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Market Outlook for Major Primary Commodities

(In Two Volumes) Volume II: Agricultural Products, Fertilizers, and Tropical Timber

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International Trade Division
International Economics Department

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Market Outlook for Major Primary Commodities

Report 814/92

Volume II: Summary, Agricultural Products, Fertilizers, and Tropical Timber

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Preface

This report is a compilation of studies which review the market prospects for major primary commodities exported by developing countries.

The forecasts are mainly used in forecasting the balance of payments of countries that borrow from the World Bank and in appraising investment projects that include these commodities as inputs or outputs. Because of the multiple purposes they are intended to serve, the price forecasts are presented in current (nominal) as well as 1990 constant dollar (real) terms.[1] For the period 1992-95, the price forecasts are in terms of prices expected for the individual years. For 2000 and 2005, the price forecasts are forecasts of the average price levels expected during that period.

The forecasts are conditional on the various macroeconomic and commodity-specific assumptions used--all of which are subject to uncertainty. The macroeconomic assumptions forming the basis for the forecasts are available in the World Bank's report Global Economic Prospects and the Developing Countries, 1992. Because of the uncertainty which is inherent in commodity price forecasts, the International Trade Division periodically prepares probability distributions of its price forecasts. These are available upon request.

The primary commodity market outlooks are discussed by commodity. For most commodities or group of commodities, there is a standardized set of tables giving historical and forecast values for production, consumption, exports, and imports; these tables give details in terms of major economic regions as well as for countries which are major participants in these markets. For most commodities, the forecasts have been based on simulation runs of global commodity models maintained within the International Trade Division of the World Bank's International Economics Department. Details of these models can be obtained directly from the Division.

The assistance given to the Division in preparing this report is gratefully acknowledged. People in both public and private organizations have been most forthcoming in providing data and in discussing the outlook for the various commodity markets. Their cooperation has added greatly to the usefulness of the report.

[1] Commodity prices have been deflated by the World Bank's Manufacturing Unit Value (MUV) index and the G-7 CPI. The MUV index is the c.i.f. index of US dollar prices of industrial countries' manufactured exports (SITC 5-8) to the developing countries and may be regarded as a useful deflator to measure changes in the net barter terms of trade of developing countries highly dependent on exports of primary commodities. The G-7 CPI may be a useful deflator to use in circumstances where the major countries' inflation rate is believed to be an appropriate measure of changes in the overall price or cost level.

Notes and Definitions

- Commodity market-price descriptions are shown on the next page.
- Dollars are United States dollars unless otherwise specified.
- All tons refer to metric tons (1,000 kilograms) unless otherwise noted.

Abbreviations and Symbols

tons	= metric tons	lb	= pounds
cum	= cubic meters	bbl	= barrels
kg	= kilograms	mb/d	= million barrels per day
ha	= hectares	N.A.	= not available
MTOE	= million tons of oil equivalent	../–/	= no data

Country Classifications

High-Income Countries

OECD

Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, United States, United Kingdom.

Non-OECD

Andorra, Aruba, Bahamas, Bermuda, Brunei, Channel Islands, Cyprus, Faeroe Islands, French Polynesia, Greenland, Hong Kong, Israel, Kuwait, Mayotte, OAE [a/], Qatar, Singapore, United Arab Emirates, Virgin Islands (US).

Low- and Middle-Income Countries (LMICs)

Africa

Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Rep., Chad, Comoros, Congo, Rep., Côte d'Ivoire, Djibouti, Equatorial Guinea, Ethiopia, Gabon, the Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Reunion, Rwanda, São Tomé and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Zaire, Zambia, Zimbabwe.

America

Antigua and Barbuda, Argentina, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Rep., Ecuador, El Salvador, French Guiana, Grenada, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Jamaica, Martinique, Mexico, Netherlands Antilles, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, St. Kitts and Nevis, St. Vincent, St. Lucia, Suriname, Trinidad and Tobago, Uruguay, Venezuela.

Asia and Pacific

American Samoa, Bangladesh, Bhutan, Cambodia, Fiji, Guam, Indonesia, Kiribati, Korea, Dem. Rep., Korea, Rep., Lao PDR, Macao, Malaysia, Maldives, Mongolia, Myanmar, Nepal, New Caledonia, Pacific Islands, Trust Territory, Pakistan, Papua New Guinea, Philippines, Solomon Islands, Sri Lanka, Thailand, Tonga, Vanuatu, Viet Nam, Western Samoa.

Europe

Albania, Bulgaria, Czechoslovakia, Former Soviet Union (FSU)[b/], Gibraltar, Greece, Hungary, Isle of Man, Malta, Poland, Portugal, Romania, Turkey, Yugoslavia.

Middle East and North Africa

Afghanistan, Algeria, Bahrain, Egypt, Arab Rep., Iran, Islamic Rep., Iraq, Jordan, Lebanon, Libya, Morocco, Oman, Saudi Arabia, Syrian Arab Rep., Tunisia, Yemen, Rep.

a/ Other Asian economies–Taiwan, China.
b/ Data are not available for individual republics.

Commodity Description

Energy

Petroleum, average OPEC price: OPEC government sales weighted by export volumes through 1981; beginning 1982 OPEC spot prices weighted by OPEC export volumes.
Thermal Coal, (12,000 BTU/lb, less than 1.0% sulfur, 12% ash), f.o.b. Piers, Hampton Roads, Norfolk.

Food

Coffee (ICO), indicator price, other mild Arabicas, average New York and Bremen/Hamburg markets, ex-dock for prompt shipment.
Cocoa (ICCO), daily average price, New York and London, nearest three future trading months.
Tea (London Auction), average price received for all teas.
Sugar (World), ISA daily price, f.o.b. and stowed at greater Caribbean ports.
Beef (Australian/New Zealand), cow forequarters, frozen boneless, 85% chemical lean, c.i.f. US port (East Coast), ex-dock.
Bananas (Central and South American), first-class quality tropical pack, importer's price to jobber or processor, f.o.r. U.S. ports.
Oranges (Mediterranean Exporters), navel, EEC indicative import price, c.i.f. Paris.

Cereals

Rice (Thai), white, milled, 5% broken, government standard, Board of Trade posted export price, f.o.b. Bangkok.
Wheat (Canadian), No. 1 Western Red Spring (CWRS) 13.5%, basis in store Thunder Bay, domestic through March 1985; subsequently St. Lawrence, export.
Maize (US), No. 2, yellow, f.o.b. Gulf ports.
Grain Sorghum (US), No. 2, Milo yellow, f.o.b. Gulf ports.

Fats and Oils

Palm Oil (Malaysian), 5% bulk, c.i.f. N.W. Europe.
Coconut Oil (Philippines/Indonesian), bulk, c.i.f. Rotterdam.
Groundnut Oil (Nigerian/West African), bulk c.i.f. UK, through January 1977; subsequently (any origin), c.i.f. Rotterdam.
Soybean Oil (Dutch), crude, f.o.b. ex-mill.
Soybeans (US), c.i.f. Rotterdam.
Copra (Philippines/Indonesian), bulk, c.i.f. N.W. Europe.
Palm Kernels (Nigerian), c.i.f. UK.
Groundnut Meal (Indian), 48%, c.i.f. Rotterdam through 1981; thereafter Argentine, 48/50%.
Soybean Meal (US), 44% extraction, c.i.f. Rotterdam.

Non-Food

Cotton (Outlook "A" Index), Middling (1-3/32"), c.i.f. Europe.
Jute (Bangladesh), white D, f.o.b. Chittagong/Chalna.
Rubber (RSS No. 1), in bales, spot New York.
Tobacco (Indian), flue-cured, average export unit value.

Timber

Logs (Southeast Asian), Philippines, Lauan for plywood and veneer, length over 6.0 M, diameter over 60 CM, average wholesale price in Japan through 1976, beginning 1977, Malaysian, Meranti, Sabah SQ Best Quality, sale price charged by importers, Japan.
Logs (West African), Sapelli, high quality, loyal and marchand, f.o.b. Cameroon.
Sawnwood (Malaysian), Dark Red Meranti, select and better quality, standard density, c.i.f. French ports.

Metals and Minerals

Copper (LME), cash wirebars through November 1981; from December 1981 through June 1986, high grade cathodes, settlement price; subsequently, grade A.
Tin (Malaysian), Straits quality, ex-smelter, Penang, official settlement price.
Nickel (Canadian), electrolytic cathodes, Ni 99.9% shipping point through 1979; subsequently cathodes, minimum 99.8% purity, official morning session weekly average bid/asked price.
Aluminum, indicative price of U.S. unalloyed primary ingot in the European Market through 1978; subsequently LME standard grade, minimum 99.5% purity, cash price.
Lead (LME), settlement price, refined lead, purity 99.97%.
Zinc (LME), settlement price, good ordinary brand through August 1984; thereafter High Grade brand.
Iron Ore (Brazilian), CVRD Itabira sinter feed produced from 64.2 purity ore, metal content weight, contract to Germany, Federal Republic, f.o.b. reference price through 1974; from 1975 through 1985, standard sinter feed from 64% purity ore; starting 1986 Southern System (Itabira and other southern mines) 64%; during 1988 and 1989, 64.2%; beginning 1990 64.3% purity ores.
Bauxite, crude and dried, US import reference price based on imports from Jamaica through 1974; from 1975 US import price, c.i.f. US port.
Gold (UK), 99.5% fine, London afternoon fixing, average of daily rates.
Silver (Handy & Harman), 99.9% grade refined, New York.

Fertilizers

Phosphate Rock (Moroccan), 72% BPL, FAS Casablanca through 1980; from 1981, 70% TPL contract.
Urea (any origin), bagged, f.o.b. N.W. Europe.
TSP (Triple Superphosphate), bulk, f.o.b. US Gulf.
DAP (Diammonium Phosphate), bulk, f.o.b. US Gulf.
Potassium Chloride (Muriate of Potash), bulk, f.o.b. Vancouver.

World Bank, International Economics Department.
November 5, 1992

Summary

HIGHLIGHTS OF FORECASTS TO 2005

Prices

- *Non-fuel commodity prices are expected to fall even further in real terms from the 1991 record low. No significant increase is foreseen until the latter half of this decade.*

- *Real price declines over the next few years are expected in all commodity groups with the exception of beverages (the price index for this group has declined an extraordinary 68% in real terms since 1986) timber (which is expected to continue increasing in real terms), and vegetable oils.*

- *Over the longer term, it is mainly the expected recovery in beverage prices which supports the upturn in non-fuel prices.*

- *Petroleum prices are expected to average near present levels in current dollar terms for several years before increasing due to tightening supplies.*

Production, Consumption, and Trade

- *Recent developments in Eastern Europe, and particularly in the FSU, have increased the uncertainty in the outlook for most commodities. Because of their reductions in consumption, reverberations will be felt for many years in the form of reductions in imports (e.g., cocoa, coffee, tea, sugar, grains) or increases in exports (e.g., metals).*

- *Production growth in the beverages should slow rapidly as a result of reduced new plantings and replantings and reduced inputs, setting the stage for a recovery in prices.*

- *The main growth markets for grains imports will be the developing countries, particularly those in the Asia-Pacific region. Industrial country exporters will supply the bulk of these imports.*

- *Most metals markets are in surplus and prices should increase over the next few years as balance is restored. Mining, smelting, and refining are expected to continue shifting towards the developing countries.*

- *Petroleum consumption is expected to grow at 1.3% p.a. on average but with growth being increasingly concentrated in the LMICs.*

- *Petroleum supplies will be more concentrated in the Middle East.*

COMMODITY PRICE FORECASTS

The historical prices and the price forecasts made in this report are brought together in constant 1990 dollars in the Summary Table 1 and in current dollars in Table 2. The various commodity price indices maintained by the World Bank are shown in Table 3 (constant dollars) and Table 4 (current dollars), with the indices based on weights for the period 1979-81. The deflator used to derive the constant dollar values in Tables 1 and 3 is the Manufacturing Unit Value (MUV) Index. This and other price indices are presented in Table 5 for the period 1948-2005. The price indices for the major commodity groups, in current and constant dollars, are graphed in the two figures below.

The constant dollar, non-fuel commodity price index is expected to fall six percentage points in 1992, matching the fall in 1991, and to remain at that level over the following two years. The main reason for the decline in 1992 is the 20% decline in the beverage index. The constant dollar beverage price index has now fallen 68% since 1986. With beverage prices expected to recover somewhat in 1993, offsetting declines in the aggregate index are expected mainly to come from cereals and other foods.

The turnaround in the aggregate non-fuel index after 1994 is supported by all commodity groups with the exception of vegetable fats and oils. This turnaround is conditional mainly on two assumptions: that there will be an upturn in economic activity in the industrial countries and that production growth in the perennial crops will slow fairly rapidly.

A brief summary of the market outlook for the major primary commodities is provided below. For more details, readers are referred to the chapters reporting on the market outlook for each commodity.

COMMODITY MARKET OUTLOOK--AGRICULTURE

(i) BEVERAGES

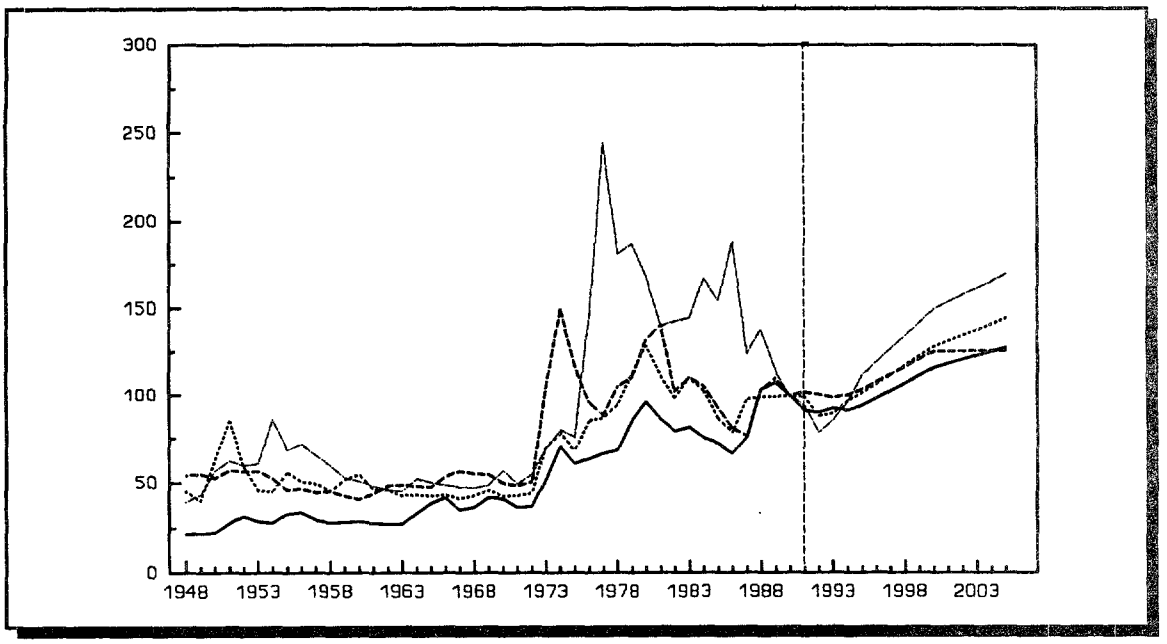
Cocoa prices to increase eventually, as production growth slows. In real terms, the market outlook for the 1992-95 period is for cocoa prices to remain near present levels, given the large stocks and the continuing increases in production.

After the mid-1990s, the low level of new plantings and replantings in recent years should result in a production decline in some of the major producers (Brazil, Cameroon, Côte d'Ivoire, and Malaysia) and a slowdown in most other. Only Indonesia is expected to have significant growth in production over the forecast period.

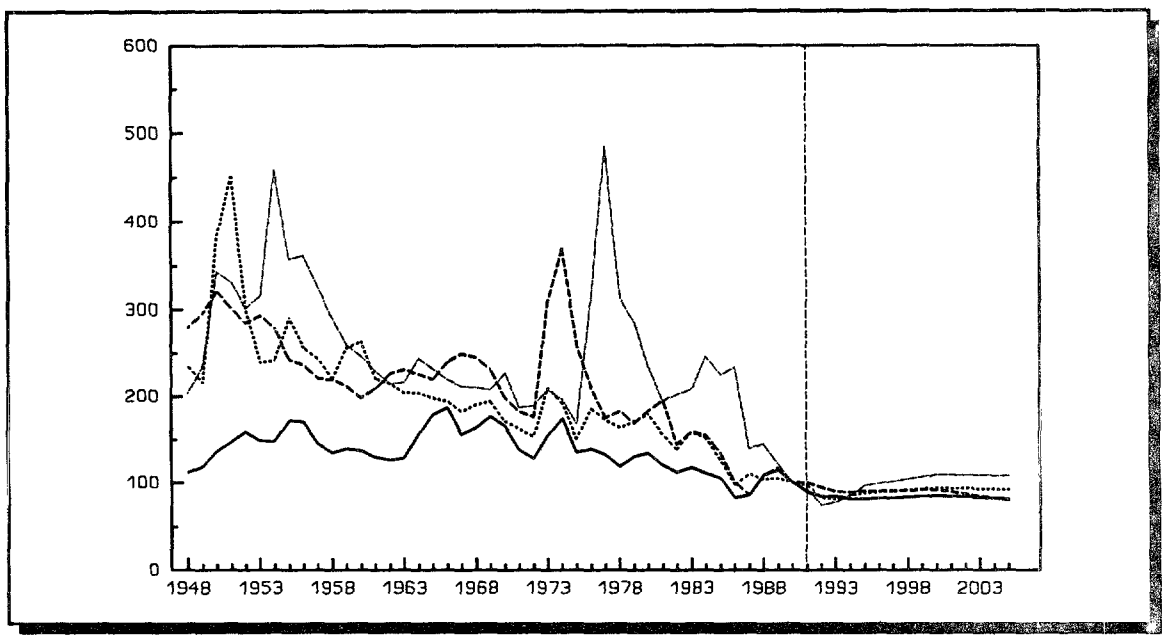
Long-term prices should increase somewhat in real terms with the slowing of production growth.

Consumption growth will be likely slow, averaging less than 2% p.a. Recent developments in the FSU and Eastern Europe, which have been substantial cocoa importers, increase the range of uncertainty about this market. Growth in consumption is expected from some nontraditional markets such as China, Japan, and the Republic of Korea.

