft, 1975/76-1991/92, selected fiscal years
(Units)

	1975/76	1980/81	1985/86	1988/89	1989/90	1990/91	1991/92[a]
Fixed-wing aircraft	2	12	8	5	12	6	9
Helicopters	-	12	7	13	17	14	12

Sources: Government of Indonesia, *Nota Keuangan dan Rancangan Anggaran Pendapatan dan Belanja Negara*, various issues, and Supplement of the President's Report to Parliament, 15 August 1992.

a/ Preliminary.

Apart from the production of aircraft and components, Indonesia is developing an increasingly sophisticated aeronautical maintenance and servicing industry. IPTN has operated a universal maintenance centre since 1986, where it is authorized to carry out overhaul and maintenance work on engines produced by five major international manufacturers. The State-owned international airline Garuda Indonesia has also expanded its internal aircraft maintenance operations since 1990

and used them as the basis for the formation of a new self-contained unit, Garuda Maintenance Facility (GMF), which it hopes to develop into a major international aircraft service centre. To facilitate the achievement of this goal the government has exempted most of the materials needed for aircraft maintenance from import duties since August 1991.[208/]

Constraints and prospects

Despite the high degree of political patronage it has received since the mid-1970s, the Indonesian aircraft industry remains relatively small and inefficient. With the government continuing to regard its development as a strategic imperative, the industry will undoubtedly survive and record a steady growth in the coming years. At the same time, however, it is highly unlikely to attain major international significance in the foreseeable future, and will not even be able to cover Indonesia's own needs for a long time to come.

By contrast, the aircraft service and maintenance industry appears to have considerably brighter prospects. With its large pool of relatively skilled and cheap labour, Indonesia is well placed to establish itself in this industry. According to recently published estimates, for example, the cost of aircraft maintenance in 1991 amounted to $65 per hour in Switzerland, $35 per hour in Singapore and $20-$30 per man-hour at the Garuda Maintenance Facility.[209/]

ELECTRONICS AND ELECTRICAL APPLIANCES

The Resource Base

As with other engineering industries, the main source of Indonesia's comparative advantage in the production of electrical and electronic products does not lie in the availability of any specific natural resources, but in its abundant supplies of low-cost labour and its equally impressive pool of high school and university graduates with a sound technical education. This favourable human resource endowment has given it the capacity to assemble cheaply and efficiently a wide range of electrical products from imported components, and to develop these products further through own-account innovation. As the volume and range of these products manufactured in Indonesia has expanded, so local producers have become increasingly able to rely on each other for inputs, thereby reducing the country's dependence on imported materials.

Past trends

Although small volumes of some simple electrical appliances were produced in Indonesia prior to the 1970s, the industry has only gained significance since then. In common with most other engineering industries in Indonesia, it began to be developed in the mid-1970s as a heavily protected import-substituting industry based on the domestic assembly of CKD kits imported from abroad. For the most part, this assembling activity was carried out by joint-venture enterprises between local businessmen and large foreign producers such as Matsushita, Sanyo, Sharp and Sony. The bulk of the output was intended for the domestic market, in which these firms were protected from external competition through a variety of import controls.

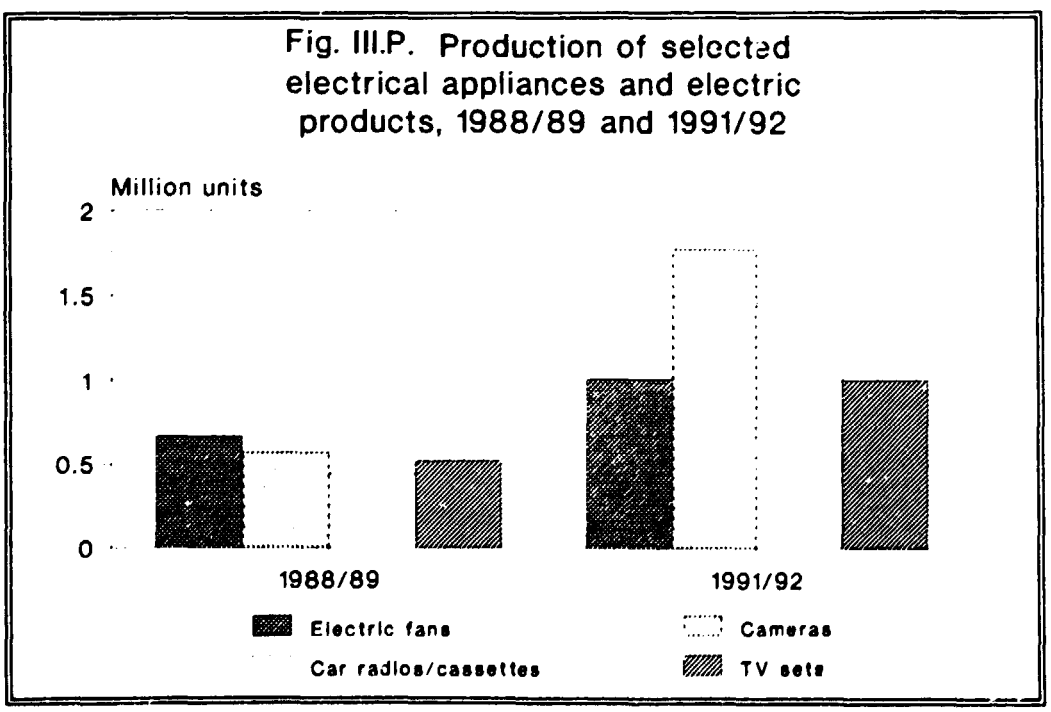
A major shift in official policy took place in 1990, when the government sought to shift the orientation of the electrical appliances industry towards external markets as part of its drive to reduce Indonesia's dependence on hydrocarbon exports. In a package of deregulatory reforms introduced in May 1990, the government removed most restrictions on the import of foreign components in an attempt to enhance the competitiveness of domestically produced electrical products in overseas markets. This has inspired a large number of domestic and foreign

Table III.78. Production of electrical appliances and electric products, 1970/71-1991/92, selected fiscal years (Thousand units, except as stated)

	1970/71	1975/76	1980/81	1985/86	1988/89	1989/90	1990/91	1991/92[a/]
Air conditioners	-	23.0	73.5	53.2	67.2	78.8	99.2	114.3
Refrigerators	-	40.0	134.5	148.8	104.0	138.3	158.9	193.9
Light bulbs and tubes (Million units)	5.5	21.5	33.8	86.0	107.9	137.8	171.7	221.2
Electric fans	-	-	490.2	992.0	664.1	824.7	923.6	1,011.3
Electric organs	-	-	-	-	17.1	18.5	19.7	22.1
Cameras	-	-	-	-	573.8	1,278.1	1,643.1	1,782.0
Car radios and cassette players	-	-	616.5	353.0	444.8	536.9	692.5	1,467.4
Television sets	4.7	166.0	730.1	750.0	521.9	796.6	1,082.0	1,010.5
Radios, radio cassettes	393.0	1,100.0	1,110.5	1,883.4	1,535.9	2,338.6	3,091.7	3,246.3
Amplifiers	-	-	-	111.3	136.4	136.4	167.9	149.9
Tuners	-	-	-	187.4	154.4	234.4	684.9	1,097.8
Loudspeakers	-	-	-	1,875.0	18,240.0	22,800.0	48,700.0	54,198.0
Telephone exchanges and PABX (Thousand lines)	-	-	2.8	80.0	148.9	169.0	206.0	365.7
High frequency-single side band sets	-	-	-	2.0	2.6	4.7	5.8	5.2
Telephone receivers	-	-	-	112.0	115.9	68.7	223.0	581.1
Integrated circuits (Million units)	-	-	-	274.9	41.2	59.8	26.0	49.9

Sources: Government of Indonesia, Supplements to the President's Reports to Parliament, 15 August 1974, 11 March 1978, 15 August 1981, 16 August 1988 and 15 August 1992.

a/ Preliminary.



entrepreneurs to invest in the export-oriented manufacture of electrical appliances, and prompted a significant increase in production of most of these products (see Table III.78).[210/]

This increase in production has been accompanied by a corresponding increase in exports. From $102 million in 1988 the value of Indonesia's exports of electrical and electronic products rose to $286 million in 1990, and thence to an officially estimated $840 million in 1992, which exceeded the value of component imports. In 1993 the value of these exports is officially projected to exceed $1 billion.[211/]

Constraints and Prospects

Despite its recent growth, Indonesia's electrical appliances and electronics industry is still very much in its infancy. Its growth prospects are extremely favourable, however, especially now that it has been liberalized and re-oriented towards export markets. As a result of this development it appears certain to continue to attract new investments, especially from companies in Japan, Republic of Korea and Taiwan Province, seeking to relocate their production to low-cost sites.

NOTES TO CHAPTER III

1/ A comprehensive analysis of the economic impact of this shift is provided in Timmer, C. Peter, "Choice of Technique in Rice Milling in Java", *Bulletin of Indonesian Economic Studies*, Vol. IX, No. 2, July 1973. In introducing his discussion, Timmer notes that: "In the past four years a technological revolution has swept across Java virtually unnoticed. As recently as 1971 informed estimates assumed as much as 80 per cent of Java's rice crop was hand-pounded, both for subsistence consumption and local marketings. The figure now is certainly less than 50 per cent and may be as little as 10 per cent."
An interesting comment on this article by William A. Collier *et. al.* and a reply by Timmer are published in *Bulletin of Indonesian Economic Studies*, Vol. X, No. 1, March 1974.

2/ A comprehensive analysis of the rice industry is provided by Mears, Leon A., *The New Rice Economy of Indonesia*, Gadjah Mada University Press, Yogyakarta, 1981.

3/ Cengkawak, Suteja, "In Sago Business: Indonesia Makes One Step, Malaysia Makes Great Strides", *Business News*, No. 5270, Jakarta, 12 June 1992.

4/ The rapid growth of the instant noodle industry since the mid-1980s has been well documented in several recent articles in the *Indonesian Commercial Newsletter*, Jakarta: "Salim Group Becomes More Dominant in Instant Noodle Industry", (No. 67, 14 January 1991).
"Condition and Prospects of Instant Noodle Industry in Indonesia", (No. 83, 9 September 1991).
"Salim Group Dominates the Instant Noodle Industry", (No. 97, 13 April 1992).

5/ For a detailed study of the Indonesian biscuit industry, see *Indonesian Commercial Newsletter*, No. 112, 23 November 1992, Jakarta.

6/ "Salim Group Strengthens Its Food Industry", *Indonesian Commercial Newsletter*, No. 72, 25 March 1991.

7/ "Food Canning Industry: Condition and Prospects", *Indonesian Commercial Newsletter*, No. 66, 24 December 1990, Jakarta.
"Canned Fruit Industry Has Good Prospects of Growth", *Indonesian Commercial Newsletter*, No. 103, 13 July 1992, Jakarta.

8/ "Food Canning Industry: Condition and Prospects", *Indonesian Commercial Newsletter*, No. 66, 24 December 1990, Jakarta.
"Indonesia Has The Potential To Be A Mushroom Supplier", *Indonesian Commercial Newsletter*, No. 88, 25 November 1991, Jakarta.

9/ "Though Soyabean Imports Still Big, Nestlé Will Set Up Soyabean Milk Powder Plant", *Indonesian Commercial Newsletter*, No. 110, 26 October 1992, Jakarta.

10/ "Palm Oil Production in 1991 About 2,675,115 Tonnes", *Business News*, No. 5245, 13 April 1992, Jakarta.

11/ "Oil Palm Estates Expand by 11.3 Per Cent and Oil Palm Output Up by 12.8 Per Cent Annually", *Business News*, No. 5101/5102, 8 May 1991, Jakarta.

12/ For details of the controls introduced in 1979 see the mis-titled article:
"Industrial Waste Water Processing Installation in Bandung to be Completed Next Year" in *Business News*, No. 5119/5120, pp. 4-5, 19 June 1991, Jakarta.
The impact of these measures, and the likely benefits of their withdrawal, are discussed in several articles published in Indonesian businesses publications in mid-1991, in particular:
"Indonesia's Palm Oil Losses [sic] Market Share Abroad", *Business News*, No. 5116/5117, 2 June 1991, Jakarta.
Suteja Cengkawak, "Palm oil Under Pakjun: Making Headway?", *Business News*, No. 5124, 28 June 1991, Jakarta.
Suteja Cengkawak, "Palm oil: Pursuing The Prospect Through Pakjun", *Business News*, No. 5127, 5 July 1991, Jakarta.
"CPO Exports Expected to Increase Following Deregulation", *Indonesian Commercial Newsletter*, No. 82, 26 August 1991, Jakarta.

13/ "Indonesia's Palm Oil Losses [sic] Market Share Abroad", *Business News*, No. 5116/5117, 12 June 1991, Jakarta.

14/ For details of international consumption patterns of CCO and CPO, see respectively:
"Very Low Income for Coconut Growers Compared with Earnings from Other Crop Culture", *Business News*, No. 5103, 10 May 1991, Jakarta.
Sutja Cengkawak, "Palmoil Under Pakjun, Making Headway?", *Business News*, No. 5124, 28 June 1991, Jakarta.

15/ "Strict Competition on the Cooking Oil Market", *Indonesian Commercial Newsletter*, No. 95, 9 March 1992, Jakarta.

16/ These threats to Indonesia's palm oil exports became particularly acute in late 1987, when the American Soyabean Association launched a campaign to have foods containing tropical vegetable oils specially labelled owing to alleged health hazards, and the executive commission of the EC proposed the levying of a tax on vegetable and fish oils. In the event, however, neither of these proposals were implemented. For details see the Economist Intelligence Unit, *Country Report: Indonesia*, Nos. 4-1987 (p. 22) and 1-1988 (p. 32).

17/ Suteja Cengkawak, "Palmoil: Pursuing the Prospect Through Pakjun", *Business News*, No. 5127, 5 July 1991, Jakarta.

18/ For historical developments of the Indonesian tea industry, see Etherington, D. M., "The Indonesian Tea Industry", *Bulletin of Indonesian Economic Studies*, Vol. X, No. 2, July 1974.

19/ According to estimates produced by PT Data Consult, and Indonesian Business Consultancy, Indonesia's domestic demand for cacao is likely to increase from an estimated 101,800 tonnes in 1992 to 179,100 tonnes in 1996, while export demand is expected to increase from 146,100 tonnes to 215,700 tonnes during the same period. For details see "Condition and Prospects of Indonesian Cacao Industry", *Indonesian Commercial Newsletter*, No. 107, 14 September 1992, Table 14, Jakarta.

20/ For a historical survey of the Indonesian sugar industry and an analysis of its performance to the mid-1960s see Mubyarto, "The Sugar Industry", *Bulletin of Indonesian Economic Studies*, Vol. V, No. 2, July 1969.

21/ For a fuller discussion of the background to the introduction of this programme see Mubyarto, "The Sugar Industry: From Estate to Smallholder Cane Production?", *Bulletin of Indonesian Economic Studies*, Vol. XIII, No. 2, July 1977.

22/ For a comprehensive review of the current state of the Indonesian sugar industry see: "Development of Sugar Industry", *Indonesian Commercial Newsletter*, No. 110, 26 October 1992.

23/ Mubyarto, "The Sugar Industry: From Estate to Smallholder Cane Production?", *Bulletin of Indonesian Economic Studies*, Vol. XIII, No. 2, July 1977, Table 2, p. 31.

24/ The growth of the confectionery industry is recorded in recent issues of the *Indonesian Commercial Newsletter*, Jakarta, see in particular:
"Indonesia's Confectioneries Gain Popularity In Export Market", No. 71, 11 March 1991.
"Bright Prospects For Confection Business", No. 98, 27 April 1992.
"Confectionery Exports Increase Rapidly", No. 114, 21 December 1992.

25/ Setyawan, T. Harun, "The Role of Natural Rubber in Indonesia", *Business News*, No. 5142, 9 August 1991, Jakarta, Table 3.

26/ Data for the mid-1980s show that Indonesian smallholdings achieved average yields of 317 kg/ha, while Malaysian and Thai smallholders achieved average yields of 1,050 kg/ha and 545 kg/ha, respectively. For details see Hobohm, Sarwar, "Natural Rubber: Prospects for the 1990s", *Special Report No. 2038*, The Economist Intelligence Unit, May 1990, London, Chapter 2.

27/ For a fuller discussion of the Indonesian natural rubber industry see "Natural Rubber in Indonesia", *Rubber Trends*, The Economist Intelligence Unit, No. 124, December 1989, London.

28/ For fuller surveys of the Indonesian tyre industry see:
"The Indonesian Tyre Industry", *Rubber Trends*, The Economist Intelligence Unit, No. 117, March 1988, London.
"Condition and Prospects of Automotive Tire Industry", *Indonesian Commercial Newsletter*, No. 79, 8 July 1991, Jakarta.
"Condition and Prospects of Tire Industry in Indonesia, *Indonesian Commercial Newsletter*, No. 104, 27 July 1992, Jakarta.
"Tyre Prices Increase by 5 Per Cent as of 1 July 1992", *Business News*, No. 5273, 19 June 1992, Jakarta.

29/ For more details of the explosive growth of the Indonesian sports shoe industry see *Indonesian Commercial Newsletter*, Jakarta, various issues:
"Sharp Increase in Production of Rubber/Canvas Shoes", No. 68, 28 January 1991.
"Prospects of Rubber/Canvas Shoes Remain Bright", No. 89, 9 December 1991.
"Shoes Likely to Become One of Indonesia's Leading Export Commodities", No. 97, 13 April 1992,.
"The Shoe Industry Still Attracting New Investors", No. 112, 23 November 1992.

30/ A comprehensive review of the rubber gloves industry is given in "Despite Export Increases, The Industry of Rubber Gloves Reaches Saturation", *Indonesian Commercial Newsletter*, No. 92, 27 January 1992, Jakarta.

31/ "Inefficiency in Rubber Processing Inflicts an Annual Loss of Rp 250 Billion", *Indonesian Commercial Newsletter*, No. 85, 14 October 1991, Jakarta.
"Indonesia's Natural Rubber Production Lower Than Thailand's", *Indonesian Commercial Newsletter*, No. 87, 11 November 1991, Jakarta.

32/ Castles, Lance, "Cloves and Kretek", *Bulletin of Indonesian Economic Studies*, No. 2, September 1965.

33/ "Acreage of Tobacco Plantations Will be Reduced Because Cigarette Manufacturers' Tobacco Purchases Decrease", *Indonesian Commercial Newsletter*, No. 104, 27 July 1992, Jakarta, Table 2, p. 57.

34/ "Acreage of Tobacco Plantations will be Reduced Because Cigarette Manufacturers' Tobacco Purchases Decrease", *Indonesian Commercial Newsletter*, No. 104, 27 July 1992, Jakarta, Table 2, page 57.

35/ For a discussion of this possibility, see Cengkawak, Suteja, "Lampung, the Prospective Livestock Storehouse", *Business News*, No. 5255, 8 May 1992, Jakarta.

36/ Examples of two such enterprises are given in "Imports of Beef Increase" in *Indonesian Commercial Newsletter*, No. 110, 26 October 1992. PT Tipperary Indonesia, has access to about 1 million hectares of grazing land in Australia, from where it obtains a significant proportion of its cattle, which are fattened in Lampung before being shipped for slaughter to the company's slaughterhouse in Jakarta. PT Timornusa Primatama, plans to establish an integrated beef slaughtering operation in East Timor with an annual capacity of 7,200 tonnes of frozen meat for export.

37/ Cengkawak, Suteja, "Lampung, The Prospective Livestock Storehouse", *Business News*, No. 5255, 8 May 1992, Jakarta.

38/ In *Indonesian Commercial Newsletter*, a discussion of the principal issues relating to the fishing technologies employed in Indonesia is in:
"Number of Foreign Fishing Vessels Operating in Indonesian Waters Still High", No. 86, 28 October 1991, Jakarta.
"Imports of Fishing Vessels Continue to Decline", No. 108, 28 September 1992, Jakarta.

39/ The development of the tuna fishing and processing industry is discussed in greater detail in recent articles in the *Indonesian Commercial Newsletter*, Jakarta:
"Food Canning Industry: Condition and Prospects", No. 66, 24 December 1990.
"Industry of Tuna and Cakalang (Skipjack) Still Attractive to Investors", No. 80, 22 July 1991.
"Number of Foreign Fishing Vessels Operating in Indonesian Waters Still High", No. 86, 28 October 1991.
"Djajanti Group to Establish an Integrated Fishing Industry", No. 89, 9 December 1991.
"Dolphin Issue Hampers Tuna Exports to the United States", No. 98, 27 April 1992.
"Market Prospects of Canned Fish Quite Good", No. 101, 8 June 1992.
"Indonesia's Fish Exports Up Again", No. 112, 23 November 1992.

40/ For a fuller review of the shrimp industry, see the following recent articles in the *Indonesian Commercial Newsletter*, Jakarta:
"Role of Shrimps as an Export Commodity Declining", No. 74, 29 April 1991.
"Shrimps Still Attractive to Investors Despite Low Image", No. 79, 8 July 1991.
"Value of Shrimp Exports Up Steadily Despite Low Prices", No. 96, 23 March 1992.
"Condition and Prospects of Indonesian Shrimp Industry", No. 103, 13 July 1992.

41/ "Japan Rejects 40,000 Tonnes of Shrimps from East Java", *Business News*, No. 5323/5324, 21 October 1992, Jakarta.

42/ For a fuller discussion of the difficulties faced by Indonesia's cotton industry, see:
Cengkawak, Suteja, "Cotton Self Sufficiency: Like an Endless Road", *Business News*, No. 5130, 12 July 1991, Jakarta.
"Foreign Expenditure for Cotton Procurement Continues to Increase", *Indonesian Commercial Newsletter*, No. 72, 25 March 1991, Jakarta.
"Local Cotton Not As Good As Imported Cotton", *Indonesian Commercial Newsletter*, No. 106, 24 August 1992, Jakarta.

43/ The synthetic fibre production will be discussed in greater detail in the chemical industry section. Comprehensive recent trends in the synthetic fibre industry are given in *Indonesian Commercial Newsletter*, Jakarta, see:
"Opportunity for Investment in Upstream Textile Industry Still Attractive",No. 95, 9 March 1992.
"Development of the Textile Fiber Industry in Indonesia", No. 106, 24 August 1992.

44/ "Indonesian Natural Silk, Still at the Bottom of the World Silk Business", *Business News*, No. 5209, 17 January 1992, Jakarta.

45/ Palmer, Ingrid, & Castles, Lance, "The Textile Industry", *Bulletin of Indonesian Economic Studies*, No. 2, September 1965, Tables 1 and 3, pages 35 and 37.

46/ Boucherie, W., "The Textile Industry", *Bulletin of Indonesian Economic Studies*, Vol. V, No. 3, November 1969.

47/ For an comprehensive analysis of the development of the Indonesian textile industry during the "New Order" period, see Hill, Hal, "The Emperor's Clothes Can Now Be Made In Indonesia", *Bulletin of Indonesian Economic Studies*, Vol. 27, No. 3, December 1991.
A contemporary analysis of the implications of this shift from manual to mechanized weaving process, see Hill, Hal, "The Economics of Recent Changes in the Weaving Industry", *Bulletin of Indonesian Economic Studies*, Vol. XVI, No. 2, July 1980.
An interesting selection of case studies of the interplay between government policy makers and private industrialists in determining the development of the industry is presented in Wibisono, Makarim, "The Politics of Indonesian Textile Policy: The Interests of Government Agencies and the Private Sector", *Bulletin of indonesian Economic Studies*, Vol. 25, No. 1, April 1989.

48/ The output of the garments industry were first officially recorded in the 1978/79 fiscal year, when it amounted to 14.4 million dozen. See Supplement to the President's Report to Parliament, 16 August 1980, page 422.

49/ These data are derived from:
Boucherie, W., "The Textile Industry", *Bulletin of Indonesian Economic Studies*, Vol. V, No. 3, November 1969, p.48.
"Development and Prospects of Spinning Industry in Indonesia", *Indonesian Commercial Newsletter*, No. 75, 13 May 1991, Jakarta, p. 8.

50/ Hill, Hal, "The Emperor's Clothes Can Now be Made in Indonesia", *Bulletin of Indonesian Economic Studies*, Vol. 27, No. 3, December 1991, pp. 91-92. In discussing the virtual disappearance of handlooms from the commercial textile industry, Hill notes further that "the explanation for their demise is straightforward: even at very low wage levels, the productivity gap between hand and mechanised techniques is so large that the former are unable to compete".

51/ "Investor Interest in Textile Industry Quite High", *Indonesian Commercial Newsletter*, No. 102, 22 June 1992, Jakarta, Table 2.

52/ "Investor Interest in Textile Industry Quite High", *Indonesian Commercial Newsletter*, No. 102, 22 June 1992.

53/ Details of the restrictions imposed on Indonesian textile exports are presented in *Business News*, Jakarta:
"Indonesia's Exports of Textile/Textile Products to United States", No. 5062/5063, 30 January 1991.
"Indonesia's Textile Exports to Quota Countries in Europe", No. 5070, 15 February 1991, Jakarta.

54/ For details of these regulations see *Indonesian Commercial Newsletter*, Jakarta:
"Development and Prospects of Indonesia's Garment Industry", No. 63, 12 November 1990, pp. 21-23.
"Returns of Textile and Textile Product Export Allocations to be Prohibited", No. 108, 28 September 1992, Jakarta.

55/ "A Bright Prospect for Textile Products & Sports Shoes Exports", *Business News*, No. 5181, 8 November 1991, Jakarta, Table 2, p. 2.

56/ "Development and Prospects of Spinning Industry in Indonesia", *Indonesian Commercial Newsletter*, No. 75, 13 May 1991, Jakarta.

57/ "Development and Prospects of Spinning Industry in Indonesia", *Indonesian Commercial Newsletter* No. 75, 13 May 1991, Jakarta.

58/ "Investor Interest in Textile Industry Quite High", *Indonesian Commercial Newsletter*, No. 102, 22 June 1992, Jakarta.

59/ An anonymous Jakarta-based stockbroker cited by the Economist has described some textile companies as a "tinderbox" of potential labour problems. See "*Indonesia's Ripping Yarn*", the Economist 9 January 1992, p. 64.

60/ For more detailed accounts of the explosive growth of the Indonesian shoe industry are presented in *Indonesian Commercial Newsletter*, Jakarta, see:
"Sharp Increase In Production of Rubber/Canvas Shoes", No. 68, 28 January 1991.
"The Value of Exports of Leather Shoes Exceeds $100 Million", No. 76, 27 May 1991.

"Exports of Leather Shoes Boost Imports of Raw Material", No. 82, 26 August 1991.
"Prospects of Rubber/Canvas Shoes Remain Bright", No. 89, 9 December 1991.
"Shoes Likely to Become One of Indonesia's Leading Export Commodities", No. 97, 13 April 1992.
"The Shoe Industry Still Attracting New Investors", No. 112, 23 November 1992.
"A Bright Prospect for Textile Products & Sports Shoes Exports", No. 5181, 8 November 1991.

61/ "Shoes Likely to Become One of Indonesia's Leading Export Commodities", *Indonesian Commercial Newsletter*, No. 97, 13 April 1992, Jakarta, p. 9.

62/ "Leather & Footwear '92 in Kemayoran Jakarta Fair Ground", *Business News*, No. 5319, 9 October 1992.

63/ "Exports of Leather Shoes Boost Imports of Raw Material", *Indonesian Commercial Newsletter*, No. 82, 26 August 1991, Jakarta, Table 5 and 6, p. 37.

64/ "Shoes Likely to Become One of Indonesia's Leading Export Commodities", *Indonesian Commercial Newsletter*, No. 97, 13 April 1992, Jakarta, Tables 5 and 6, pp. 14-15.

65/ For details of import regulations for Indonesian shoes to the United States and the EC see *Business News*, Jakarta:
"A Bright Prospect for Textile Products & Sports Shoes Exports", No. 5181, 8 November 1991.
"Export Quota of Shoes to EEC for 1992 Increased by 5 per cent", No. 5216/5217, 5 February 1992.

66/ National Development Information Office, "*Indonesia Source Book 1992*", Jakarta, 1992, p. 98.

67/ "Opening of Timber Estates Reaches 326,000 Ha", Business News, No. 5215, 31 January 1992.

68/ "Creation of Timber Estates This Year Projected at 65,000 Ha", Business News, No. 5279, 3 July 1992.

69/ Manning, Chris, "The Timber Boom - With Special Reference to East Kalimantan", *Bulletin of Indonesian Economic Studies*, Vol. VII, No. 3, November 1971, Table 6, p. 39.
A contemporary analyses of the early growth of the timber industry, see:
Palmer, Ingrid, "The Indonesian Economy Since 1965 - A Case Study of Political Economy", Frank Cass, London & Ottawa NJ, 1978, pp. 120-126.
Ruzicka, I., "Rent Appropriation In Indonesian Logging: East Kalimantan 1972/3-1976/7", *Bulletin of Indonesian Economic Studies*, Vol. XV, No. 2, July 1979.

70/ Koehler, K. G., "Wood Processing in East Kalimantan: A Case Study of Industrialisation and Foreign Investment in Indonesia", *Bulletin of Indonesian Economic Studies*, Vol. VIII, No. 3, November 1972.

71/ *Business News*, Jakarta:
"Editorial - The Export of Logs, etc.", No. 5267, 5 June 1992.
"Trade Minister Lifts Ban on Exports of Timber, Rattan and Leather", No. 5271/5272, 17 June 1992.

72/ Koehler, K. G., "Wood Processing in East Kalimantan: A Case Study of Industrialisation and Foreign Investment in Indonesia", *Bulletin of Indonesian Economic Studies*, Vol. VIII, No. 3, November 1972, p. 99.

73/ "Production of Upstream Industry in Forestry Sector 16.36 M Cu. M.", *Business News*, No. 5122/5123; 26 June 1991, Jakarta.

74/ Koehler, K. G., "Wood Processing in East Kalimantan: A Case Study of Industrialisation and Foreign Investment in Indonesia", *Bulletin of Indonesian Economic Studies*, Vol. VIII, No. 3, November 1972, p. 100. Koehler points out, however, that three additional mills existed but were not operational due to management problems and supply bottlenecks.

75/ "Plywood Industry Approaching Culmination Point", *Indonesian Commercial Newsletter*, No. 92, 27 January 1992.

76/ *Indonesian Commercial Newsletter*, Jakarta:
"The Industry of Particle Boards Begins to Develop", No. 65, 10 December 1990.
"Export Value of Several Processed Wood Products Increased", No. 72, 25 March 1991.
"Dayak Besar Group Planned the Development of Particle Board Project of Rp 264 Billion", No. 76, 27 May 1991.
"The Value of Exports of Indonesia's Processed Wood Reached $ 514.7 Million in 1990", No. 79, 8 July 1991.
"Interest in Investing in the Woodworking Industry High Despite Declining Exports", No. 88, 25 November 1991.
"Exports of Doors and Windows Up Rapidly", No. 90, 23 December 1991.
"Forest Products Remain Major Export Commodities", No. 91, 13 January 1992.

Business News, Jakarta:
"Indonesia's Exports of Wooden Doors and Windows Keep Growing", No. 5110/5111, 29 May 1991.
"Wood Exported in Finished Products to Avoid Prevention of Export Tax", No. 5231/5232, 11 March 1992.
"Exports of Window and Door Frames and Panels", No. 5261, 22 May 1992.

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ANNEX A
STATISTICAL TABLES

Annex Table A-1. Population distribution by province, 1971, 1980 and 1990

Province	Area (Square kilometres)	Population 1971 (Thousand)	Population 1980 (Thousand)	Population 1990 (Thousand)	Population density 1971 (Per square kilometre)	Population density 1980 (Per square kilometre)	Population density 1990 (Per square kilometre)	Population growth 1971-1980 (Annual percentage)	Population growth 1980-1990 (Annual percentage)
Sumatra	473,481	20,809	28,017	36,436	43.9	59.2	77.0	3.4	2.7
Aceh	55,392	2,009	2,611	3,417	36.3	47.1	61.7	3.0	2.7
North Sumatra	70,787	6,622	8,361	10,254	93.5	118.1	144.9	2.6	2.1
West Sumatra	49,778	2,793	3,407	4,001	56.1	68.4	80.4	2.2	1.6
Riau	94,561	1,642	2,169	3,283	17.4	22.9	34.7	3.1	4.2
Jambi	44,800	1,006	1,446	2,016	22.5	32.3	45.0	4.1	3.4
South Sumatra	103,688	3,441	4,630	6,278	33.2	44.7	60.5	3.4	3.1
Bengkulu	21,168	519	768	1,181	24.5	36.3	55.8	4.5	4.4
Lampung	33,307	2,777	4,625	6,006	83.4	138.9	180.3	5.8	2.6
Java	132,186	76,086	91,270	107,529	575.6	690.5	813.5	2.0	1.7
Jakarta	590	4,579	6,503	8,225	7,761.0	11,022.0	13,940.7	4.0	2.4
West Java	46,300	21,624	27,454	35,380	467.0	593.0	764.1	2.7	2.6
Central Java	34,206	21,877	25,373	28,519	639.6	741.8	833.7	1.7	1.2
Yogyakarta	3,169	2,489	2,751	2,915	785.4	868.1	919.8	1.1	0.6
East Java	47,921	25,517	29,189	32,490	532.5	609.1	678.0	1.5	1.1
Bali	5,561	2,120	2,470	2,779	381.2	444.2	499.7	1.7	1.2
Nusa Tenggara/Timor	82,927	4,498	6,017	7,391	54.2	72.6	89.1	3.3	2.1
West Nusa Tenggara	20,177	2,203	2,725	3,371	109.2	135.1	167.1	2.4	2.2
East Nusa Tenggara	47,876	2,295	2,737	3,270	47.9	57.2	68.3	2.0	1.8
East Timor	14,874	-	555	750	-	37.3	50.4	-	3.1
Kalimantan	539,460	5,155	6,723	9,111	9.6	12.5	16.9	3.0	3.1
West Kalimantan	146,760	2,020	2,486	3,237	13.8	16.9	22.1	2.3	2.7
Central Kalimantan	152,600	702	954	1,398	4.6	6.3	9.2	3.5	3.9
South Kalimantan	37,660	1,699	2,065	2,599	45.1	54.8	69.0	2.2	2.3
East Kalimantan	202,440	734	1,218	1,877	3.6	6.0	9.3	5.8	4.4
Sulawesi	189,216	8,528	10,409	12,519	45.1	55.0	66.2	2.2	1.9
North Sulawesi	19,023	1,719	2,115	2,480	90.4	111.2	130.4	2.3	1.6
Central Sulawesi	69,726	914	1,290	1,705	13.1	18.5	24.5	3.9	2.8
South Sulawesi	72,781	5,181	6,062	6,983	71.2	83.3	95.9	1.8	1.4
Southeast Sulawesi	27,686	714	942	1,351	25.8	34.0	48.8	3.1	3.7
Maluku	74,505	1,089	1,410	1,853	14.6	18.9	24.9	2.9	2.8
Irian Jaya	421,981	923	1,174	1,631	2.2	2.8	3.9	2.7	3.3
Indonesia	1,919,317	119,208	147,490	179,249	62.1	76.8	93.4	2.4	2.0

Source: Central Bureau of Statistics, Census reports, 1971, 1980 and 1990.

Annex Table A-2. Distribution of population by age group and sex, 1972, 1980 and 1990

Age group	1971			1980			1990		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Thousand									
0-4	9,675	9,560	19,235	10,872	10,422	21,294	10,766	10,120	20,887
5-9	9,593	9,302	18,895	10,889	10,446	21,335	11,791	11,290	23,081
10-14	7,406	6,875	14,281	9,179	8,525	17,704	10,998	10,438	21,437
15-19	5,627	5,779	11,406	7,552	7,806	15,358	9,553	9,367	18,920
20-24	3,627	4,461	8,088	6,010	7,055	13,065	7,662	8,486	16,148
25-34	7,722	9,226	16,948	9,685	9,920	19,605	13,962	14,770	28,732
35-44	7,062	7,119	14,181	7,876	8,172	16,048	9,778	9,475	19,253
45-54	4,360	4,213	8,573	5,761	5,856	11,617	7,036	7,284	14,320
55-64	2,224	2,373	4,597	3,297	3,354	6,651	4,615	4,887	9,502
65+	1,450	1,539	2,989	2,200	2,593	4,793	3,213	3,749	6,962
Not stated	7	8	15	11	9	20	3	5	8
Total	**58,753**	**60,455**	**119,208**	**73,332**	**74,158**	**147,490**	**89,376**	**89,872**	**179,248**
Percentage distribution									
0-4	16.5	15.8	16.1	14.8	14.1	14.4	12.0	11.3	11.7
5-9	16.3	15.4	15.9	14.8	14.1	14.5	13.2	12.6	12.9
10-14	12.6	11.4	12.0	12.5	11.5	12.0	12.3	11.6	12.0
15-19	9.6	9.6	9.6	10.3	10.5	10.4	10.7	10.4	10.6
20-24	6.2	7.4	6.8	8.2	9.5	8.9	8.6	9.4	9.0
25-34	13.1	15.3	14.2	13.2	13.4	13.3	15.6	16.4	16.0
35-44	12.0	11.8	11.9	10.7	11.0	10.9	10.9	10.5	10.7
45-54	7.4	7.0	7.2	7.9	7.9	7.9	7.9	8.1	8.0
55-64	3.8	3.9	3.9	4.5	4.5	4.5	5.2	5.4	5.3
65+	2.5	2.5	2.5	3.0	3.5	3.2	3.6	4.2	3.9
Not stated	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source Central Bureau of Statistics, Census Reports 1971, 1980 and 1990.

Annex Table A-3. **Gross domestic product by industrial origin, 1983-1990, current prices** (Billion Rp)

	1983	1984	1985	1986	1987	1988	1989	1990
Agriculture	17,695	20,420	22,513	24,871	29,116	34,278	39,547	43,062
Farm food crops	11,057	12,692	13,860	15,085	17,540	21,124	24,489	26,066
Farm non-food crops	2,295	2,739	2,979	3,534	4,140	4,389	4,784	5,056
Estate crops	375	593	715	690	978	1,245	1,441	1,797
Animal husbandry	1,754	2,084	2,427	2,640	3,015	3,545	3,809	4,560
Forestry	994	939	938	1,001	1,247	1,448	1,682	1,931
Fisheries	1,220	1,373	1,595	1,921	2,196	2,528	3,342	3,652
Mining and quarrying	16,107	16,938	13,571	11,503	17,267	17,162	22,140	28,748
Oil/gas	15,103	15,917	12,584	10,502	15,979	15,525	19,283	24,695
Other	1,004	1,021	987	1,001	1,287	1,637	2,857	4,053
Manufacturing	9,896	13,114	15,503	17,185	21,150	26,253	30,573	38,602
Oil refining	359	1,013	1,864	1,915	1,820	2,026	2,148	3,531
Liquefied natural gas	1,871	2,707	2,424	1,969	2,097	2,948	3,281	4,848
Other	7,666	9,394	11,216	13,301	17,233	21,278	25,144	30,223
Electricity, gas and water	314	354	396	647	747	869	1,008	1,258
Construction	4,597	4,757	5,302	5,314	6,087	7,169	8,884	10,828
Trade	11,541	13,434	15,417	17,122	21,048	24,379	28,330	32,154
Retail and wholesale trade	9,933	11,371	12,962	14,235	17,561	20,389	23,916	26,866
Hotels and restaurants	1,608	2,063	2,455	2,887	3,487	3,991	4,415	5,288
Transport and communications	4,098	5,051	6,100	6,407	7,443	8,140	9,306	11,041
Transport	3,694	4,611	5,539	5,770	6,639	7,227	8,280	9,735
Communications	404	440	562	637	804	913	1,025	1,306
Banking and finance	2,359	3,058	3,496	4,037	4,795	5,322	6,551	7,902
Ownership of dwellings	2,356	2,573	2,775	2,976	3,349	3,736	4,151	4,891
Public administration and defence	5,712	6,470	7,925	8,307	8,912	9,446	11,174	12,801
Other services	3,001	3,718	3,999	4,315	4,903	5,351	5,830	6,434
GDP	77,676	89,887	96,997	102,683	124,817	142,105	67,495	197,721

Source: Government of Indonesia, Central Bureau of Statistics.

Annex Table A-4. **Distribution of gross domestic product by industrial origin, 1983-1990, current prices**
(Percentage shares)

	1983	1984	1985	1986	1987	1988	1989	1990
Agriculture	22.8	22.7	23.2	24.2	23.3	24.1	23.6	21.8
Farm food crops	14.2	14.1	14.3	14.7	14.1	14.9	14.6	13.2
Farm non-food crops	3.0	3.0	3.1	3.4	3.3	3.1	2.9	2.6
Estate crops	0.5	0.7	0.7	0.7	0.8	0.9	0.9	0.9
Animal husbandry	2.3	2.3	2.5	2.6	2.4	2.5	2.3	2.3
Forestry	1.3	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Fisheries	1.6	1.5	1.6	1.9	1.8	1.8	2.0	1.8
Mining and quarrying	20.7	18.8	14.0	11.2	13.8	12.1	13.2	14.5
Oil/gas	19.4	17.7	13.0	10.2	12.8	10.9	11.5	12.5
Other	1.3	1.1	1.0	1.0	1.0	1.2	1.7	2.0
Manufacturing	12.7	14.6	16.0	16.7	16.9	18.5	18.3	19.5
Oil refining	0.5	1.1	1.9	1.9	1.5	1.4	1.3	1.8
Liquefied natural gas	2.4	3.0	2.5	1.9	1.7	2.1	2.0	2.5
Other	9.9	10.5	11.6	13.0	13.8	15.0	15.0	15.3
Electricity, gas and water	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.6
Construction	5.9	5.3	5.5	5.2	4.9	5.0	5.3	5.5
Trade	14.9	14.9	15.9	16.7	16.9	17.2	16.9	16.3
Retail and wholesale trade	12.8	12.7	13.4	13.9	14.1	14.3	14.3	13.6
Hotels and restaurants	2.1	2.3	2.5	2.8	2.8	2.8	2.6	2.7
Transport and communications	5.3	5.6	6.3	6.2	6.0	5.7	5.6	5.6
Transport	4.8	5.1	5.7	5.6	5.3	5.1	4.9	4.9
Communications	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.7
Banking and finance	3.0	3.4	3.6	3.9	3.8	3.7	3.9	4.0
Ownership of dwellings	3.0	2.9	2.9	2.9	2.7	2.6	2.5	2.5
Public administration and defence	7.4	7.2	8.2	8.1	7.1	6.6	6.7	6.5
Other services	3.9	4.1	4.1	4.2	3.9	3.8	3.5	3.3
GDP	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Government of Indonesia, Central Bureau of Statistics.