Index of Non-Fuel Primary Commodity Prices (Current), 1948-2005
(1990=100)



Index of Non-Fuel Primary Commodity Prices (Constant), 1948-2005
(Deflated by MUV, 1990=100)



Source: World Bank, International Economics Department.

Coffee price outlook is also dependent on production growth; demand growth expected to be only 1%. The current low international prices are below variable production costs for many producers, dampening new plantings and replantings. Production growth should slow; with output growth projected to average only 0.6% p.a. over the forecast period.

Supply prospects differ significantly between countries; output in Brazil, Colombia, and Côte d'Ivoire is expected to fall. Indonesia is expected to increase production during the forecast period because of its abundance of land and low-cost labor.

World coffee demand is expected to average about 1% p.a. growth for the 1991-2005 period. Very slow population growth and already high consumption levels in the high-income countries mean faster consumption growth is unlikely. Japan and LMIC Asia and Europe are the main prospective growth areas.

International coffee price prospects point to some recovery in 1993. But any possibility of a significant increase during the 1990s, absent some supply shock or re-introduction of an international coffee agreement, has been made less likely by the large stocks now held in the importing countries.

The demand for robusta coffees is projected to grow more slowly than the demand for arabica coffees. The switch from robustas to arabicas in the OECD countries is expected to continue. This, together with the expected increase in robusta production in Brazil, Indonesia, and Viet Nam should lead to an increasing price differential between arabicas and robustas, which is bad news for African producers of robustas such as Cameroon, Côte d'Ivoire, and Uganda.

Tea price increase expected with Kenyan production growth slowing; recovery of FSU and Middle East demand would assist. World tea prices at London auctions were at their lowest level ever in real terms in 1991. The main cause has been continuing output increases while world import demand has been stagnant.

One of the key reasons for the continued growth in output in major producing countries has been depreciations in their real exchange rates.

Tea prices are recovering somewhat at the end of 1992 and this should continue into 1993 as a result of reduced output in South India, Sri Lanka, and southern Africa due to drought. In the second half of the 1990s, real tea prices should increase as production growth slows in Kenya and demand increases in the FSU and the Middle East.

World tea output is projected at 2% p.a. over the forecast period--a considerably slower rate than for the 1970-90 period when it averaged 4.8% p.a.

(ii) GRAINS, OILSEEDS, AND SUGAR

Grain import gap in developing countries will continue to widen; to be filled by high-income exporters. The LMICs other than Eastern Europe and the FSU are expected to continue expanding their net grain imports to satisfy the increased demand generated by increasing incomes and populations. They are projected to double their grain imports over the period to 2005. The industrial countries will be the main sources of exports--increasing exports by about 40% over the forecast period. Wheat is projected to be the fastest growing export crop.

Forecasts for Eastern Europe and the FSU are highly uncertain but our best guess is that grain consumption will be depressed for several years, production will begin to grow more quickly than over the past two decades, and thus imports will decline--probably halving over the forecast period.

Grain prices are expected to remain nearly constant in nominal dollars for the next several years with grains markets in relative surplus. However, prices are expected to rise slightly in real terms in the latter half of the 1990s given the continued fast growth projected for the developing countries.

Vegetable oils/meals markets to have robust growth, but declining real prices. Over the long term, vegetable oil prices are expected to be constant to downward trending in real terms, despite vigorous growth in demand. The recent fast pace of production increases in the low-cost producing countries, especially Argentina, Brazil, Indonesia, and Malaysia, is expected to continue. Because of earlier plantings, Indonesia and Malaysia are locked onto a path of rapid expansion of palm oil output throughout this decade.

In an environment of falling real prices and substantial income growth, especially in the many populous countries in Asia, vegetable oil demand should grow strongly. Demand for oilseed meals should also grow rapidly in developing countries, especially in the Asia-Pacific region, as their demand for meats rises.

Sugar consumption growth expected to return to 2% p.a. after China and FSU shocks; long-term real price about ¢13/lb. Since 1988-89, political developments in China, Eastern Europe, and the FSU have resulted in a halving of the usually steady 2-2.5% p.a. growth in sugar consumption. Prices fell from around ¢15/lb in 1989 to around ¢10/lb in mid-1992.

Long-term world sugar consumption growth is expected to average 2% p.a. with strongest growth in Asia (3.1%), Africa (2.5%), and Latin America (2.1%). Sugar production is expected to decline in Cuba, the FSU, and the United States; growth in production should slow in China and India; while growth should increase in Australia, Brazil, the EC, and Thailand.

The long-term average price forecast is ¢12-13/lb (1990 dollars). However, price volatility is expected to remain very high.

(iii) AGRICULTURAL RAW MATERIALS

Cotton market to be dominated by Asia region. Cotton consumption declined in the 1990-92 period due to the poor global economic performance, particularly in the Eastern European countries and the FSU.

Over the long term, the declining trend in population growth is expected to reduce the growth rate of cotton consumption below the 2% p.a. rate of the 1964-90 period. The region with the largest population and fastest expected economic growth--LMIC Asia-Pacific--is expected to see the fastest increase in cotton consumption. A large part of this increase should be in China, although China's cotton demand growth should be at a slower pace than in recent years due to competition from domestically produced synthetic fibers.

The Asia region (major producers China, India, and Pakistan) is expected to continue to be the largest cotton-producing area. LMIC Europe is likely to see production declining.

Some recovery in prices is expected in 1993/94 as producers reduce planted area and yields fall from the record levels of 1991/92. Long term, the declining trend in real prices is expected to continue.

Rubber markets' main growth to be in Asia-Pacific region; Indonesia to become leading producer. Natural rubber consumption is expected to grow fastest in the LMICs of the Asia-Pacific region. The impact of rapid income growth on rubber consumption in these countries is illustrated by the 50% increase in China's consumption from 450,000 tons to 660,000 tons during the 1986-88 period and by the 30% increase in India's consumption from 278,000 tons to 358,000 tons in the 1987-90 period. Rubber consumption in the Asia-Pacific region is expected to increase from 1.9 million tons to 3.1 million tons over the forecast period.

World rubber consumption is expected to increase at 2.6% p.a. to reach 7.6 million tons in 2005. The fastest growth in the OECD countries should be in Japan with 1.7% p.a. increase.

The economic reforms in Eastern Europe and the FSU should reduce demand for synthetic rubber and increase natural rubber consumption. However, the time path of this shift is highly uncertain.

Of the three major producers, Indonesia is projected to become the leading producer with output growth of 3.5% p.a.--going from 1.1 million tons in 1992 to 1.9 million tons in 2005. Higher investment than previously expected in Malaysia should lead to 2.4% growth, with output increasing from 1.2 million tons in 1992 to 1.8 million tons in 2005. Because of its land constraint, growth in Thailand is expected to slow to 1.3% p.a. Fast growth is expected in the upcoming producers China, India, and Viet Nam.

An upturn in real prices is expected over the 1995-2000 period, given the economic growth assumptions. But over the long run, major improvements in productivity--including shifts to lower-cost producers--are expected to cause real prices to decline.

Commodity Market Outlook--Metals and Minerals

Copper market outlook reasonably optimistic for producers. World consumption of refined copper is forecast to be relatively robust, with an average growth rate of 2% p.a. over the 1991-2005 period. The newly industrializing countries are expected to continue to be the main growth point.

Demand in the FSU and Eastern Europe is expected to remain depressed, at least in the near term, but could grow rapidly from the mid-1990s as these economies require large investments in infrastructure and equipment.

In the industrial countries, the copper intensity of industrial production should decline at a slower rate than over the past two decades owing to lower energy prices and faster expansion of the capital goods sector.

A tally of announced projects indicates that over the 1992-95 period world mine and refined copper capacities will each expand by as much as one million tons. Most of these increases will take place in Latin America, North America, and Asia.

Over the period to 1996, the market balance is expected to turn to a moderate surplus as supplies increase. Prices are likely to decline. However, the constraints of smelter capacity should persist through 1995.

If the historical pattern of the investment cycle is repeated, copper prices are likely to trend upwards again in the latter part of this decade.

Aluminum market should continue its recent slow growth. Aluminum consumption growth in the 1980s was a mere 1.6% p.a. Some increase in the growth rate is expected in the forecast period (to 2.2% p.a.), with the share of LMICs rising from 31% in 1991 to 36% in 2005.

As aluminum prices are also expected to remain low by historical standards, smelting capacity growth should be slow. Most new smelting capacity is likely to be in Australia, Canada, the Middle East, South America, and southern Africa where bauxite and low-cost energy are in good supply.

Prices of aluminum and bauxite are expected to increase in the 1992-94 period as the market balance adjusts from the surplus in 1991. After that, with declining average costs of production, aluminum prices should fall in real terms.

The greatest source of uncertainty in the medium term for aluminum prices is the level of FSU exports to international markets. These will depend on the pace of domestic demand recovery, the changes in energy prices, and the renovation of antiquated smelting facilities.

Steel consumption in high-income countries fell 7% in 1991 due to the global economic slowdown. Consumption in the LMICs fell 8% in the 1989-91 period--mainly because of the sharp declines in Eastern Europe and the FSU. High-income country consumption is expected to grow at only 0.7% p.a. over the period to 2005. LMIC steel consumption growth is forecast at 2.1% p.a.

Steel production to continue its shifts to LMICs. World steel production is undergoing a substantial change with capacity shifting from the high-income countries to the LMICs. In 1980-91, steelmaking capacity in the high-income countries fell 120 million tons while LMIC capacity grew by 110 million tons. A further 20 million tons decline is expected in the high-income countries by 2000, which should be more than offset by a 30 million tons increase anticipated in the LMICs.

Low-cost iron ore producers will increase domination. Iron ore consumption will track steel production, increasing at about 1.3% p.a. over the 1991-2005 period. About 30 million tons of additional iron ore production capacity is expected to come on-line around the mid-1990s, mainly from upgrading existing operations in major producing countries. Australia and Brazil should strengthen their dominant positions as producers.

With the increasing dominance of the large low-cost producers, iron ore prices are expected to decline at an average rate of 0.7% p.a. in real terms over the forecast period.

Nickel market is one of the brighter spots for producers. Long-term growth in nickel consumption should be sustained at around 2% p.a. The outlook for nickel is generally upbeat because of its use in products that have strong growth potential. Environmental protection pressures should boost

nickel demand in the form of stainless steel and high nickel alloys used in the flue gas desulphurization in power plants.

Nickel production capacity is expected to increase by at least 100,000 tons over the next five years, with major expansions in Australia, Brazil, China, Cuba, and Colombia.

Some increase in real prices is expected in the latter half of the 1990s, with capacity expansions lagging demand increases because of current low prices.

Lead and zinc markets to remain in excess supply for several years. New mines will lower production costs. Lead and zinc prices have been at record lows in real terms in the past year due to weak demand--particularly in the automobile sector--and to increased supplies. The excess supply situation was exacerbated by exports from the FSU and Eastern Europe. Prior to 1990, these countries had been net importers of these metals.

Over the short term, lead and zinc prices are not expected to increase much, if at all, as the excess supply situation is expected to continue for the next two to three years.

The market balance is expected to improve by the mid-1990s as demand catches up with production capacity. Although greenfield lead and zinc projects have moved to more unfriendly environments in recent years (e.g., Red Dog mine in Alaska), costs of production have tended to fall. New mines projected to come on-stream in the latter half of the 1990s are expected to have even lower costs. So prices over the long term are expected to average at near the currrent low levels in real terms.

COMMODITY MARKET OUTLOOK--ENERGY

Petroleum consumption will grow most rapidly in LMICs. Petroleum consumption is expected to increase, on average, by 1.3% p.a. during the forecast period. Fastest growth should be seen in the LMICs (excluding Eastern Europe and the FSU), with their share growing from 16% in 1991 to 36% by 2005. Increased use of motor transport will be the main reason for this growth.

Supplies from non-OPEC producers (excluding the FSU) will contribute about one half of the incremental global output up to the mid-1990s. But beyond that time, dependence on OPEC will increase as several producing regions reach maturity.

OPEC's share to increase. OPEC's share of global output is expected to increase from 38% in 1991 to around 46% in 2005. The share of Middle East producers is expected to grow from 28% to 37%.

Which could mean higher prices for a period. The market outlook is for prices to decline slightly in real terms in the near term. Although industrial activity is expected to pick up after 1994, supplies should be ample to forestall price increases for some time. However, in the latter half of the decade, we expect prices to increase in real terms as production begins to decline in several OPEC and non-OPEC producers.

Coal prices expected to rise in long term with increased consumption and higher production costs. World coal consumption is expected to increase at 1.8% p.a. over the 1991-2005 period. Thermal coal consumption growth is forecast at 2.5% p.a.

Future production increases should come mostly from Australia, China, India, South Africa, and the United States. Most European countries and Japan can be expected to phase down their coal industries due to high costs, while Colombia, Indonesia, and Venezuela are likely to become more important exporters.

No increase is expected in coal prices in real terms up to 1995. Beyond that time, prices are expected to rise somewhat in real terms in line with increases in petroleum prices and with expected increases in production costs.

Table 1: Commodity Prices and Price Projections in 1990 Constant Dollars a/

		Actual							Projections					
									Short-Term				Long-Term	
		1970	1980	1985	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005
ENERGY														
Petroleum	$/BBL	5.2	42.4	38.9	14.3	17.2	21.2	17.0	16.5	15.7	15.5	15.6	18.0	17.0
Coal	$/MT	N.A.	60	68	39	43	42	41	38	38	38	39	44	43
FOOD														
Coffee	¢/KG	457	478	468	318	252	197	183	130	142	164	195	226	216
Cocoa	¢/KG	269	362	329	166	131	127	117	106	108	111	113	124	136
Tea	¢/KG	437	310	289	188	213	203	181	193	188	182	190	198	204
Sugar	$/MT	323	878	130	236	298	277	194	188	185	195	220	255	280
Beef	¢/KG	520	384	314	264	271	256	261	229	228	227	228	274	253
Bananas	$/MT	659	527	551	502	578	541	548	471	443	439	434	422	414
Oranges	$/MT	670	543	581	476	471	531	510	488	473	471	470	453	436
Rice	$/MT	574	603	315	316	338	287	308	272	261	258	260	245	237
Wheat	$/MT	250	265	253	188	213	156	140	161	147	146	148	159	129
Maize	$/MT	233	174	164	112	118	109	105	99	94	95	95	101	82
Grain Sorghum	$/MT	207	179	150	103	112	104	103	97	92	91	91	98	79
FATS & OILS														
Palm Oil	$/MT	1,037	811	730	459	370	290	332	371	380	353	343	303	266
Coconut Oil	$/MT	1,584	936	860	593	546	337	424	554	498	509	535	564	457
Groundnut Oil	$/MT	1,510	1,194	1,319	619	819	964	875	568	584	583	617	554	421
Soybean Oil	$/MT	1,224	829	834	486	456	447	444	404	416	443	433	409	374
Soybeans	$/MT	466	412	327	318	291	247	235	221	224	234	234	219	233
Copra	$/MT	897	629	563	417	368	231	280	357	326	335	350	396	322
Palm Kernels	$/MT	670	480	424	280	265	185	215	216	214	219	234	243	227
Groundnut Meal	$/MT	407	334	208	220	211	185	147	147	149	163	172	157	175
Soybean Meal	$/MT	411	364	229	281	260	209	195	195	199	204	209	185	210
NON-FOOD														
Cotton	¢/KG	252	284	192	147	177	182	164	122	117	136	140	150	145
Jute	$/MT	1,092	428	850	388	394	408	370	300	308	311	308	321	313
Rubber	¢/KG	185	226	135	135	118	102	99	96	96	99	103	114	112
Tobacco	$/MT	3,938	3,196	2,843	2,037	1,998	1,964	2,182	1,849	1,787	1,742	1,733	1,712	1,690
TIMBER														
Logs (Meranti)	$/CM	148	271	199	245	237	210	217	236	238	241	243	258	276
Logs (Sapelli)	$/CM	171	350	253	285	289	344	309	316	322	324	327	346	368
Sawnwood	$/CM	370	507	403	322	446	524	462	483	484	489	493	517	543
METALS & MINERALS														
Copper	$/MT	5,634	3,032	2,066	2,730	3,009	2,662	2,291	2,173	2,153	1,865	1,704	1,974	1,840
Tin	¢/KG	1,432	2,284	1,682	740	902	609	536	577	597	640	675	620	610
Nickel	$/MT	11,348	9,058	7,142	14,457	14,061	8,864	7,987	6,759	6,876	7,195	7,527	8,377	8,566
Aluminum	$/MT	2,153	2,466	1,517	2,676	2,062	1,639	1,275	1,183	1,312	1,466	1,601	1,465	1,435
Lead	$/MT	1,212	1,259	570	688	711	811	546	530	543	551	597	656	539
Zinc	$/MT	1,176	1,057	1,141	1,303	1,753	1,513	1,094	1,220	1,131	1,110	1,107	1,173	1,034
Iron Ore	$/MT	39.2	39.0	38.7	24.7	28.0	30.8	32.6	29.7	27.4	26.4	27.8	27.9	27.1
Bauxite	$/MT	47.8	44.5	52.0	31.8	36.3	34.4	33.1	30.0	29.9	30.2	31.1	30.0	30.0
Gold	$/TOZ	143	845	463	459	403	384	355	324	317	335	340	360	360
Silver	¢/TOZ	706	2,867	895	686	581	482	396	375	353	380	389	450	450
FERTILIZERS														
Phosphate Rock	$/MT	44	65	49	38	43	41	42	40	40	41	42	42	41
Urea	$/MT	193	309	199	163	140	157	168	134	141	148	153	169	159
TSP	$/MT	169	251	177	166	152	132	130	114	110	115	120	125	123
DAP	$/MT	215	309	246	206	183	171	169	136	127	135	140	148	145
Potassium Chlor b/	$/MT	126	161	122	92	104	98	107	105	104	108	108	107	105

N.A. = Not Available.

a/ Computed from unrounded data and deflated by MUV (1990=100).
b/ Potassium Chloride, also known as Muriate of Potash.