Annex Table A-5. Gross domestic product by expenditure, 1983-1990, current prices
(Billion Rp)

	1983	1984	1985	1986	1987	1988	1989	1990
Private consumption	47,063	54,067	57,201	63,355	71,989	81,045	88,752	106,312
Public consumption	8,077	9,122	10,893	11,329	11,764	12,756	15,698	17,543
Gross fixed capital formation	19,468	20,136	22,367	24,782	30,980	36,803	45,650	55,538
Change in stocks	2,847	3,406	4,837	4,243	8,166	8,007	13,288	16,616
Exports	19,846	22,999	21,534	20,010	29,874	34,666	42,503	51,197
Less imports	19,625	19,845	19,835	21,036	27,956	31,171	38,395	49,485
GDP	77,676	89,885	96,997	102,683	124,817	142,105	167,495	197,721

Source: Government of Indonesia, Central Bureau of Statistics

Annex Table A-6. Distribution of gross domestic product by expenditure, 1983-1990, current prices
(Percentage share)

	1983	1984	1985	1986	1987	1988	1989	1990
Private consumption	60.6	60.2	59.0	61.7	57.7	57.0	53.0	53.8
Public consumption	10.4	10.1	11.2	11.0	9.4	9.0	9.4	8.9
Gross fixed capital formation	25.1	22.4	23.1	24.1	24.8	25.9	27.3	28.1
Change in stocks	3.7	3.8	5.0	4.1	6.5	5.6	7.9	8.4
Exports	25.5	25.6	22.2	19.5	23.9	24.4	25.4	25.9
Less imports	25.3	22.1	20.4	20.5	22.4	21.9	22.9	25.0
GDP	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Memo: Trade/GDP	30.8	47.7	42.6	40.0	46.3	46.3	48.3	50.9

Source: Government of Indonesia, Central Bureau of Statistics

Annex Table A-7. Gross domestic product by industrial origin, 1983-1990, constant 1983 prices
(Billion Rp)

	1983	1984	1985	1986	1987	1988	1989	1990
Agriculture	17,695	18,512	19,300	19,799	20,224	21,214	21,996	22,605
Farm food crops	11,057	11,680	11,986	12,287	12,415	12,974	13,472	13,596
Farm non-food crops	2,295	2,349	2,576	2,581	2,693	2,835	3,016	3,158
Estate crops	375	446	511	562	565	623	636	709
Animal husbandry	1,754	1,890	2,037	2,064	2,111	2,212	2,265	2,434
Forestry	994	894	851	889	968	1,013	974	1,013
Fisheries	1,220	1,253	1,341	1,418	1,472	1,557	1,635	1,694
Mining and quarrying	16,107	17,120	15,480	16,309	16,366	15,893	16,818	17,538
Oil/gas	15,103	16,187	14,513	15,237	15,219	14,692	15,391	15,974
Other	1,004	933	968	1,072	1,146	1,201	1,427	1,564
Manufacturing	9,896	12,079	13,431	14,678	16,235	18,182	19,836	22,277
Oil refining	359	626	767	927	938	981	990	1,090
Liquefied natural gas	1,871	2,790	2,919	2,923	3,233	3,595	3,665	4,037
Other	7,666	8,663	9,745	10,828	12,064	13,607	15,181	17,150
Electricity, gas and water	314	324	361	430	495	549	616	726
Construction	4,597	4,394	4,508	4,609	4,803	5,259	5,878	6,715
Trade	11,541	11,811	12,399	13,399	14,356	15,657	17,214	18,645
Retail and wholesale trade	9,933	10,028	10,412	11,238	12,005	13,035	14,323	15,501
Hotels and restaurants	1,608	1,783	1,987	2,160	2,351	2,622	2,891	3,143
Transport and communications	4,098	4,443	4,487	4,668	4,939	5,212	5,812	6,392
Transport	3,694	4,008	4,032	4,178	4,394	4,626	5,151	5,620
Communications	404	435	455	490	545	586	660	772
Banking and finance	2,359	2,829	3,020	3,483	3,659	3,752	4,288	4,788
Ownership of dwellings	2,356	2,412	2,461	2,545	2,654	2,762	2,878	2,999
Public administration and defence	5,712	5,997	6,455	6,862	7,366	7,932	8,397	8,783
Other services	3,001	3,117	3,180	3,299	3,422	3,570	3,791	3,981
GDP	77,676	83,038	85,082	90,080	94,518	99,982	107,523	115,443

Source Government of Indonesia, Central Bureau of Statistics

Annex Table A-8. **Growth of gross domestic product, 1984-1990, constant 1983 prices**
(Percentage change)

	1984	1985	1986	1987	1988	1989	1990	1985-1990
Agriculture	4.6	4.3	2.6	2.1	4.9	3.7	2.8	3.2
Farm food crops	5.6	2.6	2.5	1.0	4.5	3.8	0.9	2.6
Farm non-food crops	2.4	9.7	0.2	4.4	5.3	6.4	4.7	4.2
Estate crops	18.9	14.5	10.0	0.5	10.4	2.0	11.6	6.8
Animal husbandry	7.8	7.8	1.3	2.3	4.8	2.4	7.5	3.6
Forestry	-10 1	-4.8	4.5	8.9	4.7	-3.9	4.1	3.6
Fisheries	2.7	7.0	5.8	3.8	5.8	5.0	3.6	4.8
Mining and quarrying	6.3	-9.6	5.3	0.3	-2.9	5.8	4.3	2.5
Oil/gas	7.2	-10.3	5.0	-0.1	-3.5	4.8	3.8	1.9
Other	-7.1	3.7	10.7	7.0	4.8	18.8	9.6	10.1
Manufacturing	22.1	11.2	9.3	10.6	12.0	9.1	12.3	10.7
Oil refining	74.4	22.5	20.9	1.1	4.6	0.9	10.1	7.3
Liquified natural gas	49.1	4.6	0.1	10.6	11.2	2.0	10.2	6.7
Other	13.0	12.5	11.1	11.4	12.8	11.6	13.0	12.0
Electricity, gas and water	3.2	11.4	19.1	15.1	11.0	12.2	17.9	15.0
Construction	-4.4	2.6	2.2	4.2	9.5	11.8	14.2	8.3
Trade	2.3	5.0	8.1	7.1	9.1	9.9	8.3	8.5
Retail and wholesale trade	1.0	3.8	7.9	6.8	8.6	9.9	8.2	8.3
Hotels and restaurants	10.9	11.4	8.7	8.8	11.5	10.3	8.7	9.6
Transport and communications	8.4	1.0	4.0	5.8	5.5	11.5	10.0	7.3
Transport	8.5	0.6	3.6	5.2	5.3	11.4	9.1	6.9
Communications	7.7	4.6	7.7	11.1	7.5	12.8	16.9	11.1
Banking and finance	19.9	6.8	15.3	5.1	2.5	14.3	11.7	9.7
Ownership of dwellings	2.4	2.0	3.4	4.3	4.1	4.2	4.2	4.0
Public administration and defence	5.0	7.6	6.3	7.3	7.7	5.9	4.6	6.4
Other services	3.9	2.0	3.7	3.7	4.3	6.2	5.0	4.6
Gross domestic product	6.9	2.5	5.9	4.9	5.8	7.5	7.4	6.3

Source Government of Indonesia, Central Bureau of Statistics

Annex Table A-9. **Gross domestic product by expenditure, 1983-1990, constant 1983 prices**
(Billion Rp)

	1983	1984	1985	1986	1987	1988	1989	1990
Private consumption	47,063	48,942	49,448	50,530	52,200	54,225	56,476	62,053
Public consumption	8,077	8,353	8,991	9,241	9,226	9,924	10,965	11,338
Gross fixed capital formation	19,468	18,297	19,616	21,422	22,597	25,201	28,568	33,183
Change in stocks	2,847	4,452	6,641	6,333	5,049	1,120	1,431	1,143
Exports	19,846	21,145	19,495	22,460	25,745	26,016	27,851	30,278
Less imports	19,625	18,151	19,109	19,906	20,299	16,504	17,768	22,547
GDP	77,676	83,038	85,082	90,081	94,518	99,981	107,523	115,447

Source: Government of Indonesia, Central Bureau of Statistics.

Annex Table A-10. **Growth of gross domestic product by expenditure, 1984-1990, constant 1983 prices**
(Percentage change)

	1984	1985	1986	1987	1988	1989	1990	1985-1990
Private consumption	4.0	1.0	2.2	3.3	3.9	4.2	9.9	4.6
Public consumption	3.4	7.6	2.8	-0.2	7.6	10.5	3.4	4.7
Gross fixed capital formation	-6.0	7.2	9.2	5.5	11.5	13.4	16.2	11.1
Change in stocks[a/]	5.4	7.8	7.0	5.3	1.1	1.3	1.0	
Exports	6.5	-7.8	15.2	14.6	1.1	7.1	8.7	9.2
Less imports	-7.5	5.3	4.2	2.0	-18.7	7.7	26.9	3.4
GDP	6.9	2.5	5.9	4.9	5.8	7.5	7.4	6.3

Source: Government of Indonesia, Central Bureau of Statistics.

a/ As percentage of GDP.

Annex Table A-11. The State budget
(Billion Rp)

	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94
Revenue	19,383.5	22,825.4	21,892.8	26,961.3	32,995.0	38,169.1	49,451.0	51,993.9	56,108.6	62,322.1
Domestic revenue	15,905.5	19,252.8	16,140.6	20,803.3	23,004.3	28,739.8	39,546.4	41,584.8	46,508.4	52,769.0
Direct taxes	12,731.5	13,681.9	8,798.1	12,985.7	13,900.6	17,330.2	25,278.2	25,494.1	25,868.1	31,296.2
Oil/gas	10,429.9	11,144.4	6,337.6	10,047.2	9,527.0	11,252.1	17,711.9	15,039.1	13,947.5	15,127.6
Income tax	2,121.0	2,313.0	2,270.5	2,663.4	3,949.4	5,487.7	6,755.3	9,580.4	10,930.0	14,848.5
Land tax	180.6	224.5	190.0	275.1	424.2	590.4	811.0	874.6	990.6	1,320.1
Indirect taxes	2,371.7	3,928.2	4,994.8	5,618.0	7,242.8	9,077.0	11,909.9	13,300.8	16,575.2	17,316.3
Sales taxes and VAT	878.0	2,326.7	2,900.1	3,390.4	4,505.3	5,836.7	7,462.7	8,926.1	11,032.2	11,682.6
Excise duties	872.5	943.7	1,055.8	1,105.7	1,389.9	1,476.8	1,917.3	2,222.8	2,441.8	2,498.2
Import duties	530.1	607.3	960.1	938.4	1,192.0	1,587.0	2,485.7	2,133.1	3,041.2	3,105.5
Export taxes	91.0	50.5	78.8	183.5	155.6	171.5	44.2	18.8	60.0	30.0
Other taxes	115.0	151.2	190.4	222.9	292.1	275.5	243.5	302.6	354.5	363.8
Non-tax receipts	687.3	1,491.5	2,157.3	1,976.7	1,568.8	2,062.1	2,114.8	2,487.3	3,710.6	3,792.7
Foreign aid receipts	3,478.0	3,572.6	5,752.2	6,158.0	9,990.7	9,429.3	9,904.6	10,409.1	9,600.2	9,553.1
Project aid	3,408.7	3,503.4	3,794.7	5,430.2	7,950.0	8,422.1	8,507.8	8,845.7	9,099.0	9,126.3
Programme aid	69.3	69.2	1,957.5	727.8	2,040.7	1,007.2	1,396.8	1,563.4	501.2	426.8
Expenditure	19,380.9	22,824.6	21,891.3	26,958.9	32,990.0	38,165.4	49,449.7	51,991.8	56,108.6	62,322.1
Routine expenditure	9,429.0	11,951.5	13,559.3	17,481.5	20,739.0	24,331.1	29,997.7	30,227.6	33,196.6	37,094.9
Personnel expenditure	3,046.8	4,018.3	4,310.6	4,616.9	4,998.2	6,201.5	7,053.5	8,102.5	9,144.5	10,894.5
Public procurements	1,182.8	1,367.1	1,366.5	1,329.3	1,491.6	1,701.6	1,830.3	2,372.7	2,432.2	2,979.7
Regional subsidies	1,883.3	2,489.0	2,649.7	2,815.6	3,037.7	3,566.4	4,236.6	4,834.2	5,269.3	6,028.9
Debt service	2,776.5	3,323.1	5,058.1	8,204.6	10,940.2	11,938.7	13,394.6	13,433.8	15,902.1	16,711.9
Foreign	2,737.2	3,303.1	5,058.1	8,165.5	10,862.6	11,789.9	13,145.1	13,182.5	15,627.0	16,425.8
Domestic	39.3	20.0	0.0	39.1	77.6	148.8	249.5	251.3	275.1	286.1
Other	539.6	754.0	174.4	515.1	271.3	922.9	3,482.7	1,484.4	448.5	479.9
Development expenditure	9,951.9	10,873.1	8,332.0	9,477.4	12,251.0	13,834.3	19,452.0	21,764.2	22,912.0	25,227.2
Rupiah financed	6,543.2	7,369.7	4,537.3	4,047.2	4,301.0	5,412.2	10,944.2	12,918.5	13,813.0	16,100.9
Project aid	3,408.7	3,503.4	3,794.7	5,430.2	7,950.0	8,422.1	8,507.8	8,845.7	9,099.0	9,126.3
Balance	2.6	0.8	1.5	2.4	5.0	3.7	1.3	2.1	0.0	0.0
Public savings	6,476.5	7,301.3	2,581.3	3,321.8	2,265.3	4,408.7	9,548.7	11,357.2	13,311.8	15,674.1
Net domestic expenditure	7,759.4	7,909.7	3,235.5	2,607.1	700.1	465.7	5,962.3	3,417.9	(1,178.3)	(871.4)

Sources: Government of Indonesia, *Nota Keuangan dan Rancangan Anggaran Pendapatan dan Belanja Negara*, various issues, and Supplement of the President's Reports to Parliament, August 1992

Annex Table A-12. The State budget
(Percentage share)

	Repelita I[a/]	Repelita II[a/]	Repelita III[a/]	Repelita IV[a/]	1989/90	1990/91	1991/92	1992/93[b/]	1993/94[b/]
Revenue									
Domestic revenue	76.9	82.3	84.6	77.4	75.3	80.0	80.0	82.9	84.7
Direct taxes	38.6	57.9	67.8	51.2	45.4	51.1	49.0	46.1	50.2
Oil/gas	25.9	45.4	56.7	39.5	29.5	35.8	28.9	24.9	24.3
Income tax	12.0	11.2	10.3	10.7	14.4	13.7	18.4	19.5	23.8
Land tax	0.8	1.3	0.8	1.0	1.5	1.6	1.7	1.8	2.1
Indirect taxes	33.7	20.4	13.9	19.0	23.8	24.1	25.6	29.5	27.8
Sales taxes and VAT	8.7	7.2	4.3	10.8	15.3	15.1	17.2	19.7	18.7
Excise duties	7.3	4.0	4.0	4.4	3.9	3.9	4.3	4.4	4.0
Import duties	13.1	6.7	3.7	3.4	4.2	5.0	4.1	5.4	5.0
Export taxes	4.6	2.5	1.9	0.4	0.4	0.1	-	0.1	-
Other taxes	1.0	0.5	0.3	0.8	0.7	0.5	0.6	0.6	0.6
Non-tax receipts	3.5	3.5	2.7	6.4	5.4	4.3	4.8	6.6	6.1
Foreign aid receipts	23.1	17.7	15.4	22.6	24.7	20.0	20.0	17.1	15.3
Project aid	8.5	16.8	15.0	18.9	22.1	17.2	17.0	16.2	14.6
Programme aid	14.6	0.9	0.4	3.7	2.6	2.8	3.0	0.9	0.7
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Expenditure									
Routine expenditure	62.5	49.2	48.9	58.1	63.8	60.7	58.1	59.2	59.5
Personnel expenditure	28.0	20.0	16.6	17.1	16.2	14.3	15.6	16.3	17.5
Public procurements	12.7	9.2	6.5	5.6	4.5	3.7	4.6	4.3	4.8
Regional subsidies	11.7	10.0	8.6	10.5	9.3	8.6	9.3	9.4	9.7
Debt service	6.4	5.4	8.4	23.1	31.3	27.1	25.8	28.3	26.8
Foreign	5.6	5.1	8.1	23.0	30.9	26.6	25.4	27.9	26.4
Domestic	0.7	0.3	0.2	0.1	0.4	0.5	0.5	0.5	0.5
Other	3.8	4.6	8.9	1.9	2.4	7.0	2.9	0.8	0.8
Development expenditure	37.5	50.8	51.1	41.9	36.2	39.3	41.9	40.8	40.5
Rupiah financed	28.9	34.0	36.1	23.0	14.2	22.1	24.8	24.6	25.8
Project aid	8.6	16.8	15.0	18.9	22.1	17.2	17.0	16.2	14.6
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Sources: Government of Indonesia, *Nota Keuangan dan Rancangan Anggaran Pendapatan dan Belanja Negara*, various issues, and Supplement of the President's Reports to Parliament, 15 August 1992.

a/ Annual average

b/ Budget.

Annex Table A-13. Capital spending by sector
(Billion Rp)

	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	Budget 1992/93	Budget 1993/94
Agriculture	1,699.0	1,138.0	890.0	1,937.0	1,611.0	2,049.4	2,307.9	2,713.1	2,955.2	3,081.9
Manufacturing	603.0	963.0	465.0	215.0	447.0	399.8	547.1	544.5	519.8	529.0
Mining and energy	1,148.0	1,673.0	1,176.0	1,206.0	2,074.0	1,417.3	1,874.3	2,463.3	3,013.1	3,285.7
Transport and tourism	1,428.0	1,484.0	1,131.0	1,598.0	2,012.0	3,006.0	3,743.3	3,910.4	4,385.2	4,666.9
Trade and cooperatives	342.0	93.0	186.0	259.0	315.0	414.5	199.0	579.1	313.0	318.7
Manpower and transmigration	422.0	665.0	292.0	200.0	266.0	281.2	579.7	718.4	886.3	953.5
Regional development	791.0	850.0	939.0	930.0	1,137.0	1,369.4	1,937.7	2,478.1	2,918.9	3,561.8
Religion	60.0	77.0	39.0	18.0	18.0	24.9	42.1	46.7	67.3	80.6
Education and culture	1,231.0	1,413.0	1,184.0	1,181.0	1,606.0	1,506.6	2,051.7	2,416.9	3,001.9	3,564.7
Health and welfare	320.0	398.0	326.0	225.0	338.0	469.9	722.9	890.7	955.0	1,087.1
Housing	224.0	335.0	337.0	431.0	481.0	494.6	677.2	801.7	958.6	971.5
Law	60.0	108.0	25.0	20.0	27.0	25.1	35.2	52.1	74.4	83.5
Defence and security	702.0	590.0	554.0	514.0	555.0	720.1	996.2	1,023.2	1,120.0	1,147.0
Information	46.0	71.0	33.0	28.0	28.0	59.7	93.8	77.0	79.6	82.0
Research	190.0	274.0	181.0	178.0	721.0	333.5	553.7	430.6	566.8	660.7
Government apparatus	164.0	278.0	190.0	118.0	152.0	163.8	215.5	269.4	323.5	349.5
Business development	292.0	220.0	211.0	219.0	238.0	624.9	334.7	410.5	390.1	394.4
Environment	230.0	243.0	173.0	200.0	225.0	473.6	540.0	438.5	383.3	408.7
Budgetary reserves	0.0	0.0	0.0	0.0	0.0	0.0	2,000.0	1,500.0	0.0	0.0
Total	9,952.0	10,873.0	8,332.0	9,477.0	12,251.0	13,834.3	19,452.0	21,764.2	22,912.0	25,227.2

Sources Government of Indonesia, *Nota Keuangan dan Rancangan Anggaran Pendapatan dan Belanja Negara*, various issues, and Supplement of the President's Reports to Parliament, August 1992.

Annex Table A-14. Sectoral distribution of government capital spending[a/]
(Percentage share)

	Repelita II[b/]	Repelita III[b/]	Repelita IV[b/]	1989/90	1990/91	1991/92	1992/93[c/]	1993/94[c/]
Agriculture	20.5	12.8	14.4	14.8	11.9	12.5	12.9	12.2
Manufacturing	5.9	7.1	5.3	2.9	2.8	2.5	2.3	2.1
Mining and energy	11.9	13.8	14.1	10.2	9.6	11.3	13.2	13.0
Transport and tourism	17.7	12.7	15.0	21.7	19.2	18.0	19.1	18.5
Trade and cooperatives	0.4	1.4	2.4	3.0	1.0	2.7	1.4	1.3
Manpower and transmigration	1.8	5.2	3.6	2.0	3.0	3.3	3.9	3.8
Regional development	11.6	8.5	9.2	9.9	10.0	11.4	12.7	14.1
Religion	0.3	0.6	0.4	0.2	0.2	0.2	0.3	0.3
Education and culture	7.9	9.8	13.0	10.9	10.5	11.1	13.1	14.1
Health and welfare	2.8	3.5	3.2	3.4	3.7	4.1	4.2	4.3
Housing	1.9	2.6	3.6	3.6	3.5	3.7	4.2	3.9
Law	0.4	0.8	0.5	0.2	0.2	0.2	0.3	0.3
Defence and security	3.3	7.3	5.8	5.2	5.1	4.7	4.9	4.5
Information	0.9	0.5	0.4	0.4	0.5	0.4	0.3	0.3
Research	1.4	1.8	2.9	2.4	2.8	2.0	2.5	2.6
Government apparatus	2.4	2.9	1.8	1.2	1.1	1.2	1.4	1.4
Business development	8.9	6.0	2.3	4.5	1.7	1.9	1.7	1.6
Environment	-	2.5	2.1	3.4	2.8	2.0	1.7	1.6
Budgetary reserves	-	-	-	-	10.3	6.9	-	-
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Sources: Government of Indonesia, *Nota Keuangan dan Rancangan Anggaran Pendapatan dan Belanja Negara*, various issues, and Supplement of the President's Reports to Parliament, 15 August 1992.

a/ No comparable data available for Repelita I.
b/ Annual average.
c/ Budget.

Annex Table A-15. Monetary growth and inflation
(Percentage change, year-end)

	1985	1987	1988	1989	1990	1991	1992
A. Monetary growth							
Currency	20.2	8.3	8.0	18.9	22.5	2.8	22.8
Demand deposits	11.9	8.9	18.0	55.8	16.1	15.4	1.8
Money (M1)	**15.6**	**8.6**	**13.5**	**39.8**	**18.4**	**10.6**	**9.3**
Quasi-money	22.5	32.6	30.2	39.8	57.6	19.6	24.1
Total liquidity (M2)	**19.5**	**22.5**	**23.9**	**39.8**	**44.2**	**17.0**	**20.2**
B. Inflation[a/]							
Consumer prices	8.8	8.9	5.5	6.0	9.5	9.5	4.9

Source: Bank Indonesia, *Weekly Report*.

a/ Official estimates, derived by summing monthly percentage increases in composite consumer price index for 27 main provincial cities.

Annex Table A-16. Outstanding bank credits in rupiahs and foreign exchange, 1986-1992
(Billion Rp, end of period)

	1986	1987	1988	1989	1990	1991	1992
State banks	17,782	21,676	28,631	39,579	53,524	59,861	68,236
Private banks	5,506	7,462	10,714	18,591	34,975	41,836	42,337
Regional development banks	766	961	1,196	1,625	2,302	2,616	3,015
Foreign banks	1,204	1,406	1,913	3,115	6,177	8,512	9,330
Bank Indonesia	1,144	1,347	1,547	696	718	783	771
Total	**26,402**	**32,852**	**44,001**	**63,606**	**97,696**	**113,608**	**123,689**

Source: Bank of Indonesia, *Weekly Report*.

Annex Table A-17. Composition of exports by oil/gas and non-oil/gas products, 1981-1991

	Oil/gas		Non-oil/gas		Total	
	Billion $	Percentage	Billion $	Percentage	Billion $	Percentage
1981	20.7	82.1	4.5	17.9	25.2	100.0
1982	18.4	82.4	3.9	17.6	22.3	100.0
1983	16.1	76.3	5.0	23.7	21.1	100.0
1984	16.0	73.2	5.9	26.8	21.9	100.0
1985	12.7	68.4	5.9	31.6	18.6	100.0
1986	8.3	55.9	6.5	44.1	14.8	100.0
1987	8.5	49.9	8.6	50.1	17.1	100.0
1988	7.7	40.0	11.5	60.0	19.2	100.0
1989	8.7	39.2	13.5	60.8	22.2	100.0
1990	11.1	43.1	14.6	56.9	25.7	100.0
1991	10.9	37.4	18.2	62.6	29.1	100.0

Source: Government of Indonesia, Central Bureau of Statistics, *Indikator Ekonomi*.

Annex Table A-18. Exports and imports by principal product categories, 1981-1991
(Billion $)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Exports (fob)											
Agricultural products	1.57	1.22	1.37	1.53	1.39	1.75	1.67	1.91	1.94	2.08	2.28
Industrial products	2.67	2.47	3.22	3.98	4.25	4.51	6.67	9.26	11.03	11.88	15.07
Non-oil/gas mining products	0.20	0.1	0.17	0.18	0.20	0.25	0.23	0.35	0.50	0.64	0.89
Oil/gas	20.66	18.40	16.14	16.02	12.72	8.28	8.56	7.68	8.68	11.07	10.89
Others	0.06	0.06	0.24	0.17	0.04	0.02	0.01	0.02	-	-	-
Total	**25.16**	**22.33**	**21.15**	**21.89**	**18.59**	**14.81**	**17.13**	**19.22**	**22.16**	**25.68**	**29.14**
Imports (cif)											
Consumer goods	0.81	1.24	1.73	0.83	0.38	0.45	0.46	0.47	0.69	0.88	0.96
Raw materials/intermediate goods	10.45	12.59	11.73	10.48	8.16	8.36	9.47	10.22	11.91	14.89	17.23
Capital goods	2.02	3.03	2.89	2.57	1.72	1.91	2.44	2.56	3.77	6.07	7.68
Total	**13.27**	**16.86**	**16.35**	**13.88**	**10.26**	**10.72**	**12.37**	**13.25**	**16.36**	**21.84**	**25.87**

Source: Government of Indonesia, Central Bureau of Statistics, *Indikator Ekonomi*.

Annex Table A-19. **Direction of trade, 1983-1991**
(Million $)

	1983	1984	1985	1986	1987	1988	1989	1990	1991
Exports									
ASIA	14,137.1	14,355.1	12,398.7	9,674.5	11,384.7	13,066.8	15,232.8	18,091.5	20,206.3
ASEAN	3,476.3	2,487.3	1,982.2	1,514.9	1,703.3	2,079.3	2,429.2	2,515.1	3,196.8
Malaysia	58.0	98.2	76.6	82.3	93.8	184.0	220.1	253.2	341.8
Philippines	241.9	166.1	198.6	108.3	70.6	86.5	149.1	160.6	167.7
Singapore	3,127.8	2,125.5	1,625.6	1,238.9	1,449.2	1,653.2	1,817.9	1,902.1	2,409.8
Thailand	48.6	97.5	81.4	83.0	87.2	151.4	234.3	188.5	267.2
Hong Kong	181.7	261.3	348.4	345.2	419.6	554.4	548.7	617.7	703.2
Japan	9,678.2	10,352.5	8,593.5	6,644.1	7,393.3	8,018.3	9,321.2	10,923.4	10,766.8
AFRICA	78.8	139.6	160.4	179.3	150.4	272.0	216.7	199.2	393.9
AMERICA	5,309.9	5,581.3	4,412.6	3,143.5	3,490.8	3,221.5	3,654.9	3,605.0	3,864.5
United States	4,266.7	4,504.7	4,040.2	2,901.5	3,348.6	3,073.7	3,496.8	3,364.6	3,508.5
Canada	28.3	45.7	46.2	59.9	94.4	100.6	107.8	138.5	171.9
AUSTRALIA and OCEANIA	472.5	510.9	229.7	241.7	352.8	324.6	445.7	487.4	666.8
Australia	208.4	275.2	149.2	158.6	309.8	293.3	386.6	403.0	628.0
EUROPE	1,147.6	1,300.9	1,385.3	1,566.0	1,756.9	2,333.6	2,608.8	3,292.2	4,010.9
European Community	952.7	1,036.2	1,113.0	1,339.7	1,541.2	2,151.6	2,338.4	3,028.3	3,742.3
United Kingdom	199.0	167.7	191.4	196.6	212.4	348.8	383.6	516.7	653.9
Netherlands	289.2	331.9	392.0	452.6	493.4	646.3	681.3	723.1	837.6
Germany[a/]	252.4	246.3	254.9	334.2	361.1	455.5	492.9	749.9	907.1
Belgium and Luxembourg	32.9	62.7	45.3	90.5	109.4	177.0	173.0	209.9	257.7
France	53.1	48.6	70.6	92.9	101.8	164.4	208.9	285.7	385.9
Italy	119.5	167.3	152.0	151.8	174.9	220.5	234.1	276.1	381.5
USSR	50.3	58.7	77.9	52.0	82.4	37.9	99.8	80.9	39.8
TOTAL	**21,145.9**	**21,887.8**	**18,586.7**	**14,805.0**	**17,135.6**	**19,218.5**	**22,158.9**	**25,675.3**	**29,142.4**

(continued)

Annex Table A-19. (continued)

	1983	1984	1985	1986	1987	1988	1989	1990	1991
Imports									
ASIA	9,992.8	7,679.1	5,385.7	6,275.2	7,183.1	7,511.2	9,284.1	12,386.6	14,650.3
ASEAN	3,914.8	1,948.0	962.4	1,120.9	1,243.8	1,305.2	1,765.3	2,430.2	2,464.2
Malaysia	60.0	86.2	52.4	50.4	138.9	276.1	369.0	325.7	406.8
Philippines	181.6	15.0	23.0	28.2	82.4	36.4	63.0	649.4	81.1
Singapore	3,464.5	1,791.4	839.1	968.8	946.8	895.5	1,122.2	1,271.4	1,698.5
Thailand	208.7	55.4	47.9	72.1	75.4	96.1	209.6	183.4	277.5
Hong Kong	64.8	85.9	52.3	345.2	419.6	554.4	548.7	617.7	703.2
Japan	3,793.1	3,307.7	2,644.4	3,128.2	3,596.1	3,385.6	3,766.7	5,799.9	6,326.9
AFRICA	134.8	171.4	160.3	102.9	153.2	201.1	202.1	170.4	195.0
AMERICA	2,849.1	3,017.4	2,109.5	1,871.0	1,928.8	2,233.4	2,982.9	3,445.5	4,348.3
United States	2,533.7	2,559.9	1,720.9	1,482.4	1,415.1	1,735.7	2,217.9	2,520.1	3,396.9
Canada	186.0	318.8	198.1	214.3	303.0	274.1	310.5	406.8	354.3
AUSTRALIA and OCEANIA	474.7	450.2	529.3	484.7	542.4	674.6	1,022.7	1,300.7	1,495.6
Australia	402.3	372.0	460.5	413.4	462.7	578.4	924.8	1,186.0	1,377.9
EUROPE	2,900.4	2,564.0	2,074.3	2,235.5	2,878.3	3,049.5	3,237.5	4,878.3	5,650.8
European Community	2,234.1	2,061.9	1,706.2	1,795.5	2,352.5	2,509.8	2,575.3	4,060.8	4,704.2
United Kingdom	364.4	297.2	300.4	341.7	324.8	339.9	359.6	439.8	602.7
Netherlands	257.3	266.1	215.1	189.3	316.1	258.4	247.7	550.3	505.0
Germany[a/]	741.4	820.1	677.1	719.1	836.0	886.6	920.4	1,501.7	2,061.2
Belgium and Luxembourg	123.8	101.8	100.7	88.5	142.0	158.6	167.1	237.3	253.7
France	591.1	431.9	284.4	280.7	392.0	464.8	406.1	643.1	543.8
Italy	124.7	113.2	101.4	143.7	236.7	247.6	348.2	409.7	535.8
USSR	24.9	12.1	3.3	5.2	15.5	45.4	50.8	53.4	47.5
TOTAL	**16,351.8**	**13,882.1**	**10,259.1**	**10,969.3**	**12,685.8**	**13,669.8**	**16,729.3**	**22,181.5**	**26,340.0**

Source Government of Indonesia, Central Bureau of Statistics, *Inaikator Ekonomi*

a/ Federal Republic of Germany until 3 October 1990

Annex Table A-20. Direction of trade, 1983-1991
(Percentage share)

	1983	1984	1985	1986	1987	1988	1989	1990	1991
Exports									
ASIA	66.9	65.6	66.7	65.3	66.4	68.0	68.7	70.5	69.3
ASEAN	16.4	11.4	10.7	10.2	9.9	10.8	11.0	9.8	11.0
Malaysia	0.3	0.4	0.4	0.6	0.5	1.0	1.0	1.0	1.2
Philippines	1.1	0.8	1.1	0.7	0.4	0.5	0.7	0.6	0.6
Singapore	14.8	9.7	8.7	8.4	8.5	8.6	8.2	7.4	8.3
Thailand	0.2	0.4	0.4	0.6	0.5	0.8	1.1	0.7	0.9
Hong Kong	0.9	1.2	1.9	2.3	2.4	2.9	2.5	2.4	2.4
Japan	45.8	47.3	46.2	44.9	43.1	41.7	42.1	42.5	36.9
AFRICA	0.4	0.6	0.9	1.2	0.9	1.4	1.0	0.8	1.4
AMERICA	25.1	25.5	23.7	21.2	20.4	16.8	16.5	14.0	13.3
United States	20.2	20.6	21.7	19.6	19.5	16.0	15.8	13.1	12.0
Canada	0.1	0.2	0.2	0.4	0.6	0.5	0.5	0.5	0.6
AUSTRALIA and OCEANIA	2.2	2.3	1.2	1.6	2.1	1.7	2.0	1.9	2.3
Australia	1.0	1.3	0.8	1.1	1.8	1.5	1.7	1.6	2.2
EUROPE	5.4	5.9	7.5	10.6	10.3	12.1	11.8	12.8	13.8
European Community	4.5	4.7	6.0	9.0	9.0	11.2	10.6	11.8	12.8
United Kingdom	0.9	0.8	1.0	1.3	1.2	1.8	1.7	2.0	2.2
Netherlands	1.4	1.5	2.1	3.1	2.9	3.4	3.1	2.8	2.9
Germany[a/]	1.2	1.1	1.4	2.3	2.1	2.4	2.2	2.9	3.1
Belgium and Luxembourg	0.2	0.3	0.2	0.6	0.6	0.9	0.8	0.8	0.9
France	0.3	0.2	0.4	0.6	0.6	0.9	0.9	1.1	1.3
Italy	0.6	0.8	0.8	1.0	1.0	1.1	1.1	1.1	1.3
USSR	0.2	0.3	0.4	0.4	0.5	0.2	0.5	0.3	0.1
TOTAL	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Imports									
ASIA	61.1	55.3	52.5	57.2	56.6	54.9	55.5	55.8	55.6
ASEAN	23.9	14.0	9.4	10.2	9.8	9.5	10.6	11.0	9.4
Malaysia	0.4	0.6	0.5	0.5	1.1	2.0	2.2	1.5	1.5
Philippines	1.1	0.1	0.2	0.3	0.6	0.3	0.4	2.9	0.3
Singapore	21.2	12.9	8.2	8.8	7.5	6.6	6.7	5.7	6.4
Thailand	1.3	0.4	0.5	0.7	0.6	0.7	1.3	0.8	1.1
Hong Kong	0.4	0.6	0.5	3.1	3.3	4.1	3.3	2.8	2.7
Japan	23.2	23.8	25.8	28.5	28.3	24.8	22.5	23.9	24.0
AFRICA	0.8	1.2	1.6	0.9	1.2	1.5	1.2	0.8	0.7
AMERICA	17.4	21.7	20.6	17.1	15.2	16.3	17.8	15.5	16.5
United States	15.5	18.4	16.8	13.5	11.2	12.7	13.3	11.4	12.9
Canada	1.1	2.3	1.9	2.0	2.4	2.0	1.9	1.8	1.3
AUSTRALIA and OCEANIA	2.9	3.2	5.2	4.4	4.3	4.9	6.1	5.9	5.7
Australia	2.5	2.7	4.5	3.8	3.6	4.2	5.5	5.3	5.2
EUROPE	17.7	18.5	20.2	20.4	22.7	22.3	19.4	22.0	21.5
European Community	13.7	14.9	16.6	16.4	18.5	18.4	15.4	18.3	17.9
United Kingdom	2.2	2.1	2.9	3.1	2.6	2.5	2.1	2.0	2.3
Netherlands	1.6	1.9	2.1	1.7	2.5	1.9	1.5	2.5	1.9
Germany[a/]	4.5	5.9	6.6	6.6	6.6	6.5	5.5	6.8	7.8
Belgium and Luxembourg	0.8	0.7	1.0	0.8	1.1	1.2	1.0	1.0	1.0
France	3.6	3.1	2.8	2.6	3.1	3.4	2.4	2.9	2.1
Italy	0.8	0.8	1.0	1.3	1.9	1.8	2.1	1.8	2.0
USSR	0.2	0.1	-	-	0.1	0.3	0.3	0.2	0.2
TOTAL	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source Government of Indonesia, Central Bureau of Statistics, *Indikator Ekonomi*

a/ Federal Republic of Germany until 3 October 1990

Annex Table A-21. Balance of payments, 1985-1991
(Billion $)

	1985	1986	1987	1988	1989	1990	1991
Merchandise: Exports fob	18.5	14.4	17.2	19.5	23.0	26.8	29.4
Merchandise: Imports fob	-12.7	-11.9	-12.5	-13.8	-16.3	-21.5	-24.6
Trade balance	5.8	2.4	4.7	5.7	6.7	5.3	4.8
Services: Credit	0.8	0.8	1.1	1.4	1.9	2.5	2.9
Services: Debit	-5.1	-4.3	-4.4	-4.6	-5.4	-6.1	-6.5
Income: Credit	0.8	0.7	0.6	0.5	0.6	0.4	0.6
Income: Debit	-4.3	-3.9	-4.2	-4.6	-5.1	-5.6	-6.1
Invisibles balance[a]	-7.7	-6.4	-6.8	-7.1	-7.8	-8.3	-8.9
Current account balance	-1.9	-3.9	-2.1	-1.4	-1.1	-3.0	-4.1

Source: International Monetary Fund, *International Financial Statistics*, February 1993
a/ Including private and official transfers.

Annex Table A-22. External debt, 1980-1990, selected years
(Million $)

	1980	1985	1986	1987	1988	1989	1990
Total debt stocks	20,944	36,673	42,974	52,080	52,775	54,637	67,908
Long-term debt	18,169	30,578	36,456	45,004	45,425	46,054	54,379
Public and publicly guaranteed	15,027	26,768	32,628	40,899	41,249	41,204	44,974
Private non-guaranteed	3,142	3,810	3,828	4,105	4,176	4,849	9,405
Use of IMF credit	-	46	51	716	623	608	494
Short-term debt	2,775	6,049	6,466	6,360	6,727	7,975	13,035
Total debt flows							
Disbursements	3,246	4,285	4,958	7,041	7,298	8,028	10,148
Long-term debt	3,246	4,285	4,958	6,435	7,298	8,028	10,148
IMF purchases	-	-	-	606	-	-	-
Principal repayments	1,632	3,421	3,317	4,104	5,283	5,213	5,274
Long-term debt	1,632	3,036	3,317	4,104	5,226	5,312	5,117
IMF purchases	-	385	-	-	56	-	157
Net flows on debt	1,613	1,505	2,057	2,832	2,382	4,063	9,934
Of which short-term debt	..	641	417	-106	367	1,248	5,060
Interest payments	1,452	2,505	2,894	3,221	3,572	3,730	3,877
Long-term debt	1,182	2,028	2,388	2,617	2,920	2,952	3,021
IMF charges	-	19	4	22	41	51	59
Short-term debt	270	548	502	582	611	727	798
Net transfers on debt	161	-1,090	-836	-390	-1,190	332	6,057
total debt service	3,084	6,017	6,211	7,325	8,855	8,944	9,151
Long-term debt	2,814	5,064	5,705	6,721	8,146	8,165	8,137
IMF purchases and charges	-	405	4	22	98	51	216
Short-term debt (interest only)	270	548	502	582	611	727	798

Source World Bank, World Debt Tables 1991-92

Annex Table A-23. Approved private investment, 1981-1992[a/]

	Foreign investment (Million $)	Domestic investment (Billion Rp)
1981	1,091	1,691
1982	1,397	1,949
1983	2,882	7,005
1984	1,107	1,949
1985	859	3,750
1986	826	4,417
1987	1,457	10,265
1988	4,482	14,238
1989	4,719	19,439
1990	8,751	55,278
1991	8,778	41,085
1992	10,313	29,342

Source: Government of Indonesia, National Investment Coordinating Board (BKPM).

a/ Figures refer to intended capital investments outside the oil/gas and financial sectors, and represent original approvals plus approved expansions minus cancellations.