Source: World Bank, International Economics Department.
November 9, 1992

Table 2: Commodity Prices and Price Projections in Current Dollars a/

		Actual							Projections					
									Short-Term				Long-Term	
		1970	1980	1985	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005
ENERGY														
Petroleum	$/BBL	1.3	30.5	26.7	13.6	16.3	21.2	17.3	17.6	17.3	17.4	18.0	24.7	26.8
Coal	$/MT	N.A.	43	47	37	41	42	42	40	42	43	45	60	68
FOOD														
Coffee	¢/KG	115	344	321	303	239	197	187	139	157	185	225	310	340
Cocoa	¢/KG	68	260	225	159	124	127	120	113	119	125	131	170	215
Tea	¢/KG	110	223	198	179	202	203	184	206	208	205	220	272	322
Sugar	$/MT	81	632	90	225	282	277	198	200	205	220	254	350	441
Beef	¢/KG	130	276	215	252	257	256	266	244	252	256	264	376	399
Bananas	$/MT	165	379	378	478	547	541	560	502	490	494	502	579	652
Oranges	$/MT	168	391	398	453	445	531	521	520	523	530	543	622	687
Rice	$/MT	144	434	216	301	320	287	314	290	288	290	300	336	374
Wheat	$/MT	63	191	173	180	201	156	143	172	162	164	171	218	204
Maize	$/MT	58	125	112	107	112	109	107	105	104	107	110	139	130
Grain Sorghum	$/MT	52	129	103	99	106	104	105	103	102	103	105	134	125
FATS & OILS														
Palm Oil	$/MT	260	584	501	437	350	290	339	395	420	397	396	416	420
Coconut Oil	$/MT	397	674	590	565	517	337	433	590	550	573	618	774	721
Groundnut Oil	$/MT	379	859	905	590	775	964	894	605	645	656	713	760	664
Soybean Oil	$/MT	307	597	572	463	432	447	454	430	460	499	500	562	590
Soybeans	$/MT	117	296	224	304	275	247	240	235	248	263	270	300	368
Copra	$/MT	225	453	386	398	348	231	286	380	360	377	404	544	508
Palm Kernels	$/MT	168	345	291	267	251	185	220	230	237	246	270	334	358
Groundnut Meal	$/MT	102	240	143	210	200	185	150	157	165	184	199	216	276
Soybean Meal	$/MT	103	262	157	268	246	209	199	208	220	230	241	254	331
NON-FOOD														
Cotton	¢/KG	63	205	132	140	167	182	168	130	129	153	162	206	229
Jute	$/MT	274	308	583	370	373	408	378	320	340	350	356	441	493
Rubber	¢/KG	46	162	92	129	112	102	101	102	106	112	119	156	177
Tobacco	$/MT	988	2,300	1,950	1,941	1,891	1,964	2,228	1,970	1,975	1,961	2,003	2,350	2,663
TIMBER														
Logs (Meranti)	$/CM	37	195	136	233	225	210	222	251	263	271	281	354	435
Logs (Sapelli)	$/CM	43	252	174	271	274	344	316	337	356	365	378	475	580
Sawnwood	$/CM	93	365	276	307	422	524	472	514	535	550	570	710	855
METALS & MINERALS														
Copper	$/MT	1,413	2,182	1,417	2,602	2,848	2,662	2,339	2,315	2,380	2,100	1,970	2,710	2,900
Tin	¢/KG	359	1,644	1,154	705	853	609	548	615	660	720	780	851	961
Nickel	$/MT	2,846	6,519	4,899	13,778	13,308	8,864	8,156	7,200	7,600	8,100	8,700	11,500	13,500
Aluminum	$/MT	540	1,775	1,041	2,551	1,951	1,639	1,302	1,260	1,450	1,650	1,850	2,011	2,261
Lead	$/MT	304	906	391	656	673	811	558	565	600	620	690	900	850
Zinc	$/MT	295	761	783	1,242	1,659	1,513	1,117	1,300	1,250	1,250	1,280	1,610	1,630
Iron Ore	$/MT	9.8	28.1	26.6	23.5	26.5	30.8	33.3	31.6	30.3	29.7	32.1	38.3	42.7
Bauxite	$/MT	12	32	35.7	30.3	34.4	34.4	33.8	32	33	34	36	41.2	47.3
Gold	$/TOZ	36	608	318	437	381	384	362	345	350	377	393	494	567
Silver	¢/TOZ	177	2,064	614	654	550	482	404	400	390	428	450	618	709
FERTILIZERS														
Phosphate Rock	$/MT	11	47	34	36	41	41	43	43	44	46	48	58	65
Urea	$/MT	48	222	136	155	132	157	172	143	156	167	177	232	251
TSP	$/MT	43	180	121	158	144	132	133	121	122	129	139	172	194
DAP	$/MT	54	222	169	197	173	171	173	145	140	152	162	203	229
Potassium Chlor b/	$/MT	32	116	84	88	99	98	109	112	115	122	125	147	165

N.A. = Not Available.

a/ Data have been unrounded.
b/ Potassium Chloride, also known as Muriate of Potash.

Source: World Bank, International Economics Department.
November 9, 1992

Table 3: Weighted Index of Commodity Prices
(Constant US Dollars)
(1990=100)

(Weights-%Share) a/	Petroleum	33 Commodities (Excluding Energy) (100.0)	Agriculture						Non-Food	Timber	Metals & Minerals
			Total	Food							
				Total	Beverages	Cereal	Fats & Oil	Other			
			(67.7)	(53.2)	(22.3)	(9.4)	(9.3)	(12.3)	(14.4)	(5.2)	(27.1)
1948	55.9	176.2	228.7	226.8	203.4	280.0	396.7	137.6	235.0	50.7	111.9
1949	48.1	175.7	223.8	226.1	234.8	295.5	309.7	136.1	216.2	55.7	118.1
1950	48.8	232.3	308.4	286.4	343.7	320.6	370.2	165.4	380.0	66.5	136.1
1951	42.4	242.9	317.8	276.3	331.3	301.3	383.5	151.5	453.2	84.9	147.1
1952	40.5	210.5	258.3	245.5	301.5	285.1	308.1	133.1	300.3	60.7	159.5
1953	44.1	202.3	251.2	254.8	316.4	293.9	317.0	137.1	239.2	57.1	148.6
1954	47.6	224.0	285.5	299.0	458.6	279.1	300.8	141.6	241.5	80.1	148.1
1955	46.7	217.3	262.3	253.6	357.6	242.1	274.5	140.5	290.6	63.0	172.1
1956	45.1	211.5	254.1	253.5	362.0	236.4	271.6	140.3	256.1	58.6	170.1
1957	44.1	195.7	242.1	241.8	324.1	220.5	267.8	154.6	243.3	55.3	145.1
1958	41.1	179.3	220.7	220.9	290.3	219.6	247.8	135.4	220.3	51.8	134.5
1959	37.0	181.5	220.8	210.2	258.9	211.8	268.0	129.6	255.5	61.9	138.7
1960	34.0	177.9	215.2	200.7	246.1	197.6	249.5	130.7	262.6	66.6	137.0
1961	33.5	166.4	199.9	193.7	229.2	208.9	248.2	120.9	220.3	67.7	129.3
1962	30.6	163.4	196.4	190.8	214.1	226.2	238.3	122.8	214.6	72.8	125.5
1963	31.2	170.9	207.7	209.1	215.7	230.6	256.2	166.7	203.1	72.5	128.2
1964	28.5	181.4	210.9	213.3	243.6	225.9	259.6	151.3	203.3	60.9	155.7
1965	28.2	184.4	201.7	203.1	231.7	219.3	283.3	124.3	197.4	69.7	178.6
1966	27.4	184.8	197.7	198.9	218.9	239.5	265.8	121.7	193.7	70.9	186.4
1967	27.0	172.1	193.3	196.7	210.7	249.2	251.7	125.0	182.0	74.9	156.0
1968	27.3	175.3	193.9	195.0	210.3	244.8	242.9	126.8	190.3	77.5	163.7
1969	25.9	177.9	191.9	191.4	207.2	230.5	228.2	134.3	193.7	71.0	176.1
1970	24.4	172.9	189.7	195.6	226.6	198.4	253.9	132.7	170.5	70.6	165.5
1971	30.2	153.4	172.4	175.5	187.2	181.8	240.9	127.5	162.2	68.3	138.6
1972	31.0	148.0	170.3	175.6	189.0	175.7	218.1	140.7	153.1	62.0	127.6
1973	38.0	194.1	229.2	235.4	207.5	310.0	389.3	146.3	209.1	93.5	154.6
1974	129.4	212.3	249.2	266.8	196.2	368.8	361.4	236.2	191.7	91.9	173.9
1975	113.3	158.9	184.7	195.3	167.5	259.3	218.3	176.5	150.0	62.4	134.6
1976	119.9	179.3	214.4	223.1	316.2	209.1	230.5	129.4	186.2	82.6	139.0
1977	119.4	197.0	247.8	271.0	484.8	174.8	260.1	106.5	172.2	87.4	132.5
1978	104.6	163.2	199.6	210.9	312.3	182.3	236.4	108.1	162.9	80.0	117.9
1979	133.1	167.9	195.2	202.5	285.6	168.0	238.9	116.9	171.4	123.2	130.2
1980	199.0	168.2	193.0	197.4	233.6	182.8	201.7	165.4	178.7	129.1	133.8
1981	222.9	146.6	167.9	172.0	193.6	194.4	193.7	125.8	154.7	102.4	119.2
1982	204.6	134.0	150.6	154.3	200.9	143.8	160.2	108.4	138.4	104.2	111.8
1983	189.8	144.2	165.3	167.3	207.8	159.1	193.3	116.6	159.0	99.3	117.1
1984	189.7	148.8	174.8	182.0	245.5	155.3	232.3	105.9	151.3	116.8	110.6
1985	182.7	131.3	151.0	158.7	224.4	134.7	161.4	101.8	126.1	94.4	105.1
1986	78.4	112.1	132.1	142.8	232.8	100.0	105.6	91.1	97.2	89.0	82.4
1987	90.9	102.0	109.6	109.6	139.2	85.9	111.9	90.8	109.9	118.5	85.4
1988	67.0	114.0	116.8	120.8	144.9	108.1	136.9	94.8	103.9	116.4	108.7
1989	80.9	112.8	112.2	114.5	120.4	116.3	124.3	102.3	104.6	112.9	113.8
1990	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1991	79.6	93.9	95.5	95.1	92.2	100.0	100.8	92.5	97.0	103.2	89.2
1992	77.6	87.2	85.8	86.8	73.8	94.4	104.0	87.7	82.4	112.0	84.4
1993	73.5	86.6	84.9	86.3	77.5	89.5	104.1	84.9	80.6	113.1	83.8
1994	72.6	87.5	88.1	88.9	85.0	89.2	104.5	85.2	85.6	114.4	80.9
1995	73.2	90.1	92.2	93.5	96.6	89.7	105.8	86.5	87.7	115.6	81.3
2000	84.5	94.2	96.4	97.4	109.1	91.2	98.0	88.2	93.4	122.6	84.6
2005	79.9	92.2	94.1	94.9	107.6	79.6	96.9	89.1	91.6	131.2	80.9

a/ Weighted by 1979-1981 Developing Countries Export Values.

Source: World Bank, International Economics Department.
November 9, 1992

Table 4: Weighted Index of Commodity Prices
(Current US Dollars)
(1990=100)

(Weights-%Share) a/	Petroleum	33 Commodities (Excluding Energy) (100.0)	Agriculture							Timber	Metals & Minerals
			Total	Food					Non-Food		
				Total	Beverages	Cereal	Fats & Oil	Other			
			(67.7)	(53.2)	(22.3)	(9.4)	(9.3)	(12.3)	(14.4)	(5.2)	(27.1)
1948	10.8	34.0	44.1	43.8	39.3	54.1	76.6	26.6	45.4	9.8	21.6
1949	8.9	32.6	41.5	41.9	43.5	54.8	57.4	25.2	40.1	10.3	21.9
1950	8.0	38.0	50.5	46.9	56.2	52.5	60.6	27.1	62.2	10.9	22.3
1951	8.0	45.7	59.8	52.0	62.3	56.7	72.1	28.5	85.3	16.0	27.7
1952	8.0	41.5	50.9	48.4	59.5	56.2	60.8	26.2	59.2	12.0	31.5
1953	8.5	38.8	48.1	48.8	60.6	56.3	60.7	26.3	45.8	10.9	28.5
1954	8.9	42.0	53.5	56.0	86.0	52.3	56.4	26.5	45.3	15.0	27.8
1955	8.9	41.5	50.1	48.4	68.3	46.2	52.4	26.8	55.5	12.0	32.9
1956	8.9	41.9	50.3	50.2	71.6	46.8	53.7	27.8	50.7	11.6	33.7
1957	8.9	39.6	48.9	48.9	65.5	44.6	54.1	31.2	49.2	11.2	29.3
1958	8.5	36.9	45.4	45.4	59.7	45.2	50.9	27.8	45.3	10.6	27.7
1959	7.5	36.8	44.8	42.6	52.5	42.9	54.4	26.3	51.8	12.5	28.1
1960	7.0	36.8	44.5	41.5	50.9	40.9	51.6	27.1	54.4	13.8	28.3
1961	7.0	35.0	42.1	40.8	48.2	44.0	52.2	25.4	46.4	14.3	27.2
1962	6.6	35.1	42.2	41.0	46.0	48.6	51.2	26.4	46.1	15.6	27.0
1963	6.6	36.0	43.7	44.0	45.4	48.5	53.9	35.1	42.7	15.3	27.0
1964	6.1	38.8	45.1	45.6	52.1	48.3	55.6	32.4	43.5	13.0	33.3
1965	6.1	39.9	43.6	43.9	50.1	47.4	61.2	26.9	42.6	15.1	38.6
1966	6.1	41.2	44.1	44.4	48.8	53.4	59.3	27.1	43.2	15.8	41.6
1967	6.1	38.9	43.7	44.4	47.6	56.3	56.8	28.2	41.1	16.9	35.2
1968	6.1	39.2	43.4	43.6	47.1	54.8	54.4	28.4	42.6	17.3	36.6
1969	6.1	41.9	45.2	45.1	48.8	54.3	53.8	31.7	45.6	16.7	41.5
1970	6.1	43.3	47.5	49.0	56.7	49.7	63.6	33.2	42.7	17.7	41.4
1971	8.0	40.6	45.6	46.4	49.5	48.1	63.7	33.7	42.9	18.1	36.6
1972	8.9	42.7	49.1	50.6	54.4	50.6	62.8	40.5	44.1	17.9	36.8
1973	12.7	64.7	76.5	78.5	69.2	103.4	129.9	48.8	69.7	31.2	51.6
1974	52.6	86.3	101.2	108.4	79.7	149.8	146.9	96.0	77.9	37.4	70.7
1975	51.2	71.8	83.4	88.2	75.7	117.2	98.6	79.7	67.8	28.2	60.8
1976	54.9	82.1	98.2	102.2	144.9	95.8	105.6	59.3	85.3	37.8	63.7
1977	60.1	99.2	124.8	136.4	244.1	88.0	131.0	53.6	86.7	44.0	66.7
1978	60.6	94.5	115.6	122.1	180.8	105.5	136.9	62.6	94.3	46.3	68.3
1979	87.3	110.1	128.0	132.8	187.3	110.2	156.7	76.7	112.4	80.8	85.4
1980	143.2	121.1	138.9	142.0	168.1	131.6	145.1	119.0	128.6	92.9	96.2
1981	161.0	105.9	121.3	124.3	139.8	140.4	140.0	90.9	111.8	74.0	86.1
1982	145.5	95.3	107.1	109.7	142.9	102.3	113.9	77.1	98.4	74.1	79.5
1983	131.9	100.2	114.9	116.3	144.5	110.6	134.4	81.0	110.5	69.0	81.4
1984	129.1	101.2	118.9	123.8	167.0	105.6	158.0	72.1	102.9	79.5	75.3
1985	125.4	90.1	103.6	108.8	154.0	92.4	110.7	69.8	86.5	64.7	72.1
1986	63.4	90.6	106.8	115.5	188.2	80.8	85.4	73.6	78.6	71.9	66.6
1987	80.8	90.6	97.4	97.3	123.6	76.3	99.4	80.7	97.6	105.2	75.8
1988	63.8	108.7	111.4	115.1	138.1	103.0	130.5	90.3	99.1	110.9	103.7
1989	76.5	106.7	106.1	108.3	113.9	110.0	117.6	96.8	99.0	106.8	107.7
1990	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1991	81.2	95.9	97.5	97.1	94.1	102.1	102.9	94.4	99.1	105.4	91.0
1992	82.6	92.9	91.4	92.5	78.6	100.6	110.8	93.4	87.7	119.3	89.9
1993	81.2	95.6	93.9	95.3	85.7	98.9	115.0	93.8	89.1	125.0	92.6
1994	81.7	98.5	99.2	100.1	95.8	100.4	117.6	95.9	96.4	128.8	91.1
1995	84.5	104.1	106.5	108.0	111.6	103.6	122.2	99.9	101.3	133.6	94.0
2000	116.0	129.4	132.4	133.7	149.8	125.2	134.5	121.1	128.2	168.3	116.1
2005	125.8	145.3	148.2	149.4	169.5	125.5	152.7	140.4	144.3	206.7	127.5

a/ Weighted by 1979-1981 Developing Countries Export Values.