Annex Table A-24. Manufacturing value added by ISIC, 1980-1990
(Billion Rp)

ISIC		1980	1981	1982	1983	1984	1985[a/]	1986	1987	1988	1989	1990
311	Food products	203.2	298.1	307.1	344.6	382.7	772.2	719.3	829.7	1,199.4	1,259.5	2,794.9
312	Food products	32.7	43.4	44.9	58.8	95.0	193.9	298.1	313.0	377.3	734.5	647.2
313	Beverages	32.1	39.0	53.2	78.3	79.5	84.8	98.0	114.7	141.7	122.7	193.3
314	Tobacco	406.7	473.5	499.0	564.5	712.0	823.2	1,076.0	1,339.2	1,386.6	1,764.3	2,291.1
321	Textiles	263.5	287.8	339.1	349.3	566.1	762.5	1,046.8	1,112.9	1,240.8	2,118.8	2,324.9
322	Garments	9.1	15.6	32.5	44.0	70.8	117.4	162.4	177.5	270.1	427.2	827.8
323	Leather products	3.4	4.7	7.8	9.9	17.2	14.9	29.5	14.3	24.0	23.4	76.1
324	Footwear	16.4	9.9	12.2	22.2	24.3	33.9	41.7	44.0	72.8	144.3	341.4
331	Wood products	149.8	201.0	242.5	290.0	313.4	680.0	912.6	1,303.9	1,684.8	2,164.6	2,482.9
332	Furniture	3.6	3.9	4.6	6.1	7.4	20.0	26.7	31.3	53.4	76.8	209.1
341	Paper products	31.9	19.9	29.5	25.1	40.1	122.5	109.8	209.1	375.7	410.1	820.8
342	Printing and publishing	31.3	36.1	46.5	47.7	59.1	102.3	173.1	174.2	212.7	236.7	265.6
351	Basic chemicals	91.4	189.4	208.9	205.8	249.0	474.9	456.8	560.6	729.9	773.8	1,204.9
352	Other chemicals	151.3	168.3	187.9	194.0	274.9	430.8	441.2	523.0	632.5	696.1	929.5
355	Rubber products	102.6	91.1	91.6	123.4	132.6	364.4	263.4	331.2	575.4	786.6	871.7
356	Plastics	15.5	18.4	24.5	37.4	67.2	194.4	117.9	160.9	186.5	225.3	395.0
361	Pottery and china	5.1	6.8	9.0	11.6	13.8	26.7	31.6	33.5	48.6	75.2	128.6
362	Glass products	22.5	43.4	39.4	44.9	48.3	109.0	117.2	72.7	76.0	87.7	118.2
363	Cement	120.8	145.8	128.7	150.6	164.8	254.3	260.5	333.8	312.6	312.6	534.3
364	Structural clay products	3.0	4.3	4.4	5.1	5.4	18.4	22.2	20.2	24.5	26.9	29.1
369	Other non-metallic minerals	1.3	1.4	3.1	5.2	6.6	18.8	25.9	29.5	33.7	39.9	85.0
371	Basic metals	67.0	79.5	67.7	200.6	493.3	570.7	709.9	1,028.9	1,050.2	1,400.1	2,026.5
381	Metal products	74.2	85.7	135.3	154.4	174.5	308.6	336.0	421.7	699.0	1,115.3	700.2
382	Non-electrical machinery	33.4	42.9	52.3	48.6	60.8	84.0	68.2	99.6	125.9	167.4	288.8
383	Electrical equipment	112.6	125.9	161.4	133.7	150.0	272.5	252.0	271.1	287.5	450.2	609.9
384	Transport equipment	136.1	277.8	226.8	213.4	248.3	367.8	508.7	643.3	758.8	1,168.7	1,506.5
385	Professional equipment	1.4	0.7	0.9	1.0	1.6	4.3	4.0	5.8	8.7	11.5	16.0
390	Miscellaneous	8.3	8.1	9.5	9.1	16.5	26.6	34.1	39.0	57.5	99.2	111.0
Total		**2,130.0**	**2,727.3**	**2,970.3**	**3,379.5**	**4,475.3**	**7,703.7**	**8,343.4**	**10,238.3**	**12,646.5**	**16,919.3**	**22,830.3**
Light industry[b/]		1,278.1	1,530.5	1,714.8	1,985.4	2,543.8	4,190.5	4,999.5	5,985.7	7,483.0	10,184.0	13,831.9
Heavy processing[b/]		494.2	658.8	678.7	843.0	1,296.2	1,975.9	2,175.0	2,811.1	3,283.7	3,872.4	5,877.1
Heavy engineering[b/]		357.7	533.1	576.7	551.1	635.2	1,037.3	1,168.8	1,441.5	1,879.8	2,912.9	3,121.4

Source Government of Indonesia, Central Bureau of Statistics, *Statistik Industri*

a/ Census

b/ Defined as follows: light industry - ISIC 31, 32, 33, 342, 355, 356, 39; heavy processing industry - ISIC 341, 351, 352, 36, 37; heavy engineering industry - ISIC 38

Annex Table A-25. Value of gross output by ISIC, 1980-1990
(Billion Rp)

ISIC		1980	1981	1982	1983	1984	1985[a/]	1986	1987	1988	1989	1990
311	Food products	870.5	1,056.2	1,189.1	1,495.9	1,716.2	3,025.1	3,261.2	4,224.6	5,392.6	6,380.6	8,283.2
312	Food products	143.1	200.6	226.8	316.2	423.7	738.9	952.6	1,202.1	1,555.3	2,210.4	2,107.3
313	Beverages	78.8	97.2	124.6	156.7	177.6	235.4	260.2	310.3	408.4	454.8	454.5
314	Tobacco	1,204.0	1,548.2	1,720.1	1,974.3	2,396.4	3,293.9	3,037.1	3,586.8	3,670.6	5,770.6	5,833.2
321	Textiles	841.3	939.2	1,005.0	1,138.5	1,660.2	2,388.4	3,021.6	3,890.5	4,969.0	7,156.1	7,880.6
322	Garments	28.7	48.7	78.5	115.3	169.1	346.5	430.7	599.0	874.2	1,259.7	2,362.3
323	Leather products	18.4	21.4	24.0	28.3	45.7	47.3	61.7	71.1	119.3	131.2	242.1
324	Footwear	31.3	31.6	33.7	46.2	56.9	74.3	81.9	93.7	175.3	303.4	699.6
331	Wood products	376.8	503.4	690.0	881.8	1,100.7	1,918.8	2,388.3	3,712.2	5,334.8	6,395.3	7,334.4
332	Furniture	8.8	10.3	12.0	16.1	18.8	51.0	64.9	86.0	137.8	200.3	578.8
341	Paper products	102.5	110.9	136.4	130.4	178.9	413.0	483.5	895.4	1,288.8	1,683.5	2,481.7
342	Printing and publishing	89.3	94.3	114.0	132.3	147.1	265.9	412.3	454.8	565.1	715.4	911.4
351	Basic chemicals	316.0	433.0	508.8	600.7	733.1	1 469.4	1,473.1	1,947.8	2,218.1	2,560.0	4,211.1
352	Other chemicals	369.4	463.8	543.7	630.5	720.7	1,217.4	1,394.6	1,626.4	2,023.8	2,380.1	3,080.6
355	Rubber products	540.4	507.2	401.2	664.3	829.0	1,321.4	1,237.1	1,908.3	2,754.5	2,798.7	3,152.7
356	Plastics	71.2	99.8	113.3	152.0	237.4	498.4	543.6	797.6	1,109.9	1,352.7	1,435.3
361	Pottery and china	12.4	15.1	24.0	29.8	37.1	68.1	73.3	88.9	133.5	191.0	337.3
362	Glass products	48.1	78.5	87.9	113.3	122.6	218.8	233.7	280.3	301.0	345.4	399.1
363	Cement	236.5	257.4	302.7	408.4	447.7	793.7	831.9	954.2	995.7	1,192.8	1,524.5
364	Structural clay products	5.4	7.8	10.0	11.2	11.2	40.5	48.9	52.0	62.2	72.6	73.2
369	Other non-metallic minerals	3.7	4.5	9.0	12.9	17.9	40.4	47.7	53.6	70.0	81.7	205.1
371	Basic metals	237.7	249.4	275.6	612.8	980.0	1,151.1	1,418.7	1,880.7	2,651.3	3,685.5	5,634.2
381	Metal products	285.3	338.7	462.1	521.0	628.8	1,045.8	1,214.4	1,518.5	2,436.9	3,102.2	2,519.2
382	Non-electrical machinery	81.3	110.4	124.3	124.2	144.1	234.5	202.2	288.2	409.9	520.4	929.0
383	Electrical equipment	387.1	442.9	508.8	563.9	706.5	924.4	916.8	1,145.6	1,563.6	2,030.7	2,590.5
384	Transport equipment	402.8	604.8	747.0	744.8	838.1	1,100.8	1,660.9	1,767.1	2,316.3	3,605.3	4,821.9
385	Professional equipment	2.8	2.1	2.5	2.7	3.9	13.7	14.1	23.7	40.9	54.4	50.1
390	Miscellaneous	24.6	21.6	28.2	33.3	64.3	89.6	110.2	132.0	173.7	289.2	331.7
Total		**6,818.4**	**8,299.0**	**9,503.4**	**11,657.6**	**14,613.8**	**23,026.7**	**25,877.3**	**33,591.2**	**43,752.6**	**56,924.0**	**70,465.5**
Light industry[b/]		4,327.2	5,179.7	5,760.6	7,151.2	9,043.3	14,295.1	15,863.4	21,068.8	27,240.4	35,418.3	41,608.1
Heavy processing[b/]		1,331.8	1,620.4	1,898.1	2,549.9	3,249.2	5,412.4	6,005.5	7,779.3	9,744.4	12,192.6	17,946.7
Heavy engineering[b/]		1,159.3	1,498.9	1,844.7	1,956.5	2,321.4	3,319.2	4,008.4	4,743.1	6,767.7	9,313.1	10,910.7

Source Government of Indonesia, Central Bureau of Statistics, *Statistik Indusri*

a/ Census

b/ Defined as follows: light industry - ISIC 31, 32, 33, 342, 355, 356, 39; heavy processing industry - ISIC 341, 351, 352, 36, 37; heavy engineering industry - ISIC 38

Annex Table A-26. Manufacturing employment by ISIC, 1980-1990
(Thousand persons)

ISIC		1980	1981	1982	1983	1984	1985[a/]	1986	1987	1988	1989	1990
311	Food products	123.5	121.7	121.1	126.3	126.3	219.5	219.2	228.6	248.4	248.9	274.1
312	Food products	31.3	34.1	33.9	36.1	39.4	83.9	90.1	100.0	111.6	113.1	122.4
313	Beverages	7.3	7.4	7.4	8.3	8.6	11.4	11.8	11.8	13.2	12.5	12.7
314	Tobacco	159.3	157.7	161.1	168.0	167.8	205.1	199.0	202.7	204.2	214.3	206.2
321	Textiles	232.1	234.8	233.1	226.5	240.4	298.7	310.2	326.2	355.2	397.7	416.4
322	Garments	15.7	20.2	24.1	29.4	35.9	69.7	66.1	79.7	107.5	129.5	243.1
323	Leather products	3.1	2.8	2.9	3.1	3.2	4.4	4.0	4.3	5.8	6.9	13.0
324	Footwear	7.6	7.5	6.4	6.3	6.8	8.9	8.7	8.7	15.8	25.2	59.6
331	Wood products	59.2	65.9	91.4	113.0	166.3	169.3	168.6	196.4	276.8	317.4	326.3
332	Furniture	5.8	5.3	5.5	5.9	5.7	12.6	12.9	14.4	21.9	26.8	79.9
341	Paper products	11.9	13.2	14.5	14.3	13.8	21.6	25.2	26.5	30.5	34.1	43.3
342	Printing and publishing	20.0	21.2	22.8	22.7	21.9	35.1	37.4	35.5	37.9	39.0	43.6
351	Basic chemicals	13.9	16.6	20.5	20.9	23.1	36.9	36.3	36.2	39.5	41.3	50.4
352	Other chemicals	41.0	45.7	49.6	52.2	52.7	68.1	68.2	69.3	75.1	76.7	84.6
355	Rubber products	37.0	38.4	38.1	38.4	40.0	94.2	90.6	96.1	119.8	128.3	165.9
356	Plastics	17.8	20.5	24.3	29.3	31.1	49.4	50.3	53.1	62.7	70.7	82.1
361	Pottery and china	6.8	7.4	8.2	9.4	10.3	12.3	11.9	12.6	16.2	17.7	23.7
362	Glass products	8.9	9.5	10.2	10.1	9.8	10.5	10.1	10.8	11.7	12.3	14.1
363	Cement	20.0	21.9	22.0	24.4	23.6	34.7	29.5	31.4	33.8	34.5	35.4
364	Structural clay products	8.0	8.7	9.4	9.0	8.5	23.6	22.4	20.2	22.0	21.9	22.6
369	Other non-metallic minerals	2.9	2.7	3.3	3.1	3.5	7.8	7.2	7.5	13.3	22.4	18.2
371	Basic metals	8.8	9.5	10.1	12.9	14.0	15.6	16.9	16.8	19.6	21.2	32.7
381	Metal products	41.1	44.0	44.3	45.3	43.1	59.4	59.1	61.3	68.0	72.8	80.7
382	Non-electrical machinery	12.1	12.7	13.0	12.7	12.8	16.6	16.3	15.5	16.8	19.7	30.6
383	Electrical equipment	37.4	38.8	36.9	37.2	36.6	43.6	38.7	39.9	45.5	53.0	59.8
384	Transport equipment	30.0	35.9	44.5	46.1	42.9	57.6	65.1	66.4	69.1	75.7	86.6
385	Professional equipment	1.0	1.0	1.0	1.0	1.5	2.2	2.4	2.7	2.9	3.5	3.4
390	Miscellaneous	5.8	6.6	7.6	7.9	8.6	12.0	13.4	13.6	19.9	22.2	30.6
Total		969.2	1,011.8	1,067.0	1,119.6	1,197.8	1,684.7	1,691.4	1,788.3	2,064.7	2,259.2	2,662.0
Light industry[b/]		725.4	744.1	779.7	821.1	901.8	1,274.1	1,282.2	1,371.2	1,600.7	1,752.3	2,075.9
Heavy industry[b/]		122.4	135.3	147.7	156.3	159.2	231.3	227.6	231.3	261.7	282.2	325.1
Heavy engineering[b/]		121.5	132.4	139.7	142.3	136.8	179.4	181.6	175.7	202.2	224.6	261.1

Source Government of Indonesia, Central Bureau of Statistics, *Statistik Indonesia*

a. Census

b. Defined as follows: light industry - ISIC 31, 32, 33, 342, 355, 356, 39; heavy processing industry - ISIC 341, 351, 352, 36, 37; heavy engineering industry - ISIC 38

Annex Table A-27. Industrial labour force by education, 1976-1990, selected years
(Thousand persons)

	1976	1980	1982	1985	1988	1989	1990
No schooling	1,203.4	1,040.0	1,495.2	1,029.7	596.2	774.2	879.2
Not completed elementary school	1,490.3	1,639.9	2,006.4	1,870.2	1,319.1	1,531.6	1,647.6
Elementary school	936.8	1,104.3	1,753.4	1,825.9	2,279.1	2,540.5	2,947.1
Junior High School	206.4	305.5	403.8	523.8	773.5	827.8	1,062.5
General	160.8	232.5	301.9	422.1	659.7	725.1	920.8
Vocational	45.5	73.0	101.9	101.7	113.8	102.7	141.7
Senior High School	117.9	246.1	337.9	499.5	844.0	773.9	1,049.6
General	63.8	124.6	144.8	263.6	502.9	459.5	621.2
Vocational	54.1	121.4	193.2	235.9	341.1	314.4	428.4
Diploma and academy	9.2	14.1	13.0	27.4	61.3	37.5	64.6
University	4.1	9.9	10.9	19.3	25.4	11.4	42.6
No response	0.0	0.9	1.3	0.0	0.0	0.0	0.0
Total	**3,968.2**	**4,360.7**	**6,021.9**	**5,795.9**	**5,898.6**	**6,496.7**	**7,693.3**
Primary or less	3,630.6	3,784.3	5,255.0	4,725.9	4,194.4	4,846.2	5,474.0
Secondary	324.3	551.6	741.8	1,023.3	1,617.5	1,601.6	2,112.1
Tertiary	13.3	23.9	23.9	46.7	86.6	48.9	107.2

Source: Government of Indonesia, Central Bureau of Statistics, *Statistical Pocket book of Indonesia.*

Annex Table A-28. Industrial labour force by status and sex, 1971-1989, selected years
(Thousand persons)

	1971	1976	1977	1978	1980	1982	1985	1986	1988	1989
Employers and own account workers	**917.7**	**1,152.6**	**1,202.5**	**1,407.0**	**1,893.2**	**1,073.5**	**1,838.8**	**1,649.6**	**1,752.3**	**2,127.1**
Male	399.4	601.5	555.3	561.6	985.4	403.5	928.4	754.6	826.8	991.5
Female	518.3	551.0	647.2	845.4	907.8	670.0	910.4	894.9	925.5	1,135.6
Paid employees and wage earners	**1,559.7**	**1,599.4**	**2,390.3**	**1,935.4**	**2,228.2**	**3,938.5**	**3,094.9**	**3,105.5**	**3,366.3**	**4,009.5**
Male	1,037.0	1,079.6	1,491.7	1,248.0	1,440.3	2,481.2	2,023.1	2,113.2	2,250.0	2,616.9
Female	522.8	519.8	898.6	687.4	787.9	1,457.3	1,071.9	992.3	1,116.3	1,392.5
Family workers	**475.2**	**805.4**	**578.0**	**513.2**	**534.4**	**1,010.0**	**858.5**	**841.4**	**878.1**	**1,198.3**
Male	93.9	201.0	149.7	125.9	145.4	254.2	216.0	219.6	225.1	316.9
Female	381.4	604.3	428.4	387.2	389.1	755.8	642.5	621.8	652.9	881.4
Others	**0.0**	**2.7**	**0.5**	**0.0**	**24.2**	**0.0**	**3.7**	**9.5**	**0.0**	**0.0**
Male	0.0	0.5	0.0	0.0	13.0	0.0	2.6	7.5	0.0	0.0
Female	0.0	2.2	0.5	0.0	11.2	0.0	1.1	2.0	0.0	0.0
Total	**2,952.6**	**3,560.1**	**4,171.3**	**3,855.6**	**4,680.1**	**6,021.9**	**5,795.9**	**5,606.0**	**5,996.7**	**7,334.9**
Male	1,530.2	1,882.7	2,196.6	1,935.5	2,584.2	3,138.9	3,170.1	3,094.9	3,302.0	3,925.3
Female	1,422.4	1,677.3	1,974.7	1,920.0	2,095.9	2,883.1	2,625.8	2,511.0	2,694.7	3,409.6

Source: ILO, *Yearbook of Labour Statistics*, various issues, Table 2A

Annex Table A-29. Labour productivity (MVA per employee) by ISIC, 1980-1990
(Million Rp)

ISIC		1980	1981	1982	1983	1984	1985[a]	1986	1987	1988	1989	1990
311	Food products	1.6	2.4	2.5	2.7	3.0	3.5	3.3	3.6	4.8	5.1	10.2
312	Food products	1.0	1.3	1.3	1.6	2.4	2.3	3.3	3.1	3.4	6.5	5.3
313	Beverages	4.4	5.3	7.2	9.4	9.2	7.4	8.3	9.8	10.7	9.8	15.3
314	Tobacco	2.6	3.0	3.1	3.4	4.2	4.0	5.4	6.6	6.8	9.2	11.1
321	Textiles	1.1	1.2	1.5	1.5	2.4	2.6	3.4	3.4	3.5	5.3	5.6
322	Garments	0.6	0.8	1.3	1.5	2.0	1.7	2.5	2.2	2.5	3.3	3.4
323	Leather products	1.1	1.7	2.7	3.2	5.4	3.4	7.3	3.3	4.2	3.4	5.9
324	Footwear	2.2	1.3	1.9	3.5	3.6	3.8	4.8	5.1	4.6	5.7	5.7
331	Wood products	2.5	3.1	2.7	2.6	1.9	4.0	5.4	6.6	6.1	6.8	7.6
332	Furniture	0.6	0.7	0.8	1.0	1.3	1.6	2.1	2.2	2.4	2.9	2.6
341	Paper products	2.7	1.5	2.0	1.8	2.9	5.7	4.4	7.9	12.3	12.0	19.0
342	Printing and publishing	1.6	1.7	2.0	2.1	2.7	2.9	4.6	4.9	5.6	6.1	6.1
351	Basic chemicals	6.6	11.4	10.2	9.9	10.8	12.9	12.6	15.5	18.5	18.7	23.9
352	Other chemicals	3.7	3.7	3.8	3.7	5.2	6.3	6.5	7.5	8.4	9.1	11.0
355	Rubber products	2.8	2.4	2.4	3.2	3.3	3.9	2.9	3.4	4.8	6.1	5.3
356	Plastics	0.9	0.9	1.0	1.3	2.2	3.9	2.3	3.0	3.0	3.2	4.8
361	Pottery and china	0.7	0.9	1.1	1.2	1.3	2.2	2.7	2.7	3.0	4.2	5.4
362	Glass products	2.5	4.6	3.9	4.5	4.9	10.3	11.6	6.7	6.5	7.1	8.4
363	Cement	6.0	6.6	5.8	6.2	7.0	7.3	8.8	10.6	9.2	9.1	15.1
364	Structural clay products	0.4	0.5	0.5	0.6	0.6	0.8	1.0	1.0	1.1	1.2	1.3
369	Other non-metallic minerals	0.5	0.5	0.9	1.7	1.9	2.4	3.6	3.9	2.5	1.8	4.7
371	Basic metals	7.6	8.4	6.7	15.6	35.3	33.3	42.0	61.1	53.4	66.0	61.9
381	Metal products	1.8	1.9	3.1	3.4	4.1	5.2	5.7	6.9	10.3	15.3	8.7
382	Non-electrical machinery	2.8	3.4	4.0	3.8	4.8	5.1	4.2	6.4	7.5	8.5	9.4
383	Electrical equipment	3.0	3.2	4.4	3.6	4.1	6.3	6.5	6.8	6.3	8.5	10.2
384	Transport equipment	4.5	7.7	5.1	4.6	5.8	6.4	7.8	9.7	11.0	15.4	17.4
385	Professional equipment	1.5	0.7	0.9	1.0	1.1	2.0	1.7	2.1	3.0	3.2	4.8
390	Miscellaneous	1.4	1.2	1.3	1.2	1.9	2.2	2.6	2.9	2.9	4.5	3.6
Total		**2.2**	**2.1**	**2.8**	**3.0**	**3.7**	**4.3**	**4.9**	**5.7**	**6.1**	**7.5**	**8.6**
Light industry[b]		1.8	2.1	2.2	2.4	2.8	3.3	3.9	4.4	4.7	5.8	6.7
Heavy industry[b]		4.0	4.9	4.6	5.4	8.1	8.5	9.6	12.2	12.5	13.5	18.1
Heavy engineering[b]		2.9	4.0	4.1	3.9	4.6	5.8	6.4	7.8	9.3	13.0	12.0