Source: World Bank, International Economics Department.
November 9, 1992

Table 5: Inflation Indices: 1948-2005 a/

Year	G-5 MUV Index b/ 1990=100	G-5 MUV Index b/ % Change	US GNP Deflator 1990=100	US GNP Deflator % Change	G-5 GNP Deflator c/ 1990=100	G-5 GNP Deflator c/ % Change	G-7 CPI d/ 1990=100	G-7 CPI d/ % Change
1948	19.29		17.89	7.01				
1949	18.54	-3.90	17.80	-0.52			13.25	
1950	16.33	-11.90	18.15	2.01			12.40	-6.46
1951	18.83	15.30	19.03	4.82			13.74	10.84
1952	19.73	4.80	19.32	1.51			14.33	4.29
1953	19.18	-2.80	19.63	1.61	14.38		14.45	0.87
1954	18.76	-2.20	19.94	1.60	14.63	1.75	14.67	1.48
1955	19.11	1.90	20.58	3.24	14.94	2.16	14.72	0.38
1956	19.80	3.60	21.28	3.36	15.57	4.22	15.04	2.13
1957	20.22	2.10	22.04	3.60	16.08	3.24	15.37	2.24
1958	20.56	1.70	22.49	2.05	16.27	1.18	15.66	1.86
1959	20.27	-1.40	23.07	2.57	16.27	0.00	15.63	-0.21
1960	20.70	2.10	23.46	1.68	16.65	2.33	15.93	1.91
1961	21.05	1.70	23.68	0.96	17.21	3.41	16.30	2.36
1962	21.47	2.00	24.21	2.22	17.84	3.66	16.76	2.84
1963	21.06	-1.90	24.56	1.44	18.35	2.83	17.30	3.21
1964	21.43	1.75	24.96	1.64	18.85	2.75	17.75	2.60
1965	21.59	0.74	25.60	2.57	19.42	3.01	18.32	3.18
1966	22.35	3.50	26.50	3.50	20.05	3.25	18.94	3.39
1967	22.61	1.16	27.25	2.82	20.68	3.14	19.43	2.58
1968	22.39	-0.96	28.61	4.98	21.44	3.66	19.97	2.78
1969	23.60	5.40	30.16	5.42	22.07	2.94	20.84	4.38
1970	25.08	6.27	31.86	5.65	23.55	6.71	22.11	6.10
1971	26.44	5.42	33.64	5.59	25.44	8.03	23.60	6.71
1972	28.81	8.97	35.24	4.77	28.05	10.26	26.04	10.38
1973	33.37	15.84	37.55	6.55	31.82	13.44	29.76	14.27
1974	40.66	21.84	40.91	8.93	34.73	9.11	32.96	10.74
1975	45.21	11.18	44.96	9.91	39.28	13.11	37.03	12.36
1976	45.83	1.38	47.81	6.34	40.39	2.83	38.26	3.30
1977	50.34	9.85	51.00	6.67	44.03	9.02	42.29	10.54
1978	57.94	15.08	54.75	7.34	51.23	16.35	51.82	22.54
1979	65.62	13.26	59.56	8.79	57.10	11.46	54.84	5.82
1980	71.97	9.68	64.98	9.10	63.06	10.42	61.32	11.82
1981	72.26	0.41	71.23	9.62	62.65	-0.65	61.82	0.82
1982	71.15	-1.53	75.81	6.43	62.20	-0.72	61.04	-1.27
1983	69.53	-2.28	78.73	3.86	62.49	0.48	62.01	1.58
1984	68.05	-2.14	81.67	3.73	61.74	-1.20	61.84	-0.26
1985	68.60	0.81	84.11	2.98	63.11	2.21	63.10	2.02
1986	80.89	17.91	86.37	2.69	76.53	21.27	76.14	20.67
1987	88.84	9.84	89.20	3.28	86.32	12.78	86.01	12.97
1988	95.31	7.28	92.28	3.45	92.11	6.71	92.60	7.65
1989	94.65	-0.70	96.08	4.12	91.25	-0.94	92.18	-0.45
1990	100.00	5.66	100.00	4.08	100.00	9.59	100.00	8.49
1991	102.11	2.11	103.63	3.63	104.01	4.01	105.11	5.11
1992	106.53	4.33					111.65	6.22
1993	110.53	3.75					115.65	3.58
1994	112.58	1.86					118.37	2.35
1995	115.59	2.67					121.78	2.88
1996	119.63	3.50					126.40	3.80
1997	123.82	3.50					131.21	3.80
1998	128.15	3.50					136.19	3.80
1999	132.64	3.50					141.37	3.80
2000	137.28	3.50					146.74	3.80
2005	157.60	2.80					175.55	3.65

a/ Figures for 1992-2005 are projections.
b/ Unit value index in US dollar terms of manufactures exported from the G-5 countries (France, Germany, Japan, UK, and US) weighted proportionally to the countries' exports to the developing countries.
c/ Aggregate index of GNP deflators in US dollar terms for the G-5 countries, using SDR-based moving weights.
d/ Aggregate consumer price index in US dollar terms for the G-7 countries (Canada, France, Germany, Italy, Japan, UK and US) weighted by the countries' 1988-90 average GNP in current US dollars.

Sources: G-5 MUV Index, G-5 GNP Deflator, and G-7 CPI – World Bank.
US GNP Deflator – International Monetary Fund.

World Bank, International Economics Department, International Trade Division.
October 26, 1992

Coffee

Summary

- World coffee prices in real terms were at their lowest annual average level ever in 1991, and a further decline was recorded in the first half of 1992. The depression of prices has been due mainly to the increased world production and exports since the suspension in July 1989 of the quota system which was operating under the International Coffee Agreement (ICA). World production in 1991 and 1992 was at near record levels.

- The decline of robusta prices has been considerably greater than that of arabicas.[1] Real robusta prices fell by over 70% between 1985 and 1991, while the fall in arabica prices was 62%. As a result of the price decline, world coffee export revenues declined by 38% in real terms between 1988 and 1991. This has caused great financial difficulties in many producing countries, notably the robusta-exporting countries in Africa such as Cameroon, Côte d'Ivoire, and Uganda.

- Since current world prices are estimated to be below variable production costs for a large number of coffee growers, no investments are likely to be undertaken in the coffee subsectors in most producing countries if real world prices continue at present levels. Thus, while production at recent levels could continue for a few years because harvesting is a relatively low-cost operation, over the projection period 1991-2005 world coffee supply is expected to increase at only 0.6% p.a. Supply prospects differ significantly from one country to another, with Colombia, Côte d'Ivoire, and Brazil's supply projected to fall, while Indonesia is expected to increase its production during the projection period due to its abundance of land and low-cost labor.

- Present market indications are that world arabica coffee prices in real terms will recover in 1993 and thereafter, but that any possibility of a significant price increase during the first half of the 1990s is likely to be dampened by the release of stocks in the importing countries. Real prices are projected to strengthen in the second half of the 1990s as world production stagnates, but they are expected to weaken in the early 2000s as demand stagnates.

- World demand is projected to increase at an average rate of only 1% p.a. for the period 1991-2005. The stagnation in world import demand is expected because of projected population growth rates of zero or less and already high per capita consumption levels in many high-income countries.

- Given the projected low level of world coffee prices in real terms, producing countries should re-examine their export strategies. Consideration could be given to providing extension services and credits to farmers so that coffee growers who have potential cropping alternatives can diversify out of coffee.

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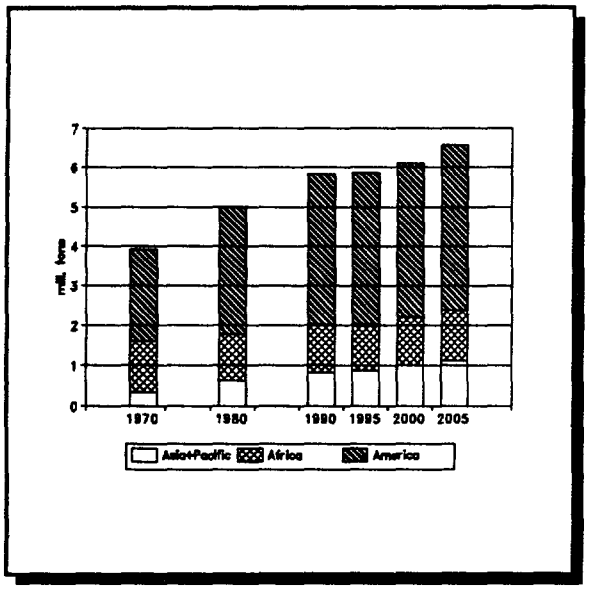
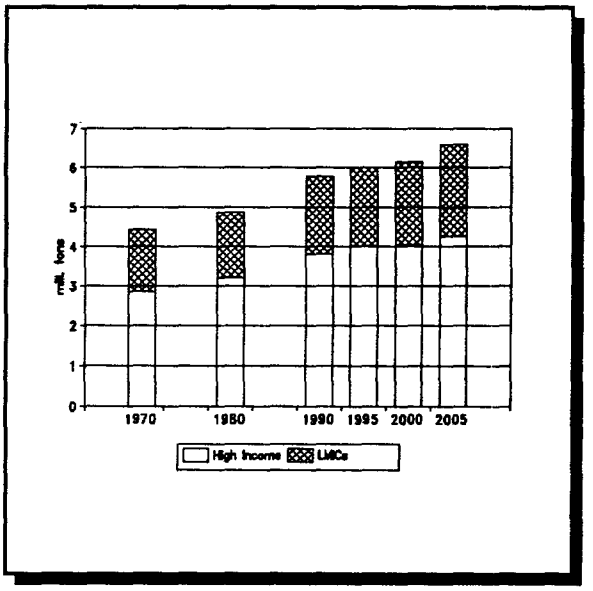
[1] World arabica and robusta prices are proxied by the ICO Indicator Prices for "Other Milds" and Robustas, respectively.

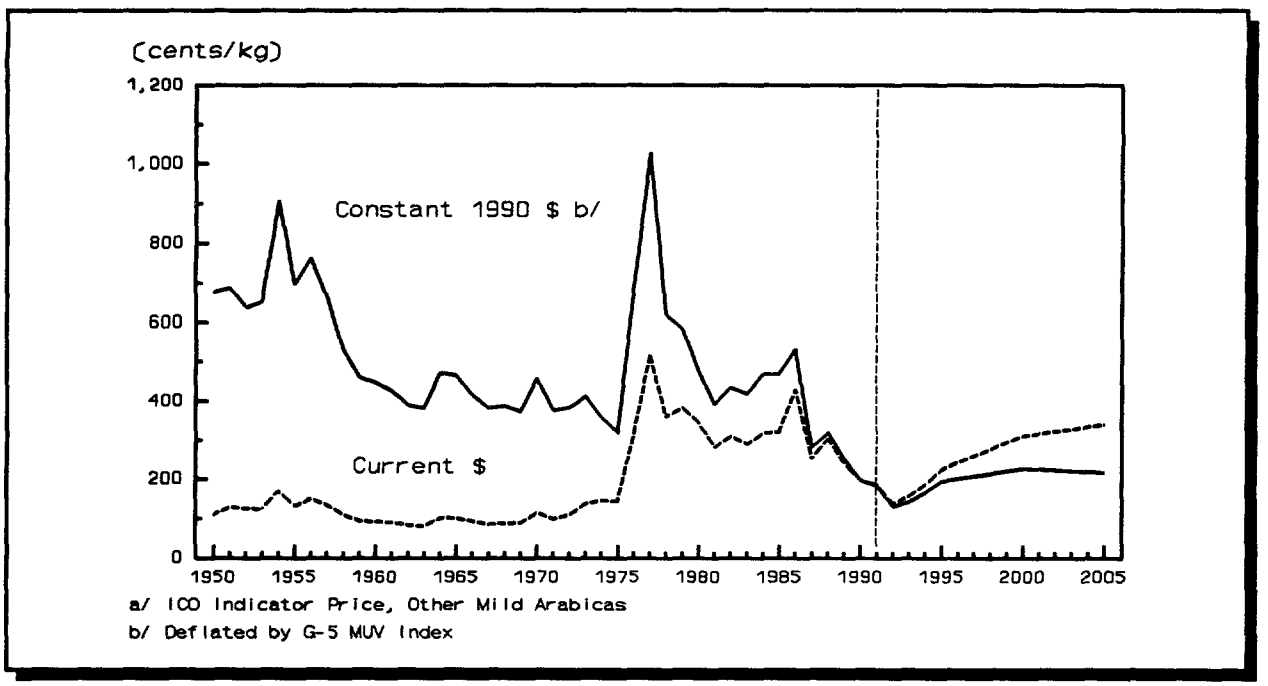
Projected Coffee Production, by Region



Projected Coffee Consumption, by Region



Coffee Prices a/, 1950-2005



Recent Developments

Prices collapse with suspension of export quota system. World coffee prices in real terms recorded their lowest annual average level in 1991 and there was a further decline in the first half of 1992. In terms of nominal US dollars, the average of the ICA "Other Milds" Indicator Price in the first quarter of 1992 was about one half its annual average in 1988.

The reasons for the falling prices since 1989 include:

(a) The release of the large stocks which had accumulated in producing countries. During most of the 1980s, when the export quota system was in force, most producing countries were forced to accumulate large stocks, so that by the end of 1988, total producers' stocks were over 47 million bags. Since the collapse of the system, producing countries have exported substantial amounts of these stocks and by the end of 1991 stocks in these countries were estimated to be less than 36 million bags. One important reason for the large increase in exports was that producing countries wanted to establish evidence of higher exports so that they would be able to obtain larger quotas if the quota system were reintroduced.

(b) Slow supply response to the reduction in world prices. In spite of the very low world prices since 1989, world coffee production in 1990 and 1991 was almost at a record. The reasons for the slow response include: (i) being a tree crop, coffee supply does not respond to prices in the short run; (ii) many producing countries reduced their exchange rates and also export taxes to try to maintain real producer prices; and (iii) productivity has increased significantly in a number of producing countries.

(c) Stagnant world demand. Import demand in the main consumers, the high-income countries, has been stagnant partly due to slower growth or recession. The decline in imports by the FSU has also been a negative factor.

Export revenue declines serious. As a result of the sharp fall in coffee prices, coffee-exporting countries have experienced a sharp decline in export revenues. As shown in Table 1, nominal world coffee export revenue declined by about 30% between coffee years 1988/89 and 1990/91. (The international coffee year is from October 1 to September 30.) In real terms, i.e., nominal US dollars deflated by the MUV, the decline was 38%. The decline was considerably larger for robusta-exporting countries as the decline in robusta prices was much steeper than in arabica prices--export revenues in nominal US dollars declined by 30% for washed arabica producers, 21% for natural arabica producers (Brazil and Ethiopia combined), and 42% for robusta producers.

There was wide divergence in rates of changes in coffee export revenues among exporting countries. A number of countries compensated for the price decline by increasing volume. Colombia's export revenue declined by only 20% between 1988/89 and 1990/91 as it increased export volume by 20%. Brazil increased export volume by 17%. Ethiopia, on the other hand, suffered a 54% decline in coffee export revenues as its export volume declined sharply--by 39%. The sharp reduction in coffee export revenues caused serious difficulties for countries that are heavily dependent on coffee as a source of foreign exchange revenue. These include Burundi, Côte d'Ivoire, Ethiopia, Rwanda, and Uganda.

Local producer prices cushioned against falls. Producing countries attempted to alleviate the impact of the world price decline on producer prices in various ways. Table 2 shows the development of producer prices in terms of real local currencies (deflator used was the CPI) in major coffee-producing countries--the average decline between 1988 and 1991 was about 30%. This figure is considerably less

Table 1: Coffee Export Revenues of Selected Coffee-Exporting Countries, 1985/86-1990/91

	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91
	(million US current dollars)					
Total of all ICO members	14,234	10,656	8,882	9,162	6,623	6,488
Brazil	2,414	2,348	2,165	1,878	1,221	1,568
Colombia	2,903	2,075	1,525	1,720	1,401	1,386
El Salvador	615	359	322	283	261	212
Mexico	862	573	404	531	430	385
Ethiopia	346	206	267	258	170	118
Cameroon	333	212	197	167	155	114
Côte d'Ivoire	781	458	515	375	291	309
Kenya	468	297	241	267	207	194
India	325	232	202	244	176	137
Indonesia	835	636	518	596	356	375

Source: ICO.

Table 2: Index of Real Producer Prices in Selected Countries, in September, 1987-91
(Base June 1989=100)

	1987	1988	1989	1990	1991
Average for all ICO members	100	107	72	69	73
Brazil	69	84	52	50	67
Colombia	102	93	96	90	90
El Salvador	108	113	93	97	83
Mexico	75	72	97	69	53
Ethiopia	89	118	65	94	48
Cameroon	102	102	103	40	34
Côte d'Ivoire	106	100	99	49	47
Kenya	130	130	99	90	94
India	93	117	95	91	66
Indonesia	208	155	84	93	80

Source: ICO.

than the 42% decline in deflated world arabica prices (US dollar prices deflated by the MUV) during the same period. The difference stems mainly from changes in the deflators, exchange rates, and taxes. To evaluate the extent of changes in taxes, Table 3 shows the differences between the unit value of exports and producer prices in major producing countries in recent years. These differences consist of taxes, subsidies, processing costs, and domestic marketing costs. For the average of all International Coffee Organization (ICO) members, the difference became substantially smaller between 1988 and 1991, suggesting large reductions in export taxes or increases in subsidies.

Table 4 shows the changes in real producer prices in major exporting countries and the components or breakdown of the changes[2]. For example, Brazil's real coffee producer prices declined by 32%. This was caused by a 41% decline in export unit value, a 37% decline in the real value of the US dollar in terms of real local currency, and tax and domestic marketing cost reductions which contributed to increasing real producer prices by 46%. As Table 4 shows, Brazil, Colombia, El Salvador, Mexico, and Ethiopia reduced taxes and domestic marketing costs substantially to alleviate the impact of low world prices on real producer prices. However, in Brazil, Mexico, and Ethiopia there was considerable currency appreciation which reduced real producer prices. Kenya and India cushioned the impact by real exchange rate depreciation but taxes and/or marketing costs increased.

Importers' retail prices largely unaffected. Table 5 shows retail prices of roasted coffee in selected coffee-importing countries. A notable feature of the retail price data is that the decline in retail prices was much smaller than that in world prices. While international arabica prices declined by about 40% between 1988 and 1991, the decline in retail prices in terms of nominal US dollars was only 5% in the United States and France, 7% in Germany, and an increase of 18% in the United Kingdom. Sharp differences in the changes between world and retail prices are caused by taxes, marketing costs, and profits. In fact, unit import values of coffee constituted only a small fraction of the retail prices of roasted coffee in major importing countries in 1990–26% in the United States, 25% in France, 18% in Germany, and 9% in Japan. For this reason, and because of the low price elasticities of coffee demand in these countries, the fall in world coffee prices had a small impact on consumption demand.

Consuming country stocks dampen recovery prospects. An important development in the world coffee market has been the sharp increase in the stocks held in consuming countries as world prices have fallen. These stocks are estimated by the ICO to have increased from 8.5 million bags at the end of 1988 to about 17 million bags by the end of 1991, an accumulation which causes concern among producing countries because it is likely to keep world prices at low levels.

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[2] Real producer price can be expressed as

$$\frac{PP}{CPI} = XUV * \frac{EXCH}{CPI} * TXR$$

where PP = Producer Price; XUV = Export Unit Value; EXCH = Exchange Rate:
TXR = Tax and Domestic Marketing Cost Rate.
So a percentage change in PP/CPI can be broken down to the percentage changes of its component XUV, EXCH/CPI and TXR.

Table 3: Difference Between Unit Value of Exports and Producer Prices in Selected Countries, in September, 1987-91

	1987	1988	1989	1990	1991
	(US¢/lb)				
Average for all ICO members	31.3	39.3	15.0	16.9	16.7
Brazil	43.2	41.6	15.5	4.6	9.9
Colombia	27.5	60.2	5.7	13.8	14.1
El Salvador	13.6	19.6	12.5	14.3	29.4
Mexico	49.7	63.0	15.4	13.9	27.7
Ethiopia	70.4	133.7	18.6	55.2	71.3
Cameroon	20.9	26.9	9.0	29.2	17.3
Côte d'Ivoire	44.9	34.5	43.4	27.3	12.6
Kenya	12.0	55.7	15.6	25.5	44.6
India	18.0	10.6	-0.2	9.9	22.9
Indonesia	21.0	35.1	18.4	7.1	11.6

Source: World Bank, International Economics Department.

Table 4: Changes in Real Producer Prices and Their Components in Selected Countries between September 1988 and September 1991

Country	Change in Real Producer Price	Export Unit Value a/	Exchange Rate and CPI b/	Taxes and Marketing Costs c/
	(in percentages)			
Brazil	-32	-41	-37	+46
Colombia	-3	-37	-2	+36
El Salvador	-27	-45	-5	+23
Mexico	-26	-29	-26	+29
Ethiopia	-59	-40	-35	+16
Côte d'Ivoire	-53	-52	-10	+9
Kenya	-28	-35	+11	-4
India	-44	-41	+33	-36
Indonesia	-48	-49	-9	+10

a/ Percentage change in export unit value.
b/ Change in the value of nominal US dollar in terms of local currency deflated by CPI.
c/ Effects of changes in taxes and domestic marketing costs on real producer prices.

Source: World Bank, International Economics Department.

Table 5: Retail Prices of Roasted Coffee in Selected Importing Countries, September, 1987-91

	1987	1988	1989	1990	1991
	(USc/lb)				
United States	282	284	310	303	269
France	280	259	262	273	246
Germany	452	439	411	462	410
United Kingdom	1000	863	1019	1099	1017
Sweden	331	357	344	353	319
Japan	968	1029	938	979	N.A.

Source: ICO.

We undertook an analysis of the behavior of these stocks. The analysis suggests that:

(a) The demand for stocks in consuming countries is considerably more price elastic than demand for consumption. While the price elasticities of demand for consumption in the major consuming countries range from 0.1 to 0.3, for stocks they range from 0.4 to 1.0. This implies that the aggregate price elasticity of world import demand has increased.

(b) Stocks in consuming countries increased sharply, by almost 4 million bags, with the suspension of the quota system. The reason for this increase is the perception by importers and roasters of increased uncertainty in world coffee prices in the absence of the quota system.

(c) If the quota system were reintroduced, these stocks would be released and the initial quota allocation would have to be small to allow for absorption of the stock release.

Another significant development since the collapse of the quota system has been the divergence of prices between arabicas and robustas. As shown in Figure 1 and Table 6, in the early 1980s when the quota system was in force, robusta prices were 4% to 20% lower than arabica prices. The gap increased to 40% and 43% in 1990 and 1991, respectively. Statistical analysis suggests two factors behind this increasing gap--the faster increase in robusta production and changes in tastes favoring arabicas. Large increases in robusta production in recent years in Brazil, Indonesia, and Viet Nam have contributed significantly to the changing relative prices.

Prospects for Supply and Exports

World production stagnates. It is estimated that even the most efficient coffee producers are facing difficulties in covering variable production costs at the current low level of world prices. In most countries, export taxes on coffee have been reduced sharply or eliminated, as discussed above. If prices continue at these levels, no country is expected to increase production substantially in the near future. In fact, world production is expected to stagnate in the first half of the 1990s and to increase thereafter, such that the average rate of growth for the period 1991-2005 should be 0.6%.

Arabica and Robusta Prices, 1980-2005 (Current Dollars)

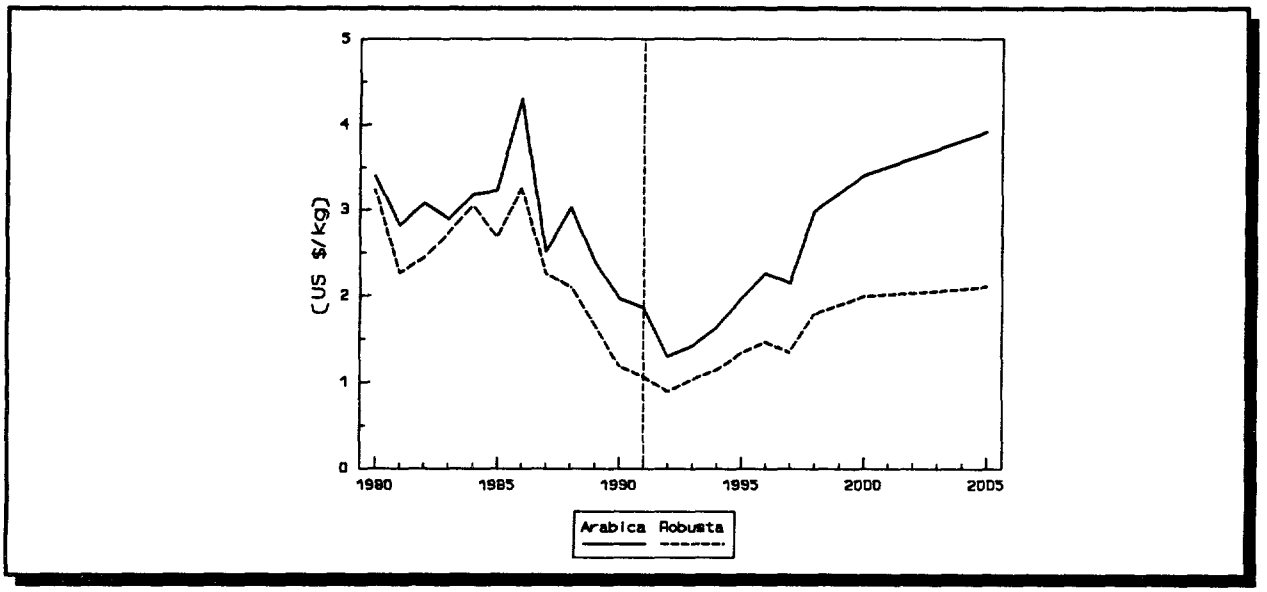


Table 6: Development of Arabica and Robusta Prices, 1980-91

Year	Arabica Prices a/	Robusta Prices b/	Ratio c/
	(US¢/kg)		(%)
1980	340	324	95
1981	282	227	80
1982	308	245	79
1983	290	274	94
1984	318	305	96
1985	323	268	83
1986	430	325	76
1987	251	226	90
1988	303	210	70
1989	240	166	70
1990	197	119	60
1991	187	107	57

a/ ICO "Other Milds" Indicator Price.
b/ ICO Robusta Indicator Price.
c/ (Robusta Prices/Arabica Prices) x 100.

Source: ICO.

An examination of recent events in the four largest producing countries highlights the effects of the low prices on world production capacity. Brazilian farmers are reported to be uprooting millions of coffee trees, especially in the states of Parana and Sao Paulo where there are alternative crops to be grown. It is reported that the total number of coffee trees in Brazil has declined from 4.2 billion to 3.2 billion since 1988. Colombia was able to subsidize its coffee farmers until recently from the stabilization fund--National Coffee Fund (FNC). However, with the continued low prices, the FNC has been depleted and real producer prices are expected to decline sharply from this year. Real producer prices in Côte d'Ivoire are estimated to be about one third of what they were in the late 1980s and this hardly covers the variable production costs of many coffee producers. Indonesia's production has been increasing over the past four years at a much slower rate than in the 1970s and 1980s, mainly due to the low world prices. Indonesia has been having difficulty in exporting its coffee as world demand has shifted to the milder arabicas.

Key factors that will determine future supply for coffee producers are real exchange rates, export taxes, labor costs, and marketing and production efficiency. Production in countries such as Colombia and Costa Rica is expected to suffer from rising labor costs although their marketing and production efficiency are considered to be very high. Production in Côte d'Ivoire and Cameroon is likely to be adversely affected by the country's exchange rate. Indonesia is expected to increase production given its low-cost labor, abundance of land, and competitive exchange rate policy.

Projections of supply in major coffee-producing countries are discussed below. No major changes in real exchange rates, export tax rates, and yield trends are assumed for these countries.

Brazil's exports to decline. Production in BRAZIL is expected to be 19 million bags in 1993. This low figure is mainly due to the fact that 1993 will be an "off-year" in the bi-annual coffee cycle. Between 1993 and 2005, production should average around 24-26 million bags.

The share of arabicas in Brazil's production is expected to decline as farmers in the arabica-producing states of Parana and Sao Paulo are expected to switch from coffee to crops such as citrus, pasture, and sugarcane. In mountainous parts of the states of Minas Gerais and Espirito Santo, where robustas are grown, labor is considerably cheaper than in the southern states and there are limited alternative crops to grow. Hence, robusta production there should increase at a moderate rate.

Brazil's exports in the 1991/92 season were at the very high level of almost 19 million bags. With stagnancy in production in the 1993-2000 period, Brazil's exports are projected to decline at 2.4% p.a. and domestic consumption to increase from 9.8 million bags in 1992 to 10.4 million bags by 2005.

Colombia's high export levels to continue to mid-1990s. Production in COLOMBIA increased significantly over the past two years as the trees planted under the replanting program in the late 1980s began to produce. Production is expected to reach 17 million bags in the mid-1990s. Colombia was able to maintain relatively high real producer prices during the past three years because of the availability of money in the FNC. As the FNC is now exhausted, real coffee producer prices in Colombia are expected to decline--by more than 20% in the 1992/93 season. Because most coffee grown in Colombia comes from high-yielding varieties, supply is considerably more sensitive to producer prices than in other countries. If real producer prices are lower over the next few years, this should cause production to stagnate in the second half of 1990s. Colombia's production is therefore projected to fall to about 14 million bags in the late 1990s--from the current level of over 16 million bags--and to increase

by 2005 to 16.7 million bags. In the past two seasons Colombia's exports have been at historical highs of over 13 million bags. The increase in exports was due not only to the historically high production but also to reduced domestic consumption as retail prices in real terms increased sharply. Colombia's exports are expected to be about 14 million bags throughout the 1990s, with part of this coming from accumulated stocks.

Output expands steadily in Indonesia. INDONESIA's production capacity reached over 7 million bags in 1990, double what it was 15 years ago. With abundant land and low-cost labor, Indonesia is one of the few countries expected to increase production substantially in the 1990s--to almost 9 million bags in 2000 and close to 10 million bags by 2005.

Indonesia's annual exports increased by about 2 million bags after the suspension of the quota system. This was achieved by increased production and a drawdown of stocks. Indonesia's stocks are estimated to have declined from 2 million bags in 1989 to about 300,000 bags in 1992. With stocks reduced, Indonesia's exports are projected to be slightly over 6 million bags in the first half of the 1990s and to increase steadily to over 8.2 million bags by 2005.

Most African producers' outlook poor. CÔTE D'IVOIRE's production is projected to decline throughout the projection period--from 4 million bags in 1991 to 3.3 million bags by 2000--due to the lower real producer prices expected throughout most of the 1990s. Real producer prices in 1992 are estimated to be about a third of their level in the first half of the 1980s. Also, the marketing system has been disrupted by the depletion of the funds accumulated by the Caisse de Stabilisation. As most coffee production is exported, exports are also projected to decline in line with production.

CAMEROON's production is projected to remain at about 1.4 million bags during the 1990s and to decline further to 1.2 million bags by 2005, substantially below the production level in the mid-1980s of over 2 million bags. The impact of the fall in world prices was considerable in Cameroon. In real terms, producer prices are estimated to have fallen by about two thirds in the past four years. This caused farmers to stop applying chemical inputs and to reduce hired labor. The low producer prices are expected to have a long-term negative impact on production. A complete reorganization and privatization of the marketing system is underway.

ETHIOPIA is, at the time of writing, still suffering severe social and political uncertainties. As a result, production and marketing infrastructure is deteriorating. Production is therefore expected to stagnate for the next few years. Over the long run, a slight increase in production is projected, assuming improved political and economic stability.

Problems ahead for Kenyan production. KENYA's real producer prices suffered considerably less than other countries from the sharp decline in world prices (see Table 2) as Kenya undertook a real depreciation of the currency and as Kenyan coffee fetches considerably higher prices than most others due to its quality. The export unit value for Kenyan coffee in September 1991 was almost US¢100/lb compared with US¢72/lb for "Other Milds" and US¢40/lb for robustas. However, real producer prices were still substantially lower than in the recent past and, as a result, production is expected to stagnate at the level of 1.7 million bags in the 1990s and recover to 2 million bags by 2005. An additional constraint on production in Kenya is a reduction in agricultural land availability as population is increasing at almost 4% p.a.

A critical problem facing Kenya's coffee industry is its payments system. A new system for paying coffee farmers, the Cherry Advance Payment System, is being implemented, although not uniformly because farmers in some provinces opted to continue receiving payment under the old system. This situation, combined with the news that some politicians are abusing the system, has made farmers lose confidence in it--a re-examination of the payments system is urgently needed.

MEXICO's production is projected to decline to 4.6 million bags by 1995 due to low world prices and increasing domestic costs including labor costs. With the projected recovery in world prices, production is expected to increase after 1995 to about 5.1 million bags by the early 2000s.

VIET NAM's production has been increasing at a very fast rate--from less than 500,000 bags in the mid-1980s to well over 1 million bags in 1992. The increase was due to large investments by the FSU. This source of investment has now dried up but production should continue to increase, though at a slower rate, as the trees mature.

Prospects for Demand and Imports

Low growth of coffee consumption. World coffee consumption is projected to increase at 1% p.a. for the period 1991-2005. The increase in consumption is expected to come mainly from countries in which per capita consumption levels are still low--Japan, LMIC Europe and Asia, and producing countries. Demand in the United States is projected to decline by 0.2% p.a. and that in the EC to increase by 0.7% p.a. World imports are also projected to increase 1% p.a. during this projection period. Imports by high-income countries are projected to increase at 1% p.a. while those by LMICs at 1.3% p.a.

FSU market decline significant for some producers. Imports by the FSU declined from 2.7 million bags in 1989 to 1.2 million bags in 1990 and about 1 million bags in 1991. Considering that the FSU was importing less than 1 million bags in the early 1980s and that 1 million bags constitutes only about 1% of world consumption, recent developments in the FSU have not had a significant impact on the world coffee market. However, for some exporting countries the impact was significant. The FSU was one of the largest markets for Brazil's soluble coffee exports, importing about one third of Brazil's total soluble coffee in recent years. The FSU stopped importing Brazilian soluble coffee in mid-1991. India exported about 1 million bags of coffee to the FSU in 1990 and about 700,000 bags in 1991. Because the FSU's imports constituted about 50% of India's total exports, India's short-run export prospects depend critically on developments in the FSU. Other exporting countries hurt by the declining import demand in the FSU are Viet Nam and Laos.

Little growth in US and EC markets. There are signs that the long-term decline in US demand has stopped. Trend analysis indicates that US consumption declined until the mid-1980s and then increased. An important factor behind this reversal in the trend has been the real price of coffee. Retail prices of coffee in real terms are about 20% below their level in the mid-1980s. With the price elasticity of demand in the United States estimated to be about 0.4, this decline in real retail prices is estimated to have caused an 8% increase in consumption. However, as retail prices are projected to increase, demand in the United States is expected to decline at 0.2% p.a. over the projection period.

Among the EC countries, demand is expected to increase where per capita consumption is still comparatively low, such as in the United Kingdom and Spain. Germany should also increase

consumption with the increase in incomes in the former East Germany. The economic integration of the EC at the end of 1992 is not likely to affect total EC coffee demand very much. At present, the EC's tariff on coffee imported from non-ACP countries is 5%, while imports from ACP countries are duty free under the Lóme Convention. Even if the tariff is reduced to zero at the end of 1992, the impact on consumption should be small given the low price elasticity of demand for coffee in the EC.

Recent developments in "gourmet" markets in the United States and the EC suggest that, in spite of the general stagnancy in coffee consumption in these countries, there is scope for high-quality and specialized coffee demand to increase. Gourmet coffee is usually handled by small roasters who customize their output to market demands. Not only are these particular markets growing but also the prices paid for the coffees sold are substantially higher than for "average" coffees.

Japanese growth weaker. Japanese consumption is expected to increase at 2.6% p.a. during the 1991-2005 period, which is considerably lower than the 7.6% p.a. rate of growth over the past two decades. The major reasons for the slowdown are the higher per capita consumption level at present compared with the 1970s and 1980s and the slower population growth--which is expected to be almost zero by the late 1990s. The aging of the population is also a negative factor. Another factor is that Japanese economic growth is expected to average 3.5% p.a. during the 1990s, considerably lower than the average for the past two decades.

The demand for robusta coffee is projected to decline relative to arabica coffee. In addition to the switching of demand from robustas to arabicas in the OECD countries, the expected increase in robusta production in Indonesia, Viet Nam, and Brazil should depress robusta prices. Also, the reduced imports by the FSU, which were mainly robustas, puts additional pressure on robusta prices. The impact of low robusta prices is and will be significant in African producing countries as many of them depend heavily on coffee exports as a source of foreign exchange.

Price Outlook

Prices to strengthen after 1995 as supply declines. In the short run, world coffee prices depend critically on what happens to Brazil's production. Brazil's 1992/93 crop is projected to be about 19 million bags. Prices should start recovering from late 1992 as long as Brazil's 1992/93 crop is not very much higher than the projected figure.

Prices are expected to recover slowly from the recent very depressed levels in the first half of the 1990s because of large world production and the large stocks held in importing countries. They are projected to increase to over US¢200/kg in the second half of the 1990s as production stagnates or even declines in many countries due to the very low prices in the first half of the 1990s. Even with this increase, the projected price in 2000 is about one half the early 1980s. In the 2000-2005 period, prices are projected to weaken as demand continues to grow slowly, while supply growth is projected to quicken as a result of the higher prices received in the second half of the 1990s.