Source Government of Indonesia, Central Bureau of Statistics, *Statistik Indastri*

a Census

b Defined as follows: light industry - ISIC 31, 32, 33, 342, 355, 356, 39; heavy processing industry - ISIC 341, 351, 352, 36, 37; heavy engineering industry - ISIC 38

Annex Table A-30. Wages and salaries by ISIC, 1980-1990
(Billion Rp)

ISIC		1980	1981	1982	1983	1984	1985[a/]	1986	1987	1988	1989	1990
311	Food products	60.8	72.9	89.5	108.7	121.6	210.6	227.1	274.8	318.0	416.0	462.0
312	Food products	10.6	14.6	18.0	21.4	28.7	59.5	71.7	85.1	105.9	117.7	152.6
313	Beverages	8.3	8.6	8.7	11.5	13.9	18.4	20.6	21.8	27.2	31.0	33.2
314	Tobacco	33.6	39.3	58.5	72.9	85.9	104.5	109.6	92.5	143.4	176.3	200.1
321	Textiles	77.2	98.5	110.3	125.5	144.9	206.7	236.1	264.3	335.2	415.9	495.6
322	Garments	4.9	8.4	12.1	17.0	24.9	51.0	51.1	70.5	99.5	137.8	288.1
323	Leather products	1.1	1.2	1.5	1.9	2.6	3.4	3.1	4.0	5.8	7.5	14.6
324	Footwear	3.3	5.5	6.0	7.3	8.8	10.6	10.7	12.5	25.1	36.1	212.5
331	Wood products	31.2	38.4	72.3	93.8	117.6	170.3	199.9	258.0	382.9	495.2	564.4
332	Furniture	2.4	2.3	2.8	3.7	4.0	10.3	11.4	13.8	21.7	29.6	88.5
341	Paper products	7.5	10.6	12.8	13.6	15.0	27.2	30.6	37.9	49.2	69.9	101.3
342	Printing and publishing	12.1	14.5	18.8	21.6	27.4	51.2	68.8	73.0	83.5	92.8	111.1
351	Basic chemicals	17.1	21.5	32.6	42.7	50.0	115.7	109.5	120.2	140.9	178.0	241.1
352	Other chemicals	34.1	45.1	62.8	76.2	85.7	138.5	143.6	170.7	210.7	212.7	268.7
355	Rubber products	20.6	24.2	28.9	34.0	44.5	93.9	86.0	139.1	181.7	197.7	266.9
356	Plastics	6.0	8.6	11.5	16.0	20.1	35.8	44.4	54.3	61.0	74.6	97.5
361	Pottery and china	2.5	3.6	5.1	6.4	7.2	11.1	10.8	13.4	18.9	22.4	35.7
362	Glass products	5.7	9.3	12.0	14.0	14.7	17.5	18.3	20.7	23.7	27.3	34.9
363	Cement	14.9	21.1	26.8	32.1	37.8	49.6	49.7	57.6	67.6	68.9	82.9
364	Structural clay products	1.6	2.0	2.6	3.2	2.9	9.2	9.8	9.5	11.0	13.0	14.5
369	Other non-metallic minerals	0.8	1.0	1.7	1.9	2.6	6.3	6.9	7.5	11.6	12.7	22.1
371	Basic metals	8.9	9.2	11.3	20.5	27.0	28.8	48.9	43.9	76.1	91.4	128.9
381	Metal products	21.3	28.1	35.0	41.7	43.7	81.3	84.8	90.8	129.6	134.0	158.3
382	Non-electrical machinery	8.1	10.2	10.7	13.2	15.1	20.8	23.2	27.6	36.7	46.0	77.9
383	Electrical equipment	24.3	29.3	33.8	39.5	46.7	62.3	57.9	67.5	88.8	106.0	149.2
384	Transport equipment	27.5	38.4	57.4	69.2	73.1	105.3	139.5	131.7	158.3	199.0	261.1
385	Professional equipment	0.4	0.4	0.5	0.5	0.7	1.8	2.2	3.4	3.7	4.3	5.6
390	Miscellaneous	2.0	2.6	3.5	4.1	6.2	8.7	11.8	14.1	18.2	28.3	36.6
Total		**448.8**	**569.3**	**747.2**	**914.0**	**1,073.4**	**1,710.2**	**1,888.1**	**2,180.3**	**2,836.1**	**3,442.1**	**4,606.0**
Light industry[b/]		274.1	339.6	442.3	539.4	651.0	1,034.9	1,152.3	1,377.8	1,809.3	2,256.4	3,023.7
Heavy industry[b/]		93.1	123.3	167.5	210.5	242.9	403.9	428.1	481.5	609.7	696.4	930.2
Heavy engineering[b/]		81.6	106.4	137.4	164.2	179.4	271.4	307.6	321.0	417.1	489.3	652.0

Source: Government of Indonesia, Central Bureau of Statistics, *Statistik Industri.*

a/ Census.

b/ Defined as follows: light industry - ISIC 31, 32, 33, 342, 355, 356, 39; heavy processing industry - ISIC 341, 351, 352, 36, 37; heavy engineering industry - ISIC 38.

Annex Table A-31. Gross profits by ISIC, 1980-1990
(Billion Rp)

ISIC		1980	1981	1982	1983	1984	1985[a/]	1986	1987	1988	1989	1990
311	Food products	142.4	225.2	217.6	235.9	261.1	561.1	492.1	554.9	881.4	843.5	2,332.9
312	Food products	22.1	28.8	27.0	37.4	66.3	134.3	226.4	227.9	271.4	616.8	494.6
313	Beverages	23.7	30.4	44.5	66.8	65.6	66.4	77.4	92.9	114.5	91.7	160.1
314	Tobacco	373.2	434.2	440.5	491.6	626.1	718.6	966.4	1,246.7	1,243.2	1,588.0	2,091.0
321	Textiles	186.2	189.3	228.8	223.9	421.2	555.8	810.7	848.6	905.6	1,702.9	1,920.3
322	Garments	4.2	7.2	20.4	27.0	45.9	66.4	111.3	107.0	170.6	289.4	539.6
323	Leather products	2.2	3.5	6.3	8.0	14.6	11.5	26.4	10.3	18.1	15.8	61.4
324	Footwear	13.1	4.4	6.2	15.0	15.5	23.3	31.0	31.5	47.7	108.2	128.8
331	Wood products	118.6	162.6	170.3	196.2	195.8	509.8	712.7	1,045.9	1,301.9	1,669.4	1,918.4
332	Furniture	1.2	1.6	1.8	2.4	3.4	9.8	15.3	17.4	31.7	47.2	120.6
341	Paper products	24.4	9.3	16.7	11.5	25.1	95.3	79.2	171.2	326.6	340.2	719.5
342	Printing and publishing	19.1	21.6	27.7	26.2	31.7	51.1	104.3	101.2	129.2	143.9	154.5
351	Basic chemicals	74.3	167.9	176.4	163.1	199.0	359.1	347.2	440.4	589.0	595.9	963.8
352	Other chemicals	117.2	123.2	125.1	117.8	189.2	292.3	297.6	352.2	421.9	483.4	660.8
355	Rubber products	82.0	66.9	62.7	89.4	88.1	270.5	177.4	192.0	393.7	488.9	604.8
356	Plastics	9.5	9.8	12.9	21.3	47.1	158.5	73.6	106.6	125.5	150.7	297.5
361	Pottery and china	2.6	3.2	4.0	5.2	6.6	15.5	20.8	20.1	29.7	52.7	92.9
362	Glass products	16.8	34.1	27.4	30.9	33.6	91.4	98.9	52.0	52.3	60.4	83.3
363	Cement	105.8	124.7	102.0	118.5	126.9	204.7	210.8	276.2	244.9	243.7	451.4
364	Structural clay products	1.4	2.4	1.8	1.9	2.5	9.3	12.4	10.6	13.5	13.9	14.6
369	Other non-metallic minerals	0.5	0.5	1.4	3.3	4.0	12.5	19.0	22.0	22.1	27.2	62.8
371	Basic metals	58.1	70.3	56.4	180.1	466.3	492.0	661.0	984.9	974.1	1,308.7	1,897.7
381	Metal products	52.9	57.6	100.3	112.7	130.8	227.3	251.2	330.9	569.4	981.3	542.0
382	Non-electrical machinery	25.3	32.7	41.6	35.4	45.7	63.2	45.0	72.0	89.2	121.4	210.9
383	Electrical equipment	88.3	96.6	127.6	94.2	103.3	210.2	194.0	203.6	198.7	344.1	460.7
384	Transport equipment	108.7	239.4	169.4	144.2	175.2	262.5	369.2	511.7	600.5	969.7	1,245.5
385	Professional equipment	1.1	0.3	0.4	0.5	0.8	2.5	1.8	2.3	4.9	7.2	10.3
390	Miscellaneous	6.4	5.5	6.0	5.1	10.3	17.9	22.3	24.8	39.3	71.0	74.4
Total		**1,681.2**	**2,153.0**	**2,223.1**	**2,465.5**	**3,401.9**	**5,493.5**	**6,455.3**	**8,058.1**	**9,810.4**	**13,477.3**	**18,224.4**
Light industry[b/]		1,003.9	1,190.9	1,272.5	1,446.1	1,892.8	3,155.6	3,847.2	4,607.9	5,673.7	7,927.6	10,808.2
Heavy industry[b/]		401.1	535.5	511.2	632.5	1,053.3	1,572.0	1,746.9	2,329.7	2,674.0	3,126.0	4,946.9
Heavy engineering[b/]		276.2	426.7	439.4	387.0	455.8	765.8	861.2	1,120.5	1,462.8	2,432.6	2,469.3

Source: Government of Indonesia, Central Bureau of Statistics, *Statistik Industri*.

a/ Census.

b/ Defined as follows: light industry - ISIC 31, 32, 33, 342, 355, 356, 39; heavy processing industry - ISIC 341, 351, 352, 36, 37; heavy engineering industry - ISIC 38.

Annex Table A-32. UNIDO's approved and/or operational technical cooperation projects

Project title	Project Number
Assistance in the implementation of Indonesian industrial standards in small- and medium-sized industries (see also TF/INS/89/001)	DP/INS/89/001[a/]
Integrated entrepreneurship cum technology development of small-scale rattan industry	DP/INS/89/002[a/]
Institution of preventive maintenance systems in industry	DP/INS/88/024
Rehabilitation and improvement of production operations of industries under local government control (see also TF/INS/89/002)	DP/INS/88/009[a/]
Assistance to P.T. Barata Indonesia towards improved plant operations (continuation of DP/INS/87/004)	DP/INS/88/018[b/]
Establishment of a machine tool design and development centre (MTDDC)	DP/INS/88/030[a/]
Diagnostic survey of the oleo-chemicals industry in Indonesia	US/INS/90/010
Assistance to the Capital Investment Co-ordination Board (BKPM)	DP/INS/83/021[a/]
Pre-investment studies for ASEAN support industries: market studies for three selected industrial sectors	US/INS/89/040
Bankable feasibility study for the erection of a second generation integrated steel mill in West or East Java	US/INS/91/183[b/]

Source: UNIDO, IO/DDG/IPCM.

a/ Large-scale project (= total allotment $150,000 or above).
b/ Total allotment $1 million or above.

ANNEX B
INDUSTRIAL, TRADE AND SERVICES ASSOCIATIONS

INDUSTRIAL, TRADE AND SERVICES ASSOCIATIONS

Adhesive Materials & Glues/Perekat-Bahan

ASOSIASI INDUSTRI FORMALIN & THERMOSETTING ADDESIVE
The Association of Industrial Formalyn & Thermosetting Addesive

- Graha Purnayudha Lt. 6
  Jalan Sudirman 50
  JAKARTA 12930
  Tlp : 520 7772
  Tlx : 62191
  Fax : 513 441

Advertising Agencies/Periklanan

PERSATUAN PERUSAHAAN PERIKLANAN INDONESIA
Indonesian Association of Edvertising Agencies

- Gedung Dewan Pers Lt. 7
  Jalan Kebon Sirih 34
  JAKARTA 10110
  Tlp : 372 880

Aircraft Services/Pesawat Terbang - Servis

INDONESIAN NATIONAL AIRCRAFTERS ASSOCIATION

- Jalan Hayam Wuruk 4 JX
  JAKARTA 10120
  Tlp 351 434, 366 952

Alcohol - Spirits/Alkohol - Spirtus

ASOSIASI ALKOHOL & SPIRTUS
Association of the Alcohol Facturers

- Jalan KH Fachrudin 14
  JAKARTA 10160
  Tlp : 358 852-3
  Tlx : 46206 GULA IA
  Fax : 358 851

Aluminium/Aluminium

FEDERASI INDUSTRI ALUMINIUM INDONESIA
Federation of Indonesian Aluminium Industry

- d/a Aprobali
  Jalan Pinangsia Timur 50
  JAKARTA 674 496

Aluminium Products/Aluminium Barang

ASOSIASI PRODUSEN BARANG ALUMINIUM INDONESIA
Aluminium Goods Manufacturers Association

- Jalan Pinangsia Timur 50
  JAKARTA 11110
  Tlp : 674 496

Appraisal Services/Penilai, Jasa

GABUNGAN PERUSAHAAN PENILAI INDONESIA
Appraisal Services Association

- Jalan Balikpapan I/96
  JAKARTA 10150

Bags/Karung

ASOSIASI PRODUSEN KARUNG INDONESIA
Indonesian Bag Producer Association

- Jalan Biora No. 21
  JAKARTA 10310
  Tlp : 331 407

Asbeston Cement/Asbes Semen

ASOSIASI PABRIK ASBES SEMEN INDONESIA
Asbestos Cement Association Manufacturing

- d/a PT. Harflex Jaya
  Jalan Daan Mogot Km 17,3
  JAKARTA 11730
  Tlp : 610 208
  Tlx : 41396 PT DHI IA
  Fax . 612 950

Coffee/Kopi

ASOSIASI EKSPORTIR KOPI INDONESIA
Association of Indonesian Coffee Exporters

- Jalan Gondangdia Lama 20
  JAKARTA 10350
  Tlp : 342 385, 336, 306

Coldstorage/Kamar Pendingin

ASOSIASI PENGUSAHA COLD STORAGE INDONESIA
Association of Indonesian Tachers & Exporter for Fisheries

- Jala: Kebon Sirih 41
  JAKARTA 10340
  Tlp : 373 701, 322 110
  Tlx : 46433
  Fax : (021) 336 978

Concrete – ready mixed/Beton-siap pakai

ASOSIASI BETON SIAP PAKAI INDONESIA
Ready Mixed Concrete Industry

- Jalan Pegambiran Raya 5B
  JAKARTA 13220

Confectionery & Bakers/Roti & Biskuit

ASOSIASI INDUSTRI ROTI, BISKUIT & MIE
Bread, Biscuit & Noddle Producers Association

- Jalan Kalibesar Timur 27
  JAKARTA
  Tlp : 679 272

Construction-Equipment/Konstruksi Peralatan

ASOSIASI PENGUSAHA ALAT-ALAT KONSTRUKSI INDONESIA
Indonesian Construction Equipment Association

- Jalan Pintu Air 31B
  JAKARTA 10710
  Tlp : 365 143, 365 263, 365 143

Consultants-General/Konsultasi Umum

IKATAN NASIONAL KONSULTAN INDONESIA
National Association of Indonesia Consultant

- Jalan Bendungan Hilir Raya 29
  JAKARTA 10210
  Tlp : 583 474, 588 577

Consultants – Tax/Konsultan Pajak

IKATAN KONSULEN PAJAK
Tax Consultant Association

- Grand Wijaya Center F/62-A
  Jalan Wijaya II
  JAKARTA 12140

Constractors – Electric Works/Kontraktor Listrik

ASOSIASI KONTRAKTOR LISTRIK INDONESIA
The Association of Indonesian Electrical Contractor

- Jalan Gunung Sahari I/42
  JAKARTA 10410
  Tlp : 380 7969, 380 7970

Contractors – General/Kontraktor Umum

ASOSIASI KONTRAKTOR INDONESIA
Indonesian Contractors Association

- Grand Wijaya Center D-1
  Jalan Dharmawangsa Raya
  JAKARTA 12160
  Tlp : 720 2997

Contractors – General/Kontraktor Umum

GABUNGAN PELAKSANA KONSTRUKSI NASIONAL INDONESIA
National Contractor Federation of Indonesia

- Jalan Raya Pasar Minggu Km 17 No 11A
  JAKARTA 12740
  Tlp : 798 1670

Contractors Marine Works/Kontraktor Marin

ASOSIASI JASA TEKNIK MARIN INDONESIA
Under Water & Marine Contraction Engineering Association

- Prince Building II Lt 6/601
  Jalan Jend Sudirman Kav 34
  JAKARTA 10220
  Tlp : 584 346, 570 0413, 586 706 ext 1707

Contractor Water Works/Kontraktor Air

ASOSIASI KONTRAKTOR AIR INDONESIA
The Association of Indonesian Water Works Contractors

- Gedung Inkopal
  Jalan Kramat Raya 27
  JAKARTA 10450
  Tlp : 351 412 – 5, ext 6
  337 868

Cosmetics/Komsetika

PERSATUAN PERUSAHAAN KOSMETIK INDONESIA
Indonesian Cosmetic Manufacturers Association

- Jalan Sapta 68,
  JAKARTA 12870
  Tlp : 829 3501

Courier Services/Kurir, Jasa

ASOSIASI PERUSAHAAN NASIONAL PENGIRIMAN & PENGANTAR BARANG INDONESIA
National Couriers Association

- Kemayoran Building Lt 3/312
  Jalan Kran Raya 11
  JAKARTA 10620
  Tlp : 412 404 ext 758
  Tlx : 49509

Detergent/Deterjen

ASOSIASI PENGUSAHA DETERJEN INDONESIA
Association of Indonesian Detergent Factories

- d/a PT. UNILEVER INDONESIA
  Gedung Menara Duta Lt 6
  Jalan HR Rasuna Said B-9
  JAKARTA 12910
  Tlp : 516 190

Diazo/Diazo

ASOSIASI PRODUSEN DIAZO INDONESIA
Indonesian Diazo Manufacturers Association

- Jalan Angkasa 18
  JAKARTA 10620
  Tlp : 413 508, 417 121

Dyestuff/Bahan Pewarna

ASOSIASI PRODUSEN DYESTUFF INDONESIA
Association of Indonesian Dyestuff Producers

- d/a PT. Hoechst Cilegon Kimia
  Jalan Ahmad Yani 2
  JAKARTA 13210
  Tlp : 489 5467, 489 9564

Electric & Electronic Appliances/Listrik & Elektronik – Peralatan

GABUNGAN PERUSAHAAN INDUSTRI ELEKTRONIKA DAN ALAT-ALAT RUMAH TANGGA INDONESIA
Electric & Electronic Appliances Manufacturer Association

- Jalan KH Zainul Arifin I-D
  JAKARTA 10130
  Tlp : 355 030, 351 131

Electrical Equipment/Listrik Peralatan

ASOSIASI PRODUSEN PERALATAN LISTRIK INDONESIA
Association of Indonesian Electric Industry

- Gajah Mada Plaza Lt. 23
  Jalan Gajah Mada 19 26
  JAKARTA 10130
  Tlp 366 070 ext 2301-2

Electro Plating/Sepuh Listrik

ASOSIASI ELEKTROPLATING INDONESIA
Indonesian Electroplating Association

- Jalan Gunung Sahari 92
  JAKARTA 10610
  Tlp 376 621

Employment Agencies/Tenaga Kerja

ASOSIASI PERUSAHAAN PENGERAH TENAGA KERJA INDONESIA
Indonesian Manpower Supplier Association

- Jalan Gudang Peluru Blok I/227
  JAKARTA 12840
  Tlp 829 4170

Fauna-Flora/Fauna/Flora

INDONESIAN WILD LIFE FAUNA & FLORA TRADE ASSOCIATION

- Jalan Manggarai Selatan 7/F 68
  JAKARTA 12860

Fertilizers/Pupuk

ASOSIASI PRODUSEN PUPUK DAN PETROKIMIA INDONESIA
Indonesian Fertilizers & Petrochemical Manufacturer Association

- Umawar Center
  Jalan Kapt. Tendean 28
  JAKARTA 12710
  Tlp 520 4234, 520 4235
  Tlx 62287
  Fax 520 4235

Fertilizer-Agencies/Pupuk Agen

GABUNGAN AGEN PUPUK NASIONAL INDONESIA
Association of Indonesia National Fertilizer Manufacturers

- d/a Curah Niaga Int. PT
  Jalan Hayam Wuruk 1RST
  JAKARTA 10120
  Tlp 363 616, 366 280

Fibre Natural/Serat Alamiah

ASOSIASI INDUSTRI TALI SERAT ALAMIAH
Association of Natural Fibre Industries

- Jalan KH Hasyim Ashari No. 4
  JAKARTA
  Tlp 363 809 ext 31

Fibre-Natural Kapok/Serat Alamiah-Kapuk

PERSATUAN PERUSAHAAN KAPUK INDONESIA
Indonesian Kapok Association

- Jalan Simpang Lima
  SEMARANG
  Tlp 318 869

Fiber, Synthetic/Serat Buatan

ASOSIASI PRODUSEN SYNTHETIC FIBER INDONESIA
Indonesian Synthetic Fiber Makers Association

- Jalan Bendungan Hilir Raya 19
  JAKARTA 10210
  Tlp

Fiberglass/Serat Kaca

ASOSIASI INDUSTRI FIBERGLASS INDONESIA
Indonesian Fiberglass Manufacturers Association

- d/a Pura Jaya Agung Fiberglass
  Jalan Cikini II.10
  JAKARTA 10330
  Tlp 327 404, 322 082, 337 538
  Tlx 41185
  Fax 323 367