Expected effects of large consumer stocks. There is great concern and some confusion among producing countries about the price-depressing effects of the large stocks held in importing countries. The current level of stocks in importing countries, estimated to be between 17 and 19 million bags, appears to be very large but one of the reasons for these large stocks is the suspension of the quota system. We estimate the suspension to have caused stocks to increase by 4 million bags (see discussion

above). In the early 1980s when the quotas were in force and when prices were about US$¢130/lb, there were on the average about 7 million bags of stocks in importing countries. So we conclude that there are between 6 and 8 million bags of stocks being held for speculative purposes. These stocks are likely to be released quickly once prices increase. A stock release of 1 to 2 million bags is likely in the 1992/93 season when Brazil's crop is expected to fall between 18 and 20 million bags. After 1992/93, these stocks are likely to be released in years when world production is below 100 million bags and to be dissipated by 1995. While these stocks exist, large price increases are not likely to occur even were world supply to fall sharply. An important characteristic of these speculative stocks is that their accumulation and release is price elastic and the price elasticity increases as price declines. In other words, the price elasticity of demand for stocks when prices are at US¢150/kg may be about 0.8, but at US¢120/kg price elasticity would be 1.1. Hence, had stocks not accumulated in importing countries, world coffee prices in 1991 and 1992 would have been even lower.

The price differential between arabicas and robustas narrowed in late 1992 and is expected to be about 30% in the near term as Côte d'Ivoire, Brazil, and Indonesia reduce exports of robustas. However, the projected prices for robustas are much lower than for arabicas in the long run, as shown in Figure 1 and Table 7, and the price differential is increasing. The main reason is the change in taste in consuming countries. The other factor which determines the relative price, the ratio of export availability of robustas to washed arabicas, is projected to be relatively stable during the projection period.

Policy Issues

International Coffee Agreement (ICA) unlikely. The suspension of the export quota system under the ICA in July 1989 caused world coffee prices to decline sharply which, in turn, caused great financial difficulties in many coffee-exporting countries. Discussions have been taking place in London since the collapse of the agreement to negotiate a new one. In spite of the strenuous efforts by a number of producing countries, ICA members have yet to come to an agreement. There are several factors which make an agreement unlikely in the near future. They include: (i) there is now a freer environment for coffee trading in many exporting countries because commodity board-type organizations have disappeared in several countries, including Mexico, Nicaragua, El Salvador, and Brazil and hence, it would be difficult to control exports from these countries; (ii) the allocation of quotas among producing countries is likely to be difficult given the changes in exports that have taken place since the expiration of the last agreement; and (iii) the global trend to a freer trade environment could make it more difficult to obtain cooperation from importing members, especially if the scheme aims to raise prices substantially or to deprive consumers of choices among varieties of coffee. Even if all the issues are agreed upon soon, the earliest possible introduction of the quota system would be October 1994.

Some diversification out of coffee desirable. Given that the reintroduction of some international price-support mechanism is unlikely, world coffee prices are projected to average much lower than in the period of the ICA agreements. So producing countries, especially those producing robustas, should consider encouraging inefficient coffee farmers to diversify. Such diversification is already underway in Brazil and Colombia. Diversification, however, often requires training of farmers through extension services and the provision of credit, both of which many countries lack.

Table 7: Projected Robusta Prices, 1992-2005
(1990 Constant $)

Year	Arabica Prices a/	Robusta Prices b/	Ratio c/
	(US¢/kg)		(%)
1992	130	90	69
1993	142	104	73
1994	164	115	70
1995	197	134	68
2000	226	147	65
2005	215	135	63

a/ ICO "Other Milds" Indicator Prices.
b/ ICO Robusta Indicator Prices.
c/ (Robusta Prices/Arabica Prices) x 100.

Source: World Bank, International Economics Department.

Weakness of fixed producer price systems. The recent decline in world prices caused especially serious financial problems in producing countries which had fixed producer price systems such as Cameroon, Côte d'Ivoire, and Rwanda. With little prospect of an export quota system forthcoming to stabilize world coffee prices, it seems desirable that producing countries implement "free market" prices in their domestic markets. Recent developments in Côte d'Ivoire and Cameroon suggest that fixed producer price systems can cause considerably more difficulty for both government and farmers than a free market pricing system when there are abrupt changes in world prices. For a free market pricing system to work, dissemination of information to farmers is essential. Experience in Ethiopia has shown that such a system can work well even where the levels of farmer education and infrastructure are weak.

Excessive producer price fluctuations can be mitigated to a great extent by a progressive export tax system. This may cause large fluctuations in government revenues but these, in turn, can be alleviated by the government using commodity risk management tools such as futures and/or options.

Producers could develop gourmet market. Over the past few years, roasters have expressed frustrations at their difficulties in obtaining good quality coffee. Judging from the price of some Kenyan coffee (US¢50/lb above standard washed arabicas) and Hawaiian Kona coffee, demand for good quality coffee is strong. These coffees are usually processed and sold by small roasters in consuming countries, so exporters could do well by increasing their contacts with these roasters and jointly developing high quality, customized brands.

Table A1: Coffee - Production By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 60 kg Bags)										(% p.a.)		
High-Income	255	230	279	285	290	300	300	300	300	300	0.6	1.4	0.4
LMICs	65,962	84,642	97,133	100,874	100,518	94,810	100,650	97,930	101,670	109,510	1.4	2.0	0.6
Asia & Pacific	5,554	10,406	13,491	14,474	14,751	14,320	14,450	14,620	16,600	18,460	5.1	5.8	1.8
Indonesia	2,882	5,218	7,100	7,480	7,350	7,500	7,550	7,700	8,770	9,770	5.2	6.2	1.9
India	1,457	2,105	2,150	2,970	3,170	2,500	3,820	3,790	3,630	3,750	3.8	3.7	1.7
Africa	21,194	19,479	20,529	19,463	18,920	18,890	19,500	19,510	20,400	21,000	0.8	-0.2	0.5
Cote d'Ivoire	4,025	4,964	4,734	4,000	3,583	4,000	3,970	3,820	3,450	3,300	1.0	-0.8	-1.4
Ethiopia	2,873	3,207	3,400	3,500	3,000	3,000	3,200	3,320	3,430	3,560	1.8	1.3	0.1
Uganda	3,469	1,867	2,500	2,700	3,000	3,000	3,070	3,140	3,520	3,940	0.2	ERR	2.7
Kenya	905	1,446	1,740	1,502	1,650	1,600	1,720	1,740	1,880	2,000	4.4	3.6	2.1
Zaire	1,281	1,378	2,000	1,695	1,500	1,300	1,300	1,500	1,700	1,800	2.8	1.8	0.4
Cameroon	1,189	1,717	1,440	1,365	1,420	1,350	1,330	1,300	1,200	1,200	3.0	1.5	-0.9
America	38,787	53,892	63,113	66,937	66,847	61,600	66,700	63,800	64,670	70,050	1.2	2.3	0.3
Brazil	19,943	24,590	26,000	31,000	28,100	18,840	26,750	23,600	24,500	25,400	0.2	2.4	-1.4
Colombia	8,050	12,477	13,300	14,500	15,900	16,500	17,240	17,000	14,630	16,700	2.3	2.7	1.0
Costa Rica	1,315	1,804	2,453	2,565	2,530	2,500	2,535	2,620	2,770	3,000	3.5	3.6	1.1
El Salvador	2,323	2,924	2,787	2,402	2,500	2,600	2,750	2,880	3,300	3,650	1.3	-0.4	3.0
Guatemala	2,076	2,762	3,472	3,282	3,450	3,300	3,240	3,320	3,620	3,800	2.3	2.2	1.1
Mexico	3,049	3,828	5,100	4,550	4,850	4,200	4,400	4,600	4,800	5,100	2.8	2.4	0.8
World	66,217	84,872	97,412	101,159	100,718	95,010	100,850	98,130	101,870	109,710	1.7	2.0	0.6

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: USDA Foreign Agricultural Circular, International Coffee Organization (actual);
World Bank, International Economics Department (projected).

Table A2: Coffee - Apparent Consumption By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 60 kg Bags)										(% p.a.)		
High-Income	47,508	53,498	63,454	62,072	67,274	66,716	66,864	66,972	67,404	70,899	1.2	1.1	1.0
OECD	47,208	53,168	63,064	61,670	66,860	66,290	66,425	66,520	66,880	70,320	1.2	1.1	0.9
United States	20,914	18,141	21,890	18,710	19,500	18,700	18,600	18,500	17,500	18,100	-0.1	-0.8	-0.2
Japan	1,289	3,299	5,236	5,783	6,160	6,270	6,400	6,530	7,320	8,300	10.1	7.6	2.6
EC-10	18,817	24,292	28,995	31,075	32,300	32,470	32,580	32,600	33,000	34,400	2.8	2.3	0.7
Other Western Europe	4,282	4,928	5,735	5,800	5,780	5,750	5,720	5,740	5,750	5,900	1.5	1.1	0.1
LMICs	26,328	27,441	33,022	33,530	32,830	32,900	32,675	33,230	35,300	39,110	1.3	1.8	1.1
Americas	14,890	15,130	18,260	18,730	18,230	17,700	17,300	17,600	19,000	20,800	1.0	1.1	0.8
Brazil	8,793	8,000	9,900	9,760	9,900	9,760	9,730	10,010	10,260	10,410	0.2	1.2	0.5
Europe	3,879	5,197	5,181	5,060	4,930	5,000	5,020	5,050	5,260	5,670	4.5	2.7	0.8
FSU	700	735	1,223	1,000	1,170	1,180	1,180	1,180	1,190	1,350	4.6	4.0	2.2
World	73,836	80,939	96,476	95,602	100,104	99,616	99,539	100,202	102,704	110,009	1.3	1.4	1.0

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: USDA Foreign Agricultural Circular, International Coffee Organization (actual);
World Bank, International Economics Department (projected).

Table A3: Coffee - Gross Exports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 60 kg Bags)										(% p.a.)		
LMICs	54,356	60,820	81,155	73,450	81,220	75,980	76,110	76,580	77,040	82,000	1.7	1.6	0.8
Africa	16,453	14,992	18,674	17,843	19,200	18,100	17,700	17,500	17,700	18,100	-0.4	-0.3	0.1
Cote d'Ivoire	3,432	3,921	3,233	3,980	4,680	4,320	4,110	3,910	3,470	3,360	1.3	0.0	-1.2
Cameroon	1,036	1,618	2,339	1,857	1,050	1,240	1,300	1,280	1,150	1,150	3.0	1.4	-3.4
Uganda	3,123	2,354	2,365	2,000	3,000	3,200	3,100	3,100	3,390	3,800	0.0	-1.1	4.7
Kenya	841	1,198	2,020	1,649	1,850	1,630	1,650	1,680	1,800	1,900	4.2	3.2	1.0
Zaire	1,098	1,083	2,127	1,349	1,360	1,400	1,410	1,450	1,460	1,480	2.3	1.3	0.7
Ethiopia	1,366	1,354	1,382	849	1,500	1,630	1,580	1,510	1,510	1,450	0.7	0.7	3.9
Americas	35,419	39,401	47,686	50,508	50,200	47,290	47,490	47,930	46,290	49,400	1.2	2.3	-0.2
Brazil	18,333	15,267	17,339	19,339	18,750	15,300	15,050	15,300	13,800	13,800	-0.1	0.1	-2.4
Colombia	6,564	9,854	13,738	12,760	15,000	15,000	15,100	14,800	13,000	14,400	2.6	3.0	0.9
Costa Rica	1,066	1,472	2,377	2,412	2,280	2,300	2,280	2,320	2,450	2,670	3.4	3.8	0.7
El Salvador	1,885	2,451	2,591	2,014	2,300	2,520	2,550	2,640	3,100	3,450	1.4	0.0	3.9
Guatemala	1,687	2,145	3,491	2,803	2,450	3,000	2,930	3,000	3,250	3,380	3.4	3.7	1.3
Mexico	1,539	2,437	4,389	3,507	3,170	2,450	2,580	2,640	2,850	3,000	3.4	3.7	-1.1
Asia & Pacific	2,484	6,427	11,473	10,474	11,820	10,590	10,920	11,150	13,050	14,500	8.3	8.3	2.4
Indonesia	1,403	3,705	6,722	6,343	6,640	6,200	6,300	6,400	7,420	8,190	8.2	8.5	1.8
India	522	1,217	2,026	1,504	1,340	1,400	1,620	1,680	2,030	2,200	5.6	5.8	2.8
World	54,356	60,820	81,155	73,450	81,220	75,980	76,110	76,580	77,040	82,000	1.7	1.6	0.8

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: USDA Foreign Agricultural Circular, International Coffee Organization (actual);
World Bank, International Economics Department (projected).

Table A4: Coffee - Gross Imports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 60 kg Bags)										(% p.a.)		
High-Income	47,507	53,498	64,231	61,997	71,684	67,066	67,144	67,202	66,964	71,059	1.3	1.2	1.0
OECD	47,207	53,168	63,841	61,595	71,270	66,640	66,705	66,750	66,440	70,480	1.3	1.2	1.0
United States	20,914	18,141	20,189	20,000	21,600	19,100	18,800	18,650	17,300	18,100	-0.9	-0.7	-0.7
Japan	1,289	3,299	5,486	5,450	6,600	6,340	6,380	6,550	7,300	8,310	10.1	7.3	3.1
EC-10	18,817	24,292	31,346	30,550	33,900	32,300	32,600	32,680	32,830	34,540	2.8	2.0	0.9
Other Western Europe	4,282	4,928	5,970	5,900	5,900	5,800	5,800	5,720	5,700	5,910	1.6	1.3	0.0
LMICs	5,770	7,413	9,061	9,188	8,976	9,124	9,216	9,378	10,076	10,941	5.3	3.5	1.3
Europe	1,159	1,477	5,181	5,060	4,930	5,000	5,020	5,050	5,260	5,670	4.5	2.7	0.8
FSU	700	735	1,223	1,000	1,170	1,180	1,180	1,180	1,190	1,350	4.6	4.0	2.2
World	53,277	60,911	73,292	71,185	80,660	76,190	76,360	76,580	77,040	82,000	1.7	1.5	1.0

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: USDA Foreign Agricultural Circular, International Coffee Organization (actual);
World Bank, International Economics Department (projected).

Table A5: Coffee - Prices, a/ 1950-91 (Actual) and 1992-2005 (Projected)

	(¢/kg)		
	Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/
Actual			
1950	111	677	895
1951	129	686	939
1952	126	637	879
1953	125	653	865
1954	170	907	1,159
1955	133	695	904
1956	151	763	1,004
1957	134	664	872
1958	109	529	696
1959	93	459	595
1960	92	446	578
1961	90	425	552
1962	83	388	495
1963	81	382	468
1964	101	471	569
1965	100	465	546
1966	93	415	491
1967	86	382	443
1968	87	387	436
1969	88	372	422
1970	115	457	520
1971	99	375	419
1972	110	383	422
1973	137	411	460
1974	145	357	440
1975	144	319	389
1976	315	687	823
1977	517	1,027	1,223
1978	359	620	693
1979	382	582	697
1980	344	478	561
1981	282	390	456
1982	309	434	506
1983	290	417	468
1984	318	467	514
1985	321	468	509
1986	429	531	563
1987	251	282	292
1988	303	318	327
1989	239	252	259
1990	197	197	197
1991	187	184	178
Projected			
1992	139	130	124
1993	157	142	136
1994	185	164	156
1995	225	195	185
2000	310	226	211
2005	340	216	194

a/ ICO Indicator Price, Other Mild Arabicas.
b/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.
c/ Deflated by G-7 Consumer Price Index (CPI).

Sources: ICO, Complete Coffee Coverage (actual); World Bank, International Economics Department (projected).

Cocoa

Summary

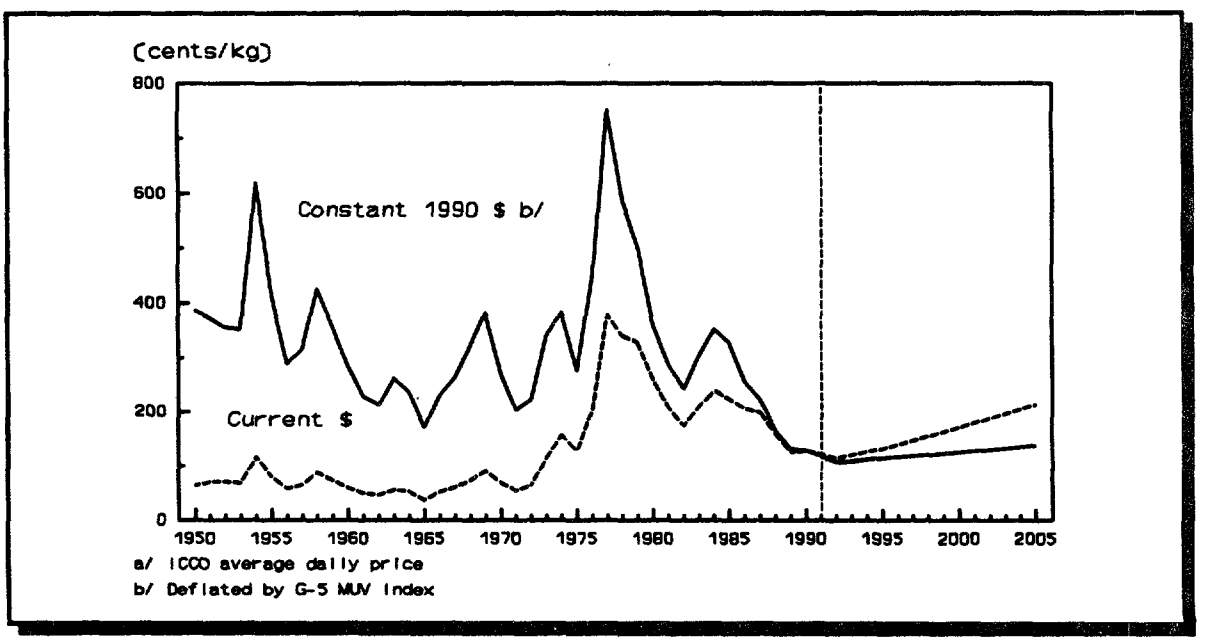
- Despite drier-than-normal weather during the summer of 1992, world cocoa production is expected to increase in 1993. Further growth is expected in the period 1993-95, although it will be much slower than in the recent past. This growth will be based on the coming into maturity of new plantings from the mid- to late 1980s, although yields from these plantings will be reduced because low producer prices in the interim have led to poor farm care.

- After 1995, the low level of new plantings and replantings of recent years should result in a production decline in some countries (Brazil, Cameroon, Côte d'Ivoire, and Malaysia) and slowing down in production growth in others (Ecuador, Ghana, and Nigeria). Only Indonesia, whose costs of production are low, is projected to show significant growth. In aggregate, production will increase at only 0.7% p.a. over the 1995-2005 period.

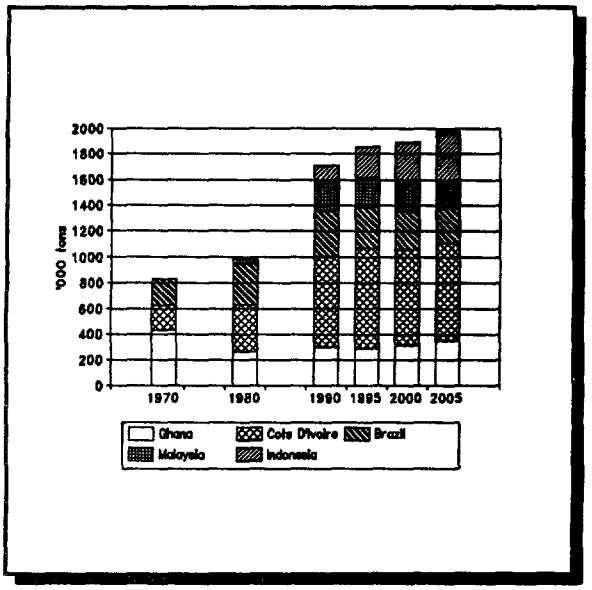
- In the short to medium term, world consumption growth will be around 2% p.a., but will slow in the longer run as cocoa prices increase. World consumption developments during this period will be significantly affected by the pace of recovery in the FSU and Eastern Europe. Increases in cocoa consumption are expected to come from Asia, particularly China, Japan, and the Republic of Korea.

- In real terms, the market outlook is for prices to remain almost unchanged during the 1992 to 1995 period due to the existence of record large stocks. In the medium to long run, we expect a slow price increase--in real 1990 US dollars going from $1,060/ton in 1992 to $1,240/ton in 2000, and to $1,360/ton in 2005. Note that for the period 1985 to 1990 the average real price of cocoa was $2,055/ton.

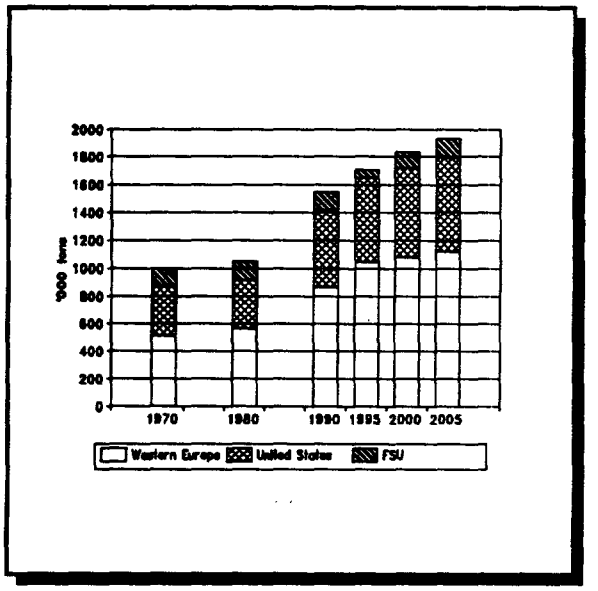
Cocoa Prices a/, 1950-2005



Projected Cocoa Bean Production, by Major Producer



Projected Cocoa Bean Consumption, by Major Consumer



Recent Developments

Stocks build up and prices plummet. Since the mid-1980s, cocoa production has increased by about 1 million tons and cocoa consumption by about 600,000 tons, resulting in significant stock growth and sharp price declines. Over the past two years, production has exceeded consumption by a cumulative total of 350,000 tons. Prices fell from $1,585/ton in 1988 to $1,195/ton in 1991. During the second quarter of 1992, cocoa prices, in current dollars, were at an 18-year low. In more detail the reasons for the continuous fall in prices were:

(a) Slow supply response to the price decline. This can be attributed to the high level of new plantings during the 1980s, plantings that are now coming to maturity. These have more than offset the effects of poorer crop maintenance due to the low prices.

(b) While cocoa consumption in the United States and Western Europe increased more quickly due to the low prices, cocoa consumption in the FSU dramatically declined.

(c) Even though consumption increased during the past two years at 5% p.a., cocoa production in absolute levels was higher than consumption. The 1990/91 crop was particularly large for major producers such as Brazil, Côte d'Ivoire, Indonesia, and Nigeria.

The decline in world cocoa prices has been evident in export revenues from cocoa (beans and products).[1] Figure 1 shows cocoa export revenues, in terms of nominal US dollars, for three

[1] In 1990, export revenues from cocoa represented 1.6% of the total export revenues from non-fuel primary commodities of all developing countries.

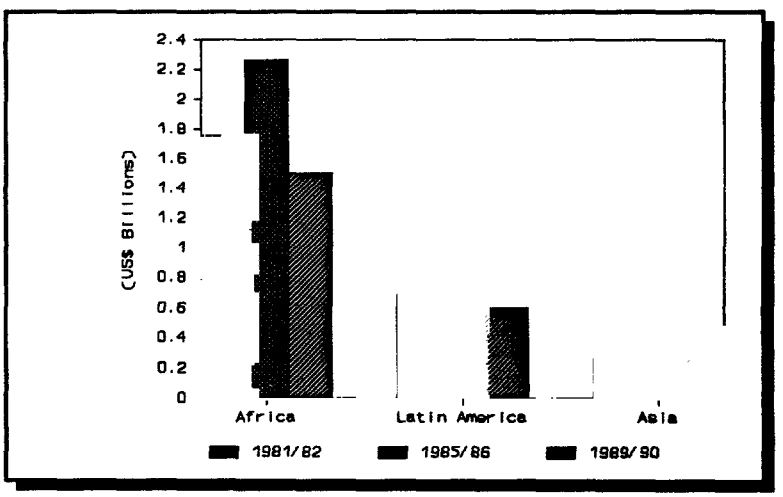
geographical regions during the years 1981/82, 1985/86, and 1989/90. The biggest losses were recorded by African producers: US$760 million less in 1989/90 compared with 1985/86 and US$260 million less in 1989/90 compared with 1981/82. Latin American cocoa producers saw reductions of US$140 million and US$86 million over these two periods. However, Asian cocoa producers recorded gains of US$37 million and US$219 million, respectively.

Low cocoa prices have prompted producing countries to seek a revival of the economic clauses of the international cocoa agreement. However, to date these efforts have been unsuccessful. Although the main consuming countries, in general, oppose market intervention, there are pressures to show some political will to assist producer countries. In addition, chocolate makers in consuming countries are concerned that the persistence of very low prices will lead to deterioration in quality of the beans and threaten the viability of cocoa production.

Supply Prospects

Production falls, expected recovery slow. World production of cocoa beans is expected to decline by about 10% this year (1991/92). To a great extent, the decline is due to adverse weather and, to a lesser extent, to the short-run price elasticity of cocoa supply. In Africa, the very wet spring of 1991 followed by a very dry summer is causing crop reductions in Ghana, Côte d'Ivoire, and Nigeria. Similarly, the excessive rain and the occurrence of black pod disease will have a significant effect on the Brazilian crop. In Indonesia and Malaysia, the coming to maturity of new plantings has offset the adverse weather effects on production. The supply response to low prices was most significant in Brazil and Malaysia, two relatively high-cost producers. In both cases, low prices were responsible for a lack of crop husbandry and lower application of fertilizers and pesticides. Also, new plantings have been severely affected by the low prices. According to USDA reports, the total area planted during the past three years declined by 20,000 ha in Cameroon, by 10,000 ha in Ecuador and by 19,000 ha in Malaysia. In Brazil and Ghana, total area has remained unchanged, while it increased by 8,000 ha in Côte d'Ivoire.

Figure 1: Export Revenues from Cocoa, 1981/2 to 1989/90



Given normal weather conditions, production could grow by 8% between 1992 and 1993. However, the summer of 1992 was drier than normal in West Africa which is expected to negatively affect 1992/93 crop developments in Cameroon, Côte d'Ivoire, and Ghana. Brazil's crop is also expected to be affected by bad weather and the spread of disease. Given the adverse weather, world production is projected to increase by only 3% between 1992 and 1993. After 1993 the projections assume normal weather conditions. Thus, the projected 6% growth between 1993 and 1994 reflects mainly the restoration of normal weather conditions. Between 1994 and 2005, production is expected to grow by only 0.7% p.a. as recent and current prices are resulting in no investment in cocoa plantings. The slow recovery of prices expected over the longer term will have some positive effects on supply due to better farm care and, with a lag, to new plantings.

Details of projections for the major producers are given below. Production in Brazil, Cameroon, Côte d'Ivoire, and Malaysia is projected to decline in the long run, while production in Ecuador, Ghana, and Nigeria is projected to register small increases. The only significant growth in production is projected for Indonesia.

Low prices dampen investment and production in Côte d'Ivoire. In CÔTE D'IVOIRE, production in the medium term is projected to grow only slowly from 741,000 tons in 1992 to 780,000 tons in 1995. The new plantings of the mid- to late 1980s will be coming to maturity and are expected to offset the decline in yields resulting from poor farm maintenance while prices are low. Farmers claim that current producer prices are insufficient to meet basic farm operating costs. Producer prices in Côte d'Ivoire are one half of what they were in the 1980s (see Figure 2). Given the low level of world prices, it is doubtful that the CFA 200/kg producer price will change soon. The government has decided to maintain crop area at current levels--1.5 million ha--and to discourage further expansion. During the second half of the 1990s, the low investment in the cocoa sector in the early 1990s will negatively affect production growth, but the expected recovery in world cocoa prices after 1995 should have a positive effect on production, both in the short and longer term. Production is projected at 748,000 tons by 2000, increasing to 765,000 tons by 2005.

The government is taking several measures towards reforming the domestic marketing system. Purchasing agents will no longer need government approval and exporters will be able to appoint as many agents as desired to buy any quantity of beans, and with no restrictions on the amount that can be exported. However, the government has increased the required capital of cocoa exporters from 30 to 100 million CFA and increased the required deposits from 15 to 50 million CFA. This measure is intended to ensure adequate working capital and to protect farmers' interests.

Production decline in Cameroon. In CAMEROON, production is expected to show a steady decline because there were no new plantings or replantings of any significance during the 1980s. Further, the prevailing producer prices do not justify investment in cocoa production.[2] USDA reports indicate abandonment of farms and reduction in the area planted as younger farmers are being encouraged by the government to plant food crops which provide a steady year-round income, and the government is in arrears in payments to farmers of 200,000 CFA/ha of new cocoa plantings which should have been made under a government program. In light of these factors and low farmgate prices, production is projected to decline from 102,000 tons in 1992 to 100,000 tons by 2000 and to 95,000 tons by 2005.

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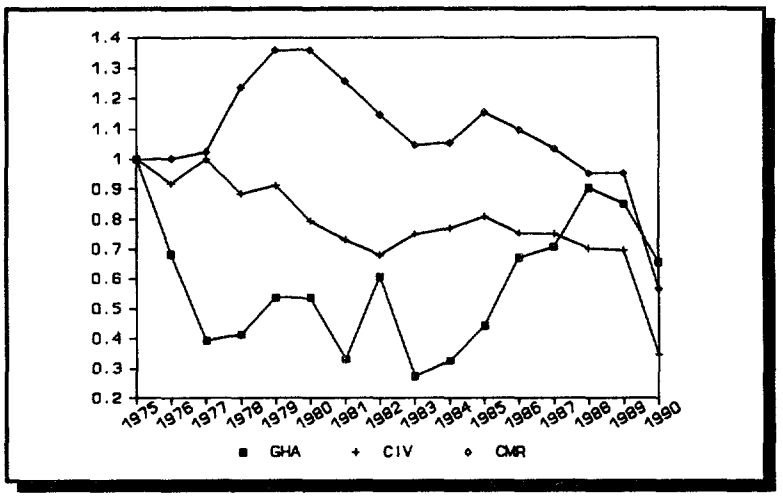
[2] As in the case of Côte d'Ivoire, real producer prices are one half of what they were in the 1980s (see Figure 2).

Figure 2: Real Producer Prices for Cameroon, Cote d'Ivoire and Ghana, 1975-90



Real prices higher so production to increase in Ghana. GHANA's cocoa production is expected to decline in 1992 mainly due to the adverse weather. Subsequently, production should show a very gradual increase up to the year 2000--from 250,000 tons in 1992 to 315,000 tons by 2000. For the period 2000 to 2005, a somewhat faster production increase (2.7% p.a. vis-a-vis 1.4% for the period 1992-2000) is projected due to the effect of higher prices on production. By 2005 production is expected to reach 348,000 tons. Despite the increases in nominal cocoa producer prices recently, real prices have been declining, although they are still double what they were in the first half of the 1980s (see Figure 2). Up until 1990, the Ghana Cocoa Board provided subsidies on insecticides. Since the subsidy was withdrawn, farmers have reduced the application of insecticides, which may increase the impact of disease.

For Ghana, an important factor will be the impact of the recent reform of the cocoa marketing system. The Ghana Cocoa Board has stated that private companies will be allowed to buy cocoa from farmers although the Cocoa Marketing Company (CMC) will still control export sales. The objective of the privatization is to introduce competition in the internal marketing of cocoa and thus improve the efficiency of the sector. It is likely that the increased marketing efficiency will result in higher prices to farmers.

Little investment in cocoa in Nigeria. In 1992, NIGERIAN cocoa production is expected to fall by 55,000 tons to 105,000 tons mainly due to adverse weather. Both yields and quality of the 1991/92 crop were hurt by the extended rainy season which resulted in a higher incidence of black pod disease and drying problems after harvest. After 1992, production is expected to recover and show a gradual increase over the period 1993 to 2005, with a projected increase from 145,000 tons in 1993 to 175,000 tons by 2005. Production growth, particularly after 2000, will be constrained mainly due to the lack of any significant new planting during the late 1980s and 1990s. After the 1986 marketing reforms, producer prices rose from 1.5 naira/kg to 4.4 naira/kg in 1987-88 (prices expressed in real 1985 nairas). Due to this price increase, farmers rehabilitated plantations, increased their productivity, and planted new trees. However, after 1988 prices fell to about 2.5 1985 naira/kg, discouraging investment in cocoa--even replacement of trees burned by the bush fires in 1989 has been limited. Not only are low cocoa

prices resulting in low levels of investment, but in addition, they are having a direct effect on production due to reduced farm maintenance. The poor quality of Nigerian beans remains a problem in the post-1986 market liberalization period. Because of their poor quality, Nigerian beans sell at significant discounts below Ghanaian beans.[3]

Low prices squeeze producers and long-term decline likely. In BRAZIL, cocoa production is facing serious problems. Domestic cocoa prices are at historical lows. Production costs are around $1,000/ton which puts the break-even f.o.b. price at around $1,400-1,500/ton. Brazil's planted cocoa area has remained unchanged at 630,000 ha since the mid-1980s when the cocoa area expansion program was halted. (In the period 1975 to 1985, 400,000 ha were planted and Brazil's production potential increased from 250,000 tons to 400,000 tons.) For 1992, production is expected to drop to 305,000 tons--down from 370,000 tons in 1991. This sharp decline is mainly due to weather conditions which favored outbreaks of pod rot and witches broom fungus. The low domestic cocoa prices and the increasing costs of fertilizers and pesticides mitigate against controlling crop diseases. If prices remain low, therefore, crop volatility is likely to increase.

In the medium term (1994-97), production should recover somewhat to 320-330,000 tons, assuming weather conditions return to normal. In the longer run, however, due to the high cost of production, poor farm care, and aging tree population, cocoa production in Brazil is likely to decrease steadily--reaching 295,000 tons by 2000 and 268,000 tons by 2005.

High costs and low prices cause diversification out of cocoa. In MALAYSIA, the scarcity of farm labor and increasing wages are expected to cause large estates to reduce farm care or even diversify out of cocoa as production costs are not covered by prices. Production costs for estates are about $1,000/ton, which puts the break-even f.o.b. price at around $1,500/ton. The Malaysian Government is encouraging plantation companies to venture into fruit and vegetable cultivation as an alternative to cocoa. Total area under cocoa has already declined from a peak of 410,000 ha in 1989 to 380,000 ha in 1992. With the low level of new plantings in the early 1990s, the diversification away from cocoa, and the projected low world prices, we project a decline in production to 220,000 tons by 2000 and to 215,000 tons by 2005. Reports indicate a reduction in the use of fertilizers and chemicals, poor farm care by smallholders and the smaller estates, and some diversification from cocoa to oil palm by larger estates, all of which contribute to reduced output. As a result of reduced farm care, yields have dropped by over 20%--from over 900 kg/ha in the late 1980s to 700 kg/ha in 1991-92.

Production is projected to increase until the mid-1990s as the significant area of new plantings in the mid-1980s--around 150,000 ha--will be coming to maturity. The production from these plantings will have a greater effect on the output than the negative effects of reduced farm husbandry. However, while production is expected to increase to 235,000 tons by 1995, this is well short of the 339,000 tons target set by the Sixth Malaysian Economic Plan.

Low-cost Indonesia expands production. INDONESIA may be the only country with the potential for expansion, even at today's low prices. Indonesian smallholders are among the lowest-cost cocoa producers. Production costs are around $300-500/ton. Labor costs are low, and new areas are opening. Quality is also improving which cushions price declines. Reports indicate a large area of new

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[3] Before liberalization, Nigerian beans were selling at £10-20/ton below Ghanaian beans. Now they are selling at about £50-70/ton below.

plantings in the late 1980s and early 1990s. We are projecting a significant and continuous increase in production for the period 1992-2005. The projected average rate of growth is 6% p.a. which, incidentally, is about one fourth of what it was during the 1980s. Production is projected to increase to 325,000 tons by 2000 and to 390,000 tons by 2005.

Elsewhere production stagnates with low prices. ECUADOR's cocoa production is projected to decline to about 90,000 tons in 1992--well down from two consecutive crops above 100,000 tons in 1990 and 1991. The main reasons for the decline are the very cool weather of last August (1991) which affected crop development (budding stage), and the decline in yields due to low prices. Over the next three to five years, cocoa production is expected to stagnate as a result of low prices and lessened farm care. Over the longer run, production growth will be constrained because presently no cocoa trees are being planted. In addition, some farmers are switching to more profitable crops such as bananas, corn, and fruits and vegetables. We project production not to exceed 100,000 tons even by 2005.