Fishery/Perikanan

HIMPUNAN PENGUSAHA PERIKANAN INDONESIA
Indonesian Fishery Club

- d/a PT Mina Karuka
  Karuka Plaza Lt. 1
  Jalan MH Thamrin 10
  JAKARTA 10230
  Tlp 321 108 ext 1427

Fishery/Perikanan

HIMPUNAN PENGUSAHA PERTAMBAKAN INDONESIA
Fishpond Businessmen Association

- Jalan Kebon Sirih 67
  JAKARTA 10340
  Tlp 327 810 ext 409, 305 3243

Flora Bunga-bungaan

ASOSIASI PENGUSAHA TANAMAN HIAS INDONESIA
Ornamental Plant Cultivators Association

- Jalan Hang Lekir II 19
  JAKARTA 12120
  Tlp 772 047

Flora - Orchids Bunga - Anggrek

PERHIMPUNAN ANGGREK INDONESIA
Indonesian Orchids Society

- Jalan Taman Anggrek
  Pintu Satu Gelora Senayan
  JAKARTA 10270
  Tlp 528 851

Food & Beverage/Makanan & Minuman

FEDERASI INDUSTRI PENGOLAHAN MAKANAN
Federation of Food Processing Industry

- Jalan Pulomas 3I
  JAKARTA 13210
  Tlp 489 0230

Food & Beverage/Makanan & Minuman

GABUNGAN PENGUSAHA MAKANAN & MINUMAN SELURUH INDONESIA
Association of Indonesian Food & Beverage Traders

- Jalan Pahlawan Revolusi 17 A
  JAKARTA 13470
  Tlp 858 0038

Food & Beverage - Additive/Makanan & Minuman - Penyedap

PERSATUAN PABRIK MONOSODIUM GLUTAMATE & GLUTAMIC ACID INDONESIA
Indonesian Monosodium Glutamate & Glutamic Acid Association

- Jalan Mangga Besar Raya 38 BJ
  JAKARTA 11180
  Tlp 630 481, 643 183

Formica & Melamine/Formika & Melamin

ASOSIASI PRODUSEN LEMBARAN MELAMIN/FORMIKA INDONESIA
Indonesian Formica/Melamine Sheets Manufacturers Association

- d/a PT Asca Indonesia
  Jalan MH Thamrin 59 Lt. 14
  JAKARTA 10350
  Tlp 336 791, 336 219

Forwarding Services Ekspedisi, Jasa

GABUNGAN FORWARDER & EKSPEDISI INDONESIA
Indonesian Forwarder Association

- Jalan [illegible] Raya 7
  JAKARTA [illegible]
  Tlp [illegible]

Forwarding Services Ekspedisi, Jasa

PERUSAHAAN EKSPEDISI MUATAN KERETA API
Railway Cargo Expedition Association

- d/a Fa Noge
  Jalan Kampung Bandan 11
  Komplex PJKA
  JAKARTA 11160
  Tlp 675 019

Footwear Sepatu

GABUNGAN PERINDUSTRIAN PERSEPATUAN SELURUH INDONESIA
Indonesian Shoes Manufacturers Association

- Jalan Muara Karang Timur D-7 102
  JAKARTA 14450
  Tlp 669 7508

Furniture Permebelan

ASOSIASI INDUSTRI PERMEBELAN & KERAJINAN INDONESIA
Indonesian Furniture Industry & Handicrafts Association

- Manggala Wanabhakti IV Lt 8
  Jalan Gatot Subroto
  JAKARTA 10270
  Tlp 587 888, 570 0249
  Tlx 45695, 46977
  Fax 581 918, 583 017

Furniture, Office Permebelan – Kantor

GABUNGAN PRODUSEN ALAT-ALAT KANTOR DARI BESI
Office Steel Furniture Manufacturers Association

- d/a Hendri Wibisono
  Jalan Kramat II/15
  JAKARTA 10420
  Tlp 380 3441

Gases, Industrial Gas Industri

ASOSIASI PRODUSEN GAS INDUSTRI INDONESIA
Association of Indonesian Industrial Gases Producers

- Jalan Minangkabau 60
  JAKARTA 12860
  Tlp 829 6108

Glukose/Gula

ASOSIASI INDUSTRI GLUKOSA & GULA INVERSI INDONESIA
Glucose Inversion Sugar Manufacturers Association

- Gedung Sanggabuana
  Jalan Senen Raya 44
  JAKARTA 10420
  Tlp 366 238

Handicrafts Kerajinan

ASOSIASI EKSPORTIR & PRODUSEN HANDIKRAF INDONESIA
Association of Indonesian Exporters & Handicraft Producers

- d/a PT Sannah Jaya
  Jalan Rawa Terate II/2
  JAKARTA 13260
  Tlp 489 4709

Heavy Equipment Machinery Alat-alat & Mesin Besar

HIMPUNAN INDUSTRI ALAT BESAR INDONESIA
Association of Indonesian Heavy Equipment Industry

- d/a PT Natra Raya
  Wisma Metropolitan I/8
  Jalan Sudirman Kav 29
  JAKARTA 12920
  Tlp 578 0508, 578 2319

Heavy Equipment & Machinery Alat-alat & Mesin Besar

PERHIMPUNAN AGEN TUNGGAL ALAT-ALAT BESAR INDONESIA
Association of Indonesian Heavy Machinery Sole Agents

- Case Building Fl IV/16
  Jalan Gatot Subroto Kav 12
  JAKARTA 12930
  Tlp 510 513
  Tlx 62086, 62 326
  Fax 510 061

Hotel & Restaurant Hotel & Restoran

PERHIMPUNAN HOTEL DAN RESTORAN INDONESIA
Indoensian Hotel & Restaurant Association

- Gedung Nugra Santana Lt 4
  Jalan S. Parman Kav 75
  JAKARTA 11410
  Tlp 560 0717
  Tlx 45564

Ice/es

IKATAN PENGUSAHA INDUSTRI ES INDONESIA
Indonesian Ice Manufacturers Association

- Jalan Baturaja
  Gang Muara Baru 3
  JAKARTA 10230
  Tlp 322 273

Insurance Asuransi

DEWAN ASURANSI INDONESIA
Indonesian Insurance Council

- Jalan Majapahit 34 Blok V 29
  JAKARTA 10160
  Tlp 363 264, 354 307

Iron-Sheet, Galvanized Seng Lembaran

GABUNGAN PABRIK SENG SELURUH INDONESIA
Association of Indonesian Galvanized Iron Sheet Manufacturers

- d/a PT Budidarma
  Wisma Argo Manunggal Lt 9
  Jalan Gatot Subroto Kav 22
  JAKARTA 12930
  Tlp 514 756, 514 778
  Tlx 62737

Lamp, Kerosene Lampu Tekan

ASOSIASI PRODUSEN LAMPU TEKAN INDONESIA
Pressured Kerosene Lamp Manufacturers Association

- d/a PT Star Angkasa Metal Factory
  Jalan Rava Rungkut
  SURABAYA
  Tlp 816 142

Leasing Services Sewa Guna, Jasa

ASOSIASI LEASING INDONESIA
Indonesian Leasing Companies Association

- d/a PT Bunas Intitama Leasing Indonesia
  Gedung Bank Umum Nasional Lt 3
  Jalan Melawai Raya 10
  JAKARTA 12160
  Tlp 718 002, 718 004, 718 094
  Tlx 47236
  Fax 718 108

Leathers/Kulit

FEDERASI PERKULITAN INDONESIA
Federation of Leathers Industry

- Jalan Keselamatan 33
  JAKARTA 11130
  Tlp . 629 2260
- Jalan Ngasem 10
  YOGYAKARTA
  Tlp . 2759

Leather, Imitation/Kulit Imitasi

GABUNGAN PABRIK KULIT IMITASI SELURUH INDONESIA
Indonesian Imitation Leather Manufacturers Association

- Pasar Biora Lt. III/9
  Jalan Kendal
  JAKARTA 10310
  Tlp . 320 414

Leather - Tanning/Kulit - Penyamakan

ASOSIASI PENYAMAKAN KULIT INDONESIA
Indonesian Tanners Association

- Jalan Keselamatan 33
  JAKARA 11140
  Tlp : 629 2260
- Jalan Jembatan Dua 44
  JAKARTA 14450
  Tlp . 669 3850

Matches/Korek Api

GABUNGAN PERUSAHAAN KOREK API INDONESIA
Safety Match Manufacturers Association

- Gedung Tifa Lt. 5
  JAKARTA 12710
  Tlp . 511 373

Metal Works & Machinery/Industry Logam & Permesinan

GABUNGAN INDUSTRI PENGERJAAN LOGAM & MESIN
Federation of Indonesian Metal Works & Machinery Industries

- GAMMA
  Plaza Selatan A-Kav BSA 48
  Arena Pekan Raya
  JAKARTA 10110
  Tlp . 377 008 ext. 239/361

Metals, Scrapp/Besi Tua

ASOSIASI PENGUSAHA LOGAM TUA INDONESIA
Scrapp - Iron Traders Association

- Jalan Siup 15
  JAKARTA 13230
  Tlp . 881 282

Milk & Milk Products/Susu & Produk Susu

ASOSIASI INDUSTRI SUSU INDONESIA
Milk Processing Industries Association

- Jalan Pulomas Raya 31
  JAKARTA 13210
  Tlp . 489 0230

Mining - Coal/Tambang - Batubara

ASOSIASI PERTAMBANGAN BATUBARA INDONESIA
Indonesian Coal Mining Association

- d/a Perum Tambang Batubara
  Jalan Prof. Supomo 10
  JAKARTA 12870
  Tlp . 829 5608 ext. 284, 829 3632
  Tlx : 48203
  Fax 829 7642

Mining - Marble/Tambang - Marmer

ASOSIASI PRODUSEN MARMER INDONESIA
Indonesian Marble Producers Association

- Jalan Buncit Raya 28-BC
  JAKARTA 12510
  Tlp . 799 8898

Mining - Phosphate/Tambang - Pospat

ASOSIASI POSPAT INDONESIA
Phospate Mining & Industries Association

- Jalan Sam Ratulangi 10
  JAKARTA 10350
  Tlp . 326 607

Mining - Silicate Sands/Tambang - Pasir Kuarsa

ASOSIASI TAMBANG PASIR KUARSA INDONESIA
Silicate Sands Miners Association

- Jalan Matraman Dalam II/50 A
  JAKARTA 10320
  Tlp . 881 256

Mining - Precious Metals/Tambang - Logam Mulia

ASOSIASI LOGAM MULIA INDONESIA
Indonesian Precious Metals Association

- d/a Ir. Rachman W.
  PN Timah
  Jalan Gatot Subroto Kav 49
  JAKARTA 12950
  Tlp . 512 955, 510 731

Money Changers/Valuta Asing, Pedagang

ASOSIASI PEDAGANG VALUTA ASING
Indonesian Money Changers Association

- Jalan Sutan Syahrir 1-C/F Lt. 3
  JAKARTA 10350
  Tlp . 323 303, 324 697, 332 739 ext. 18

Motor Car - Manufacturers/Kendaraan Bermotor - Produsen

GABUNGAN AGEN TUNGGAL & INDUSTRI KENDARAAN BERMOTOR INDONESIA
Association of Indonesian Automotive Industries

- Jalan HOS Cokroaminoto 6
  JAKARTA 10350
  Tlp . 332 100

Motor Car-Body Manufacturers/Kendaraan Bermotor - Karoseri

ASOSIASI INDUSTRI KAROSERI INDONESIA
Motorcar Body Manufacturers Association

- Kompleks Gedung Wisma Indra
  Jalan Suprapto 60
  JAKARTA 10520
  Tlp :

Motor Car - Spareparts/Kendaraan Bermotor — Suku Cadang

GABUNGAN INDUSTRI ALAT-ALAT MOBIL & MOTOR
Association of Automotive Component & Part Manufacturers

- Artanes Building G-6 Lt. 1
  Jalan Ahmad Yani 2
  JAKARTA 13210
  Tlp : 489 8118 ext. 292/296

Motor Cycle/Sepeda Motor

PERHIMPUNAN ASSEMBLER & MANUFACTURERS SEPEDA MOTOR INDONESIA
Association of Indonesian Motor Cycle Assemblers & Manufacturers

- Gajahmada Tower Lt. 19
  Jalan Gajahmada 19-26
  JAKARTA 10130
  Tlp : 366 070 ext. 2361-3

Nutmegs/Pala

ASOSIASI EKSPORTIR PALA INDONESIA
Indonesian Nutmegs Exporters Association

- Wisma Abadi Lt. 3 C-4
  Jalan Cideng 29-31
  JAKARTA 10160
  Tlp : 356 408, 356 409

Office Equipment/Peralatan Kantor

GABUNGAN AGEN TUNGGAL MESIN KANTOR INDONESIA
Indonesian Association of Sole Agents for Office Machines

- d/a Metro Data
  Wisma Metropolitan I Lt 16
  Jalan Sudirman Kav 29 31
  JAKARTA 12920
  Tlp 510 109, 578 2010

Packaging/Pengemasan

FEDERASI PENGEMASAN INDONESIA
Indonesian Packaging Federation

- Jalan Kamboja 62
  JAKARTA 11440
  Tlp 598 917, 592 266

Packaging – Rotopackaging/Pengemasan-Rotokemas

ASOSIASI ROTOKEMAS INDONESIA
Association of Corrugated Cardboard Industries of Indonesia

- d/a PT Guru Indonesia
  Jalan Raya Bogor Km 26
  JAKARTA 16416
  PO Box 278 JKT
  Tlp 870 621

Optical/Optik

GABUNGAN PENGUSAHA OPTIK INDONESIA
Indonesia Optical Association

- Jalan Panglima Polim Raya 125 A
  JAKARTA 12160
  Tlp 714 787

Paint/Cat

GABUNGAN PENGUSAHA INDUSTRI CAT INDONESIA
Indonesian Paint Manufacturers Association

- Jalan Menteng Raya 27
  JAKARTA 10340
  Tlp 352 531

Palm Oil/Minyak Kelapa Sawit

GABUNGAN PENGUSAHA KELAPA SAWIT INDONESIA
Indonesian Palm Oil Producers Association

- Jalan Pulomas III D/1
  JAKARTA 13210
  Tlp 489 2635
- Jalan Katamso 62/1
  MEDAN
  Tlp 518 814
  Tlx 51534

Papers & Pulp/Kertas & Pulp

ASOSIASI PULP DAN KERTAS INDONESIA
Indonesian Pulp & Paper Association

- Jalan Cemara 6 Flat I/2
  JAKARTA 10330
  Tlp 326 084
  Tlx 61830

Peppers/Lada

ASOSIASI EKSPORTIR LADA INDONESIA
Association of Indonesian Pepper Exporters

- Jalan Roa Malaka Selatan 35
  JAKARTA 11230
  Tlp 675 765

Pesticides/Pestisida

ASOSIASI PERUSAHAAN PERINDUSTRIAN PESTISIDA INDONESIA
Association of Indonesia Pesticide Industries

- Jalan Sasingamangaraja 14
  JAKARTA 12110
  Tlp 714 845

Petroleum & Gas/Minyak & Gas Bumi

GABUNGAN PENGUSAHA SWASTA MINYAK & GAS BUMI
Oil & Gas Retailing Agencies Association

- Glodok Baru IV D-7
  Jalan Hayam Wuruk 118
  JAKARTA 11170
  Tlp 655 139

Petroleum & Gas – Drilling/Minyak & Gas – Pemboran

ASOSIASI PEMBORAN MINYAK & GAS BUMI INDONESIA
Indonesian Oil & Gas Drilling Association

- Wisma Kosgoro Lt 17
  Jalan MH Thamrin 53
  JAKARTA 10350
  Tlp 322 719, 322 098 ext 271, 277
  Tlx 61121

Pharmacies/Farmasi

GABUNGAN PERUSAHAAN FARMASI
Federation of Pharmaceutical Enterprises of Indonesia

- Jalan Mangga Besar Raya 183
  JAKARTA 11180
  Tlp 639 5031

Photography – Laboratoria Fotografi – Laboratorium

ASOSIASI LABORATORIUM FOTO BERWARNA INDONESIA
Indonesian Photographic Laboratories Association

- Jalan Mangga Besar 7/3
  JAKARTA 11180
  Tlp 636 404

Photography – Manufacturers Fotografi – Produsen

ASOSIASI INDUSTRI FOTOGRAFI INDONESIA
Photographical Goods Manufacturers Association

- Gedung Sanggabuana
  Jalan Senen Raya 44
  JAKARTA 10420
  Tlp 366 208

Plastics/Plastik

FEDERASI INDUSTRI PLASTIK INDONESIA
Federation of Plastics Industryes Association

- Jalan Jembatan Dua 22
  JAKARTA
  Tlp 662 322

Plastics – Raw Material/Plastik – Bahan Baku

ASOSIASI PRODUSEN BAHAN BAKU PLASTIK INDONESIA
Plastic Raw-Material Manufacturers Association

- d/a PT Statomer
  Wisma BCA Lt 15
  Jalan Sudirman 22
  JAKARTA 12920
  Tlp 578 2646, 578 0366 ext 2504 5

Plastics – Pipe/Plastik – Pipa

ASOSIASI PRODUSEN PIPA PLASTIK
Plastic Pipe Manufacturers Association

- d/a PT Ruciika Plastic Industries
  Majapahit Permai Blok B/149
  Jalan Majapahit 18 20
  JAKARTA 10160
  Tlp 380 2709, 380 2790

Plastics Products/Plastik – Barang barang

ASOSIASI INDUSTRI PLASTIK INDONESIA
Indonesian Plastic Manufacturers Association

- d/a PT Mada Wikri Tunggal
  Jalan Kesatuan II/25
  JAKARTA 13150
  Tlp 881 217, 881 221

Plastics - Weaving Products/Plastik - Tenunan

GABUNGAN INDUSTRI ANEKA TENUN PLASTIK INDONESIA
Plastic Weaving Products Manufacturers Association

- Jalan Tulodong Bawah C 11
  JAKARTA 12190
  Tlp 7395554

Plywood - Tape/Kayulapis, Pita

ASOSIASI PRODUSEN PITA KAYU LAPIS INDONESIA
Plywood Tape Manufacturers Association

- Jalan Cimanu 10
  JAKARTA 10310
  Tlp 323512

Poultry/Unggas-Peternakan

GABUNGAN PETERNAKAN & PEMBIBITAN UNGGAS INDONESIA
Poultry Farms & Breeders Association

- d.a Unit Peternakan Ayam DKI Jaya
  Jalan Raya Pejaten I
  JAKARTA 12510
  Tlp 7994215

Precious Metals/Logam Mulia

ASOSIASI LOGAM MULIA INDONESIA
Indonesian Precious Metal Association

- d.a Ir. Rachman W
  PT. Timah
  Jalan Gatot Subroto Kav. 49
  JAKARTA 12950
  Tlp 512955 510731

Printers/Perusahaan Grafika

PERSATUAN PERUSAHAAN GRAFIKA INDONESIA
Graphic & Printer Association

- Jalan Pondok Jaya VI A
  JAKARTA 12720
  Tlp 7995336

Publishers/Penerbit

IKATAN PENERBIT INDONESIA
Indonesian Publishers Association

- Jalan Kalipasir 32
  JAKARTA 10330
  Tlp 321907

Radio-Stations/Radio-Pemancar

PUSAT PERSATUAN RADIO SIARAN SWASTA NIAGA INDONESIA
Association of Indonesian Radio Broadcasts

- Gedung Dewan Pers
  Jalan Kebon Sirih 34
  JAKARTA 10110
  Tlp 353177

Real Estate/Real Estate

PERSATUAN REAL ESTATE INDONESIA
Indonesian Real Estate Association

- Jalan Pejambon 7
  JAKARTA 10110
  Tlp 374893, 3805040, 3805041

Recreation Parks/Taman Rekreasi

PERHIMPUNAN OBJEK WISATA INDONESIA
Indonesian Association of Amusement & Recreation Parks

- Gedung Balai Samudra Lt. 2
  Jalan Pasar Putih I
  JAKARTA 14420
  Tlp 680084
  Tlx 42483

Records, Manufacturers/Rekaman, Produsen

ASOSIASI INDUSTRI REKAMAN INDONESIA
Association of Indonesian Recording Companies

- Glodok Plaza C I/1
  Jalan Pinangsia Raya
  JAKARTA 11110
  Tlp 6393453

Rubber/Karet

FEDERASI INDUSTRI KARET INDONESIA
Federation of Rubber Industries

- Graha Purnayudha Lt 6
  Jalan Sudirman 50
  JAKARTA 12930
  Tlp 510 909 ext 1260 2
  Fax 514 123

Rubber-Products/Karet-Barang

ASOSIASI INDUSTRI BARANG-BARANG KARET INDONESIA
Indonesian Rubber Goods Manufacturers Association

- Wisma Hayam Wuruk Lt. 9
  Jalan Hayam Wuruk 8
  JAKARTA 10120
  Tlp 358302-4, 358317
  Tlx 42764
  Fax 358918

Rubber, Crumb/Karet

GABUNGAN PENGUSAHA KARET INDONESIA
Rubber Association of Indonesia

- Jalan Cideng Barat 62 A
  JAKARTA 10150
  Tlp 346811 3
  Tlx 44963
  Fax 346 811

Saccharine/Sakarin

ASOSIASI SACCHARINE, SODIUM & CALSIUM CITRAT INDONESIA
Saccharine Sodium & Calcium Citrate Producers Association

- Jalan Mangga Besar Raya 38 B
  JAKARTA 11180
  Tlp 630481 643183

Salt-Iodized/Garam Beryodium

ASOSIASI PRODUSEN GARAM KONSUMSI BERYODIUM
Association of Consumption Iodized Salt Producers

- Jalan Kramat Raya 22
  JAKARTA 10450
  Tlp 357299 377750

Ship Builders-Services/Kapal, Galangan

IKATAN PERUSAHAAN INDUSTRI KAPAL NASIONAL INDONESIA
Indonesian National Shipbuilding Industry Association

- Jalan Hayam Wuruk 4 JX
  JAKARTA 10120
  Tlp 351434

Rubber/Karet

FEDERASI INDUSTRI KARET INDONESIA
Federation of Rubber Industries

- Graha Purnayudha Lt 6
  Jl Sudirman 50
  JAKARTA 12930
  Tlp 510 909 ext 1260-2
  Fax 514 123

Rubber – Products/Karet – Barang

ASOSIASI INDUSTRI BARANG - BARANG KARET INDONESIA
Indonesian Rubber Goods Manufacturers Association

- Wisma Hayam Wuruk Lt 9
  Jl Hayam Wuruk 8
  JAKARTA 10120
  Tlp 358302-4, 358917
  Tlx 42764
  Fax 358918

Rubber, Crumb/Karet

GABUNGAN PENGUSAHA KARET INDONESIA
Crumb-rubber Industries Association

- Jl Cideng Barat 67 A
  JAKARTA 10150
  Tlp 346811-3

Saccharine/Sakarin

ASOSIASI SACCHARINE, SODIUM & CALSIUM CITRAT INDONESIA
Saccharine, Sodium & Calcium Citrate Producers Association

- Jl Mangga Besar Raya 38 B
  JAKARTA 11180
  Tlp 630481 643183

Salt – Iodized/Garam Beryodium

ASOSIASI PRODUSEN GARAM KONSUMSI BERYODIUM
Iodized Salt Producers Association

- Jl Kramat Raya 22
  JAKARTA 10450
  Tlp 357299, 377750

Ship Builders/Services/Kapal, Galangan

IKATAN PERUSAHAAN INDUSTRI KAPAL NASIONAL INDONESIA
National Ship builders Association

- Jl Hayam Wuruk 4 JX
  JAKARTA 10120
  Tlp 351434

Shipping/Pelayaran

INDONESIAN NATIONAL SHIP – OWNERS ASSOCIATION

- Jl Tanah Abang III/10
  JAKARTA 10160
  Tlp 370998, 376694, 375922

Shipping/Pelayaran

PERSATUAN PENGUSAHA PELAYARAN RAKYAT INDONESIA
Inter insular Sailboat Owner Association

- Jl Raya Pinisi 6
  JAKARTA 14440
  Tlp 672144

Soap/Sabun

ASOSIASI INDUSTRI SABUN INDONESIA
Soap Producers Association

- Jl Mangunsarkoro 22
  JAKARTA 10310
  Tlp 331124

Soybean – Cheese/Tahu – Tempe

IKATAN PENGUSAHA TAHU – TEMPE INDONESIA
Soybean Cheese Producers Association

- Jl Tebet Timur Dalam II/12
  JAKARTA 12820
  Tlp 8295628, 8298303
  Fax 8298629

Steel – Products/Baja

ASOSIASI ANEKA BAJA SELURUH INDONESIA
Association of Multifarious Steel Products

- Jl Piano L 9
  JAKARTA 14240
  Tlp 483846

Steel Mills/Baja, Pabrik

GABUNGAN PABRIK BESI BAJA INDONESIA
Steel Factories Association

- Wisma Agro Manunggal
  Jl Gatot Subroto
  JAKARTA 12930

Sugar/Gula

ASOSIASI GULA INDONESIA
Indonesian Cane Sugar Association

- Jl RM Fachruddin 14
  JAKARTA 10130
  Tlp 358851, 358852

Surfactant/Surfactant

ASOSIASI PRODUSEN BAHAN SURFACTANT INDONESIA
Surfactant Producers Association

- d.a PT Unilever Indonesia
  Gedung Mentara Duta
  Jl HR Rasuda Said Kav 9
  JAKARTA 12910
  Tlp 516190, ext 341
  Tlx 46082

Surveying & Mapping Services/Survei & Pemetaan

ASOSIASI PERUSAHAAN SURVEI & PEMETAAN INDONESIA
Surveying & Mapping Services Association

- Jl Bunga IV/20-A
  JAKARTA 12760

Surveyors – General/Surveyor – Umum

ASOSIASI INDEPENDENT SURVEYOR INDONESIA
Association of Indonesian Independent Surveyors

- c/o PT Beckjonndo Paryaweksana
  Gedung Setiabudi I, 4 B
  Jl HR Rasuna Said
  JAKARTA 12920
  Tlp 5207714, 5207538
  Tlx 62291
  Fax 516052

Tapioca/Tapioka, Tepung

ASOSIASI TEPUNG TAPIOKA INDONESIA
Cassava & Tapioca Flour Producers Association

- Jl MI Ridwan Rais 7
  JAKARTA 10110
  Tlp 359951, 36128*

Tea/Teh

ASOSIASI TEH INDONESIA
Tea Producers Association

- Jl Juanda 107
  BANDUNG
  Tlp 81049, 82389

Technical Inspection Services/Teknik. Inspeksi

ASOSIASI PERUSAHAAN INSPEKSI TEKNIK INDONESIA
Technical Inspection Services Association

- Jl. Panglima Polim Raya 39
  JAKARTA 12160
  Tlp 7201770-1 7201524
  Tlx 46635

Telecommunication – Equipment & Services/ Telekomunikasi – Peralatan & jasa

ASOSIASI PERUSAHAAN NASIONAL TELEKOMUNIKASI
Telecommunication Industries & Services Association

- Bank Bumi Daya Plaza Lt. 24
  Jl. Imam Bonjol 61
  JAKARTA 10310
  Tlp 3103075

Textile/Tekstil

FEDERASI INDUSTRI TEKSTIL INDONESIA
Federation of Textile Industries Association

- Jl. Iskandarsyah II/90
  JAKARTA

Textile – Garment/Tekstil – Garmen

APPAREL MANUFAKTURER INDONESIA
Association of Apparel Manufacturers

- Jl. Bumi 54
  JAKARTA 12140

Textile – Weaving/Tekstil – Tenun

GABUNGAN USAHA PERUSAHAAN TENUN NASIONAL INDONESIA
Weaving Fabrics Manufacturers Association

- Jl. Tempelrejo VI/34
  SURAKARTA
  Tlp 3987

Textile – Weaving/Tekstil – Tenun

ASOSIASI PERTENUNAN INDONESIA
Weaving Industries Association

- Jl. Wijaya Timur II/12
  JAKARTA 12120
  Tlp 771818

Textile – Yarn Spinning/Tekstil – Pemintalan

ASOSIASI SEKTORAL KEBERSAMAAN PEMINTALAN
Yarn Spinning Industries Association

- Jl. Iskandarsyah II/90
  JAKARTA

Toot-Brush/Sikat Gigi

ASOSIASI PABRIK SIKAT GIGI & NILON INDONESIA
Toot Brush & Nylon Manufacturers Association

- d/a PT. Pratama Bpaksana
  Manggalan Wanabhakti. Lt. 5/517
  Jl. Gatot Subroto
  JAKARTA 10270
  Tlp 582798

Tooth-paste/Pasta gigi

ASOSIASI INDUSTRI PASTA GIGI INDONESIA
Toot paste Manufacturers Association

- Kampung Melayu Kecil I/28
  JAKARTA 12840
  Tlp 8296645

Trade – Exporters/Perdagangan – Eksportir

GABUNGAN PERUSAHAAN EKSPORTIR INDONESIA
Indonesian Exporters Association

- d/a Jl. Biora 21
  JAKARTA 10310
  Tlp 331407

Trade – Government Suppliers/Perdagangan Rekanan Pemerintah

ASOSIASI REKANAN & DISTRIBUTOR INDONESIA
Government Supplier & Distributors Association

- Perkantoran Harmoni Mas
  Jl. Suprapto 504 J
  JAKARTA 10520
  Tlp 419293. 4202355
  Tlx 49541

Trade – Importers/Perdagangan – Importir

GABUNGAN IMPORTIR NASIONAL SELURUH INDONESIA
Importers Association of Indonesia

- Jl. Kesejahteraan 98
  Arena Pekan Raya
  JAKARTA 10110
  Tlp 360643
  Tlx 46793

Trade – Military Suppliers/Perdagangan – Rekanan Hankam

ASOSIASI PERUSAHAAN PENYEDIAAN HANKAM
Military & Defence Suppliers Association

- Jl. Kayu Putih Utara A/11
  JAKARTA 13210
  Tlp 4890063

Trade – Retailing Business/Perdagangan Eceran

GABUNGAN PENGUSAHA ECERAN NASIONAL SELURUH INDONESIA
Retailing Business Association

- Jl. Kramat Pulo Dalam I B.87
  JAKARTA 10450
  Tlp 350302. 350886

Trade – Retail Business Perdagangan – Eceran

ASOSIASI PUSAT PERTOKOAN & PEMBELANJAAN
Shoping Centers Association

- Pasar Baru Plaza Lt. 2
  Jl. Pasar Baru 41-43
  JAKARTA 10710
  Tlp 365220. 366181; ext. 88

Wood-based industries/Kayu. industri

ASOSIASI INDUSTRI PERMEBELAN & KERAJINAN INDONESIA
Furniture Industries & Handicrafts Association

- Manggala Wanabhakti IV Lt. 8
  JAKARTA 10270
  Tlp 587888. 5700249
  Tlx 45695 46977
  Fax 581918. 583017

Banks/Bank

PERHIMPUNAN BANK-BANK SWASTA NASIONAL
Indonesian National Private Banks Association

- Jalan Karet Kuningan
  JAKARTA 12940
  Tlp : 512 533, 520 4110, 515 731

Banks-Community/Bank Perkreditan Rakyat

FEDERASI PERHIMPUNAN BANK PERKREDITAN RAKYAT SELURUH INDONESIA
Federation of Community Banks Association

- Jalan Gunung Sahari 57C
  JAKARTA 10610
  Tlp : 416 860, 414 197, 410 107, 417 770

Battery/Aki

GABUNGAN PENGUSAHA PABRIK AKI INDONESIA
Indonesian Storage Battery Manufacturers Association

- Jalan Yos Sudarso – Sunter I
  JAKARTA 14350
  Tlp : 490 468-9

Battery-Dry Cell/Baterai Kering

PERSATUAN INDUSTRI BATERAI KERING INDONESIA
Indonesian Dry Battery Industry Association

- Jalan Sahanjo 191
  JAKARTA 12820
  Tlp 829 3108

Beverage/Minuman

ASOSIASI INDUSTRI MINUMAN
Beverage Producers Association

- Jalan Mi Ridwan Rais 8
  JAKARTA 10110
  Tlp 341 222, 341 223
  Tlx 44248
  Fax 342 294

Buttons/Kancing

GABUNGAN PERUSAHAAN KANCING & RITSLUITING INDONESIA
Association of Button & Zipper Industries

- Jalan RP Soroso 7
  JAKARTA 10350
  Tlp 331 708

Cables – Manufacturers/Kabel Produsen

ASOSIASI PABRIK KABEL INDONESIA
Indonesian Electric Cable Manufacturer Association

- Ketapang Indah B-II/32
  Jalan Zainul Arifin
  JAKARTA 10130
  Tlp : 600 1027, 600 1113

Candy/Kembang Gula

ASOSIASI INDUSTRI KEMBANG GULA INDONESIA
Indonesian Confectionary Manufacturers Association

- Jalan Taman Kebon Sirih III/20
  JAKARTA 10160
  Tlp : 345 136, 791 366, 799 3360
  Tlx : 47444 TREBOR IA
  Fax : 799 4283

Cardboard/Karton

PERHIMPUNAN INDUSTRI CORRUGATED/-CARDBOARD INDONESIA
Indonesian Corrugated/Cardboard Manufacturers Association

- d/a PT. Guru Indonesia
  Jalan Raya Jakarta-Bogor Km 26
  JAKARTA 16416
  Tlp : 870 621

Catering Services/Catering, Jasa

ASOSIASI CATERING SELURUH INDONESIA
Indonesian Caterers Association

- c/o Masu Kodhong
  Jalan Pulomas VI/C 1
  JAKARTA 13210
  Tlp : 513 455, 342 288

Cattle Breeders

PERHIMPUNAN PETERNAKAN KERBAU INDONESIA
Indonesian Cattle & Buffalo

- Jalan Raya Ujung Berung
  Komplek Sukup Baru Kav. 20
  P.O Box 41
  BANDUNG 40611
  Tlp : 82372, 82988

Cattle Feed/Makanan Ternak

GABUNGAN INDUSTRI PRODUSEN MAKANAN TERNAK INDONESIA
Indonesia Animal Feedmill Association

- Jalan Raya Pasar Minggu No. 11, Km 17
  JAKARTA 12740
  Tlp : 799 5466, 799 2091

Cattle Feed/Makanan Ternak

ASOSIASI PRODUSEN & EKSPORTIR MAKANAN TERNAK INDONESIA
Indonesian Animal Feedstuff Producers & Exporters Association

- Gedung Jaya Lt. 2
  Jalan MH Thamrin No. 12
  JAKARTA
  Tlp : 324 119 – 327 508 Ext 282

Cement/Semen

ASOSIASI SEMEN INDONESIA
Indonesia Cement Association

- Graha Pumayudha Lt. 2
  Jalan Jend. Sudirman Kav. 50
  JAKARTA 12930
  Tlp : 520 7603, 512 242
  Tlx : 62649 PTSG IA
  Fax : (021) 517 188, 512 135, 512 177

Ceramics/Keramik

ASOSIASI ANEKA KERAMIK INDONESIA
Indonesian Ceramic Association

- Jalan KH Zainul Arifin 61
  JAKARTA
  Tlp : 353 738

Chemicals/Kimia – Produk

BADAN KERJA SAMA INDUSTRI KIMIA DASAR
Cooperation Board of Basic Chemical Industries

- Graha Pumayudha Lt. 6
  Jalan Jend. Sudirman 50
  JAKARTA 12930
  Tlp : 510 909 ext 1260-2
  Fax 514 123

Chemicals Products/Kimia Barang

ASOSIASI KIMIA DASAR AN ORGANIK INDONESIA
The Basic an Organic Chemicals Association of Indonesia

- Jalan Tanah Abang II/63
  JAKARTA 10160
  Tlp : 353 681, 353 682

Cigarette/Rokok

GABUNGAN PRODUSEN ROKOK PUTIH INDONESIA

- d/a PT. BATRO
  Jalan RS Fatmawati Raya 33, Blok A
  JAKARTA 12140
  Tlp : 717 344

Trade – State owned companies/Persero Niaga

ASOSIASI PERSERO NIAGA
State owned Trading Companies Association

- Jl. Kramat Raya 94
  JAKARTA 10420
  Tlp 346071, 346079

Travel Bureaus/Biro Perjalanan

ASSOCIATION OF THE INDONESIAN TOURS & TRAVEL AGENCIES

- Jl. Iskandarsyah Raya 7
  JAKARTA 12120
  Tlp 7394427, 722120

Transport/Pengangkutan

ORGANISASI PENGUSAHA NASIONAL ANGKUTAN BERMOTOR Jl. RAYA
National Land Transportation Association

- Jl. Sudirman 59-60
  JAKARTA 10210
  Tlp 587606, 582747

Tyre Manufacturers/Ban, Produsen

ASOSIASI PERUSAHAAN BAN INDONESIA
Tyre Manufacturers Association

- Graha Purnayudha Lt. 6
  Jl. Sudirman 50
  JAKARTA 12930
  Tlp 510909, ext 1260-2
  Fax 514123

Watches/Jam

ASOSIASI PEMBUAT, PERAKIT, PERTOKOAN & PENYALUR BERBAGAI JAM INDONESIA
Watch Makers, Assembler & Distributor Association

- Jl. Kramat Kosambi 25
  JAKARTA 13470
  Tlp 4892096

Welding – Industries/Las, Industri

ASOSIASI INDUSTRI LAS INDONESIA
Indonesian Welding Industry Association

- d/a PT Alpha Austenite
  Jl. Rawagelam III/5
  JAKARTA 13260
  Tlp 4893473, 4893345

Welloging/Welloging

ASOSIASI WELLOGING INDONESIAN
Indonesian Welloging Association

- Jl. Imam Bonjol 20
  JAKARTA 10310

Wire/Kawat

GABUNGAN PABRIK KAWAT INDONESIA
Indonesian Wire Manufacturers Association

- Jl. Raya Pluit Selatan
  JAKARTA 14450
  Tlp 335197

Wood-Preservation/Kayu-Pengawetan

ASOSIASI PENGAWETAN KAYU INDONESIA
Wood Preservation Industries Association

- Jl. Dewi Sartika 171-A
  JAKARTA 13630
  Tlp 800640, 803656

Wood-based industries-Kayu, Industri

ASOSIASI PANEL KAYU INDONESIA
Wood-panel Producers Association

- Manggala Wanabhakti IV-A-9
  Jl. Gatot Subroto
  JAKARTA 10270
  Tlp 583017, 584640, ext. 5470/1

Wood-based industries/Kayu, industri

MASYARAKAT PERHUTANAN INDONESIA
Indonesian Forestry Society

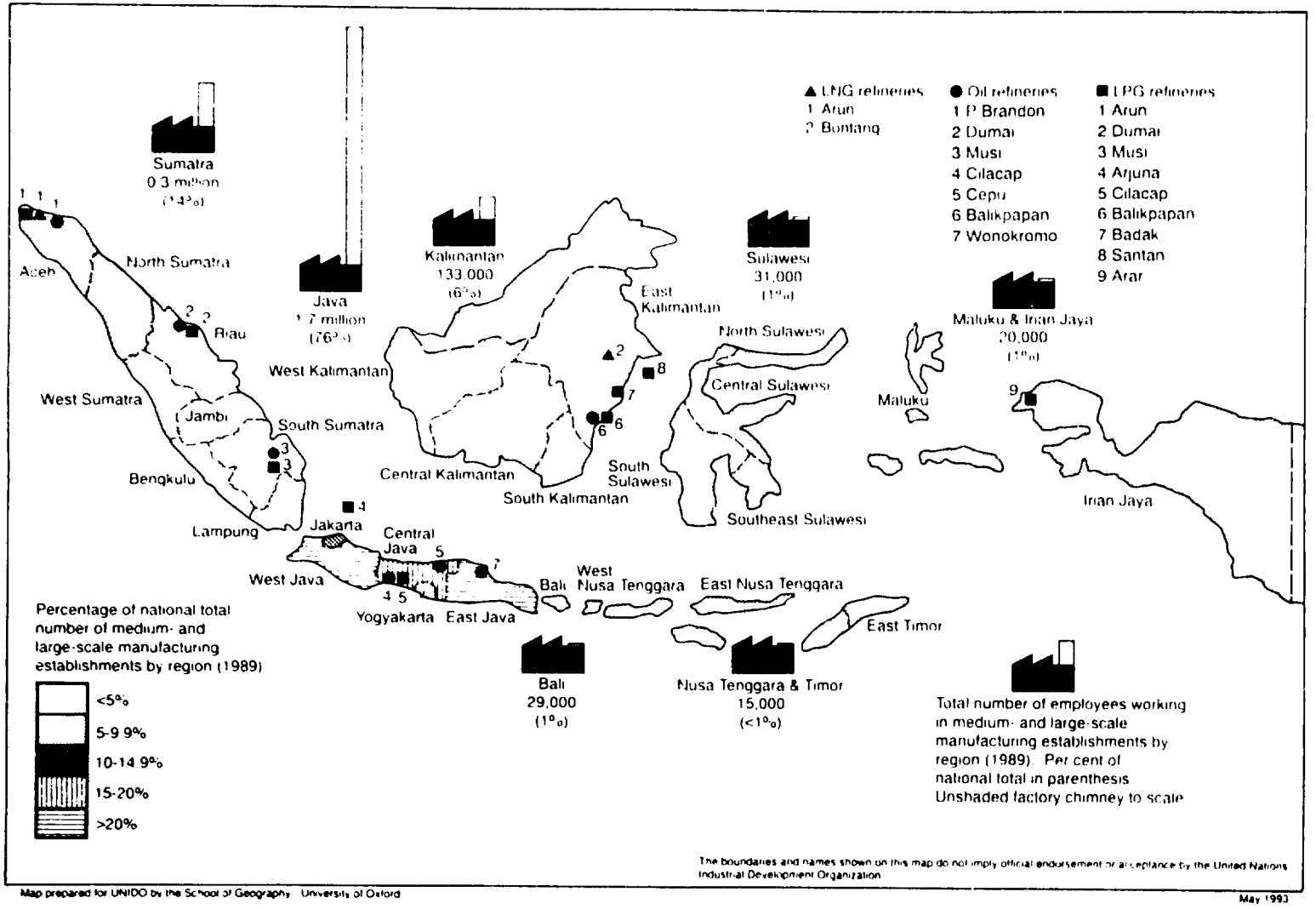
- Manggala Wanabhakti IV-A-924
  Jl. Gatot Subroto
  JAKARTA 10270
  Tlp 583010

Wood-based industries-Sawmiller/Kayu gergajian

INDONESIAN SAWMILLERS ASSOCIATION

- Manggala Wanabhakti IV/A-9
  Jl. Gatot Subroto
  JAKARTA 10270
  Tlp 584640, ext 5459

INDUSTRIAL MAP



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