No significant growth in production is projected for COLOMBIA, the DOMINICAN REPUBLIC, MEXICO, and PAPUA NEW GUINEA--in the short or long run--for the same reasons as in Ecuador.

Consumption Prospects

Key uncertainty is income growth in Eastern Europe and the FSU. World cocoa consumption is expected to remain almost unchanged between 1991 and 1992. The projected growth of 0.3% is well below the average rate of growth during the past four years of over 5%. The price increase in chocolate confectionery products in the later half of 1990 by US chocolate makers and the slowdown in economic activity in both the United States and Western Europe contributed to the sharp reduction in the consumption growth. In the FSU, cocoa grindings are below one third their level in the 1980s due to the foreign exchange shortage. Cocoa consumption in the FSU is projected not to show any significant recovery for the next three to four years. The outlook for Eastern Europe, which is discussed in a special section below, is more promising. Consumption temporarily declined from its mid-1980s levels but is now showing signs of an upturn. Ultimately, there is good potential for demand expansion in Eastern Europe and the FSU as per capita cocoa consumption is about one-third of that in Western Europe (see Figure 3). We believe that the key uncertainty in the long-run cocoa consumption projection lies with the prospects for income growth in Eastern Europe and the FSU. Over the period 1992 to 2005, consumption growth in Eastern Europe is projected to be 2% p.a. For the FSU, consumption is projected to remain at about the 1992 level for the next three to four years, but subsequently to rise as economic activity recovers. By 2005, consumption is projected to be 150,000 tons--roughly the average consumption level during the 1980s.

In Western Europe and the United States, long-term consumption growth will be constrained by the projected increases in real cocoa prices. The introduction of cocoa butter substitutes due to changing regulations in Europe will also hamper growth in Western Europe, as discussed in the next paragraph. For the United States and Western Europe, the average rate of consumption growth over the next three to five years is projected to be 2.5% p.a. and 2% p.a., respectively. With prices showing recovery after the mid-1990s, growth is expected to slow. Over the period 1992 to 2005 the average consumption growth for the United States and Western Europe is projected to be 1.4% p.a. and 1.1% p.a., respectively. The lower rate of growth for Western Europe after 1995 also reflects the substitution of cocoa butter by cocoa butter alternatives, an issue that is analyzed below.

An issue that is of concern to producing countries is the substitution of cocoa butter substitutes (vegetable fats) for cocoa butter, due to changing regulations in the EC. Currently, in all EC countries with the exception of the Denmark, Ireland, and the United Kingdom, chocolate products cannot use alternatives to cocoa butter (Denmark, Ireland, and the United Kingdom currently allow up to 5% cocoa butter alternatives). With the harmonization of regulations in Europe on January 1, 1993, other European chocolate makers will lobby to be allowed to use cocoa butter alternatives to the same extent in order to compete, particularly with UK manufacturers. Even through the low level of current and projected cocoa prices should constrain the expansion of the use of substitutes for cocoa butter, industry analysts have estimated that by the mid- to late 1990s, 50-75,000 tons of cocoa may be displaced by vegetable fat substitutes. This substitution is more likely to affect cocoas of lower quality, such as Brazilian, Indonesian, and Malaysian, rather than higher-quality cocoas such as those from Cameroon and Ghana.

Cocoa consumption developments in East Asia are beginning to assume some importance as a result of the rapid income growth. Per capita consumption is presently about 0.2 kg, one tenth that of Western Europe (see Figure 3). But statistics show that it is growing, albeit from a small base (see Table 1).

Cocoa Consumption and Imports in Eastern Europe and the FSU

FSU market recovery uncertain. In earlier years the FSU accounted for 8-9% of world cocoa consumption. However, since 1990 its share has fallen to 3-4%. Grindings averaged 121,600 tons in the 1970s and 146,000 tons in the 1980s. However, by 1990/91 average grindings had fallen to 83,000 tons (see Table 2 and Figure 4). Preliminary projections give FSU grindings at 25,000 tons for 1991/92.

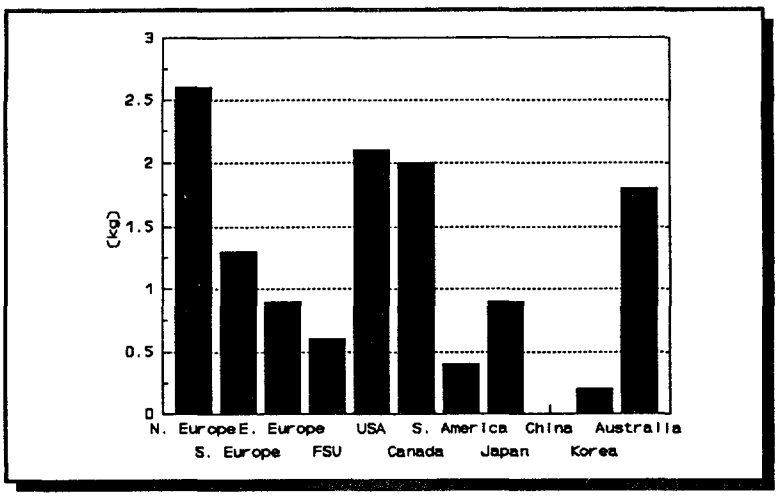
The effect of the recent reduction in FSU consumption on the world cocoa market was significant. Had the FSU imported and consumed as much cocoa as during the 1980s, the 177,000 tons world production surplus of 1990/91 would have been halved, and the projected production deficit of 83,000 tons for 1991/92 would have been virtually doubled. A rough estimate indicates that world cocoa prices for 1992 could have been about 8-10% higher had the FSU consumed as much cocoa in 1992 as the yearly average of the 1980s.

Table 1: Cocoa Consumption in East Asia, 1976-91

	1976	1981	1986	1991
	('000 tons)			
China	5.2	7.4	15.1	30.0
Indonesia	2.0	2.5	5.9	5.2
Japan	64.5	74.6	79.7	133.0
Korea, Rep. of	N.A.	4.7	5.4	9.5
Malaysia	1.0	2.3	3.6	9.0
Philippines	6.7	6.1	1.9	10.3

Source: World Bank, International Economics Department, and ICCO.

Figure 3: Per Capita Cocoa Consumption, 1989



In Eastern Europe cocoa grindings and consumption have not been affected nearly as much as in the FSU (see Table 2 and Figure 5). Final cocoa consumption averaged 92,000 tons per year during the 1980s, declined to 90,000 tons in 1990 and increased to 104,000 tons in 1991--as high as any time during the past 20 years. A major part of the increase in final cocoa consumption has been the huge increase in chocolate imports. During the 1980s they averaged 5,600 tons, or roughly 2,300 tons in cocoa bean equivalents.[4] In 1990 chocolate imports increased to 21,800 tons and in 1991 to 42,400 tons. Eastern European grindings have not been reduced as much as those in the FSU due to major investments by Western European and US companies in the chocolate industry in Czechoslovakia, Hungary, and Poland, as well as less serious foreign-exchange problems in Eastern Europe, compared with the FSU.

Price Prospects

Stock overhang depresses market to 1995. The 1992 crop year is the first year of production deficit following seven consecutive years of surpluses. By 1991, stocks exceeded 1.5 million tons, the equivalent of nine months of consumption, the highest level in the post World War II period. The 1992 deficit, which is projected to be between 85,000 and 95,000 tons, has had hardly any effect on prices due to the existence of such large stocks. For 1993, a deficit of about 70-90,000 tons is projected, mainly due to adverse weather conditions in the major producing countries. The two consecutive deficits are expected to help prices recover somewhat; however, the existence of such large stocks will restrain price increases for some time.

During the next two to three years cocoa prices in real terms are expected to experience a slow recovery in the absence of a severe production shortfall, again because of large stocks. By the mid-1990s, production growth will begin to be reduced by the lack of investment in the late 1980s-early

[4] The conversion factor between cocoa beans and chocolate is between 0.4 and 0.5.

Table 2: Eastern Europe and FSU: Cocoa Consumption and Grindings, 1975/76 to 1990/91

	1975/76	1981/82	1984/85	1987/99	1988/89	1989/90	1990/91
	('000 tons)						
Eastern Europe							
Grindings	109	54	77	73	84	78	78
Consumption	113	82	85	89	98	90	104
FSU							
Grindings	140	132	165	132	201	106	83
Consumptions	168	146	216	160	245	134	93

Source: World Bank, International Economics Department, and ICCO.

Figure 4: Consumption and Grindings in the FSU, 1981-91

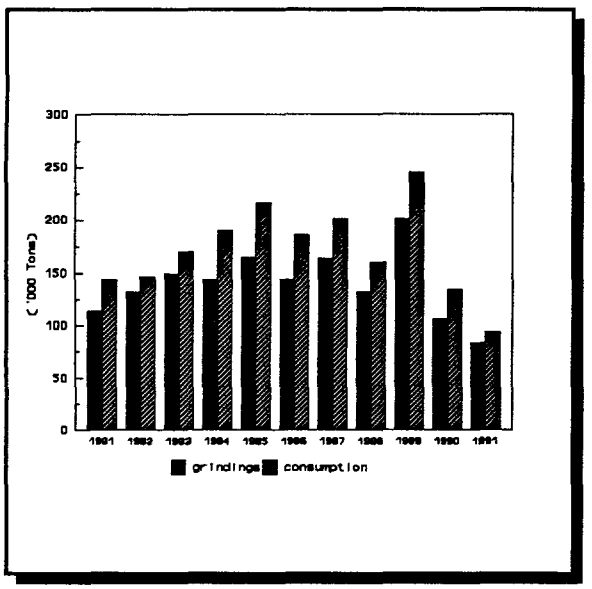
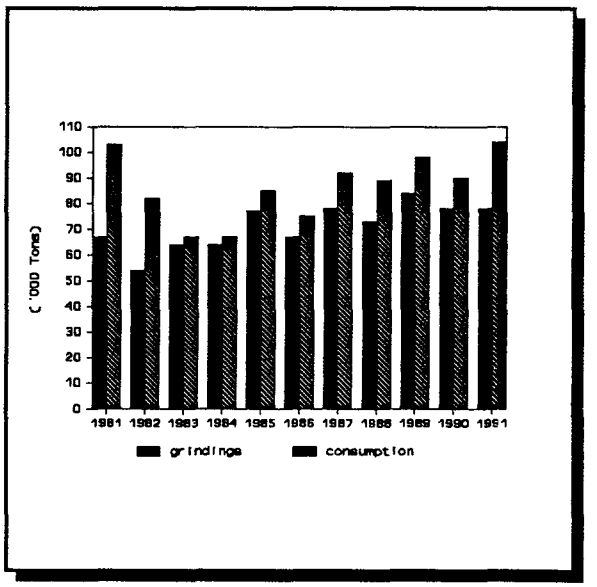


Figure 5: Consumption and Grindings in Eastern Europe, 1981-91



1990s. Consumption growth should also show improvement with more robust economic growth in the western world and some improvement in the FSU and Eastern Europe. If the rates of growth in consumption in the United States and Western Europe return to levels of recent years of around 5-6% p.a., then a faster price recovery can be achieved. In the medium to longer run (next four to ten years) developments in the FSU and Eastern Europe will most likely be the demand-side factors which are most important. The expected average rate of real price increases over the forecast period is 2%.

Policy Issues

Local processing offers few advantages. There are three policy issues of concern to cocoa producers. First, producing countries are examining proposals to expand local processing of cocoa beans. A number of factors should be taken into account in evaluating local processing: (a) since cocoa product prices follow the same path as bean prices, processing does not help in diffusing the price exposure; (b) the quality of the products produced in developing countries is often poor, so that instead of exporting good beans and receiving a premium, they export poor products at a discount; (c) there is tougher competition for cocoa products than for beans; (d) the technology is relatively capital-intensive; and (e) because local processing relies on local beans only it may not achieve a blend desirable to the market. In several cocoa-producing countries, cocoa processing facilities operate well under capacity, for example, in Nigeria where cocoa processing facilities operate at around 15% of their capacity and in Ecuador where capacity utilization is about 33%. In most cases, the lack of skilled personnel, inadequate financing, and shortages of spare parts plague the industry. Malaysia may provide the only example of a thriving downstream processing operation in a producing country. This is due to the expanding domestic market and also to successful marketing efforts in East Asia where Malaysia does not face much competition for cocoa products.

Marketing systems affect producer prices. Second, cocoa producers are concerned about maintaining international competitiveness. The main avenues are via increases in yields (introduction of new technology), improvements in quality, and importantly, streamlining the domestic marketing system. The first two avenues--yields and quality--may apply more to Indonesia and Malaysia. Improving the efficiency of the marketing system applies most to West African producers. West African cocoa farmers are low-cost producers. However, the internal cocoa marketing systems are high-cost. Figure 6 shows for major producing countries the domestic marketing costs (lower shaded area) and producer prices (upper shaded area) as a percent of the f.o.b. price in 1991.[5] The figure indicates that in the essentially free market systems (Brazil, Indonesia, Malaysia, and Nigeria) domestic marketing costs are at least 30% lower than in countries with marketing board systems (Cameroon, Côte d'Ivoire, and Ghana). In the former, producer prices as a percentage of the f.o.b. price are also higher. Despite the fact that Cameroon, Côte d'Ivoire, and Ghana receive higher f.o.b. prices due to the higher quality of their beans, producers in Brazil, Indonesia, Malaysia, and Nigeria received higher absolute prices in 1990/92.[6] The low prices of recent years led West African producers such as Cameroon, Côte d'Ivoire, and Ghana to adopt measures leading to streamlining of marketing operations and to the privatization of parts of the marketing chain. Nigeria moved to a free marketing system in 1986. For Côte d'Ivoire and Ghana, the reforms of the internal marketing systems should improve efficiency and reduce the impact of low cocoa prices on their economies and on cocoa farmers.

Producers need range of financial instruments and sound policies. Third, while cocoa-producing countries should see that producer price movements reflect world price movements, at the same time they should have the opportunity to hedge against short-term price volatility. This means that exporters, traders, and producers should have access to financial instruments such as futures and options.

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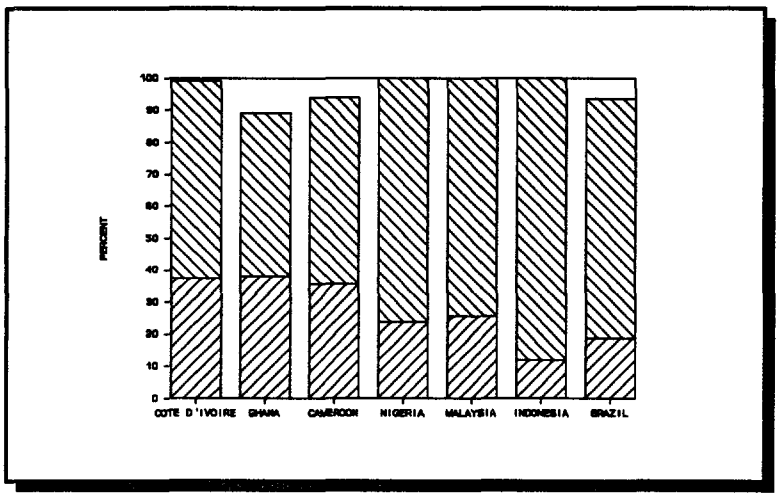
[5] When the two percentages do not add up to 100, there is a tax.

[6] In that period, no significant taxes or subsidies existed in these countries, perhaps with the exception of Ghana (about 20% to 25% tax).

Figure 6: Producer Prices and Marketing Costs (percent of f.o.b. price)



In addition, export tax and exchange rate policies should keep the cocoa sector internationally competitive. The use of export taxes is a complicated issue in respect of perennial crops such as cocoa. Current levels of export taxes affect future production as well as current production.[7] In the case of Ghana, the reduction of the export tax on cocoa and the devaluation of the 1983-84 period led to an increase in production by about 50% between 1984 and 1990, so that government revenues and cocoa producers' welfare increased as a result.

[7] See, P. Trivedi and T. Akiyama, "A Framework for Evaluating the Impact of Pricing Policies for Cocoa and Coffee in Côte d'Ivoire," World Bank Economic Review, Vol. 6, No. 2, May 1992, pp. 307-330.

Table A1: Cocoa Beans - Production By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income													
LMICs	1,392	1,601	2,409	2,541	2,281	2,352	2,490	2,526	2,588	2,702	2.5	2.8	0.4
Africa	994	961	1,341	1,442	1,255	1,304	1,381	1,386	1,383	1,443	1.5	1.5	0.0
Ghana	430	264	295	295	250	270	285	290	315	348	-1.4	-1.9	1.2
Nigeria	261	155	170	170	108	145	155	160	165	175	-0.5	-2.1	0.2
Cote d'Ivoire	195	365	710	822	750	741	788	780	748	765	7.2	6.7	-0.5
Cameroon	127	117	125	117	102	103	106	106	100	95	1.8	-0.1	-1.5
Americas	358	554	652	663	569	562	587	595	585	572	2.7	3.0	-1.0
Brazil	209	319	352	370	300	297	320	320	295	268	3.7	2.6	-2.3
Ecuador	57	87	101	106	90	87	87	90	95	97	3.1	2.9	-0.6
Asia & Pacific	40	86	418	436	457	486	522	545	620	687	11.2	12.4	3.3
Malaysia	3	36	241	225	220	225	232	235	220	215	20.8	24.5	-0.3
Indonesia	2	10	115	155	180	200	225	240	325	390	17.8	22.5	6.8
World	1,392	1,601	2,409	2,541	2,281	2,352	2,490	2,526	2,588	2,702	2.5	2.8	0.4

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: FAO, Production and Trade Yearbook Tapes; Gill and Duffus (actual);
World Bank, International Economics Department (projected).

Table A2: Cocoa Beans - Apparent Consumption By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a)		
High-Income	983	1,043	1,624	1,747	1,776	1,811	1,845	1,880	1,945	2,010	1.6	2.5	1.0
Europe	512	562	865	972	983	1,002	1,022	1,043	1,080	1,120	2.5	2.7	1.0
United States	365	359	556	565	571	585	598	610	640	670	1.8	2.1	1.2
LMICs	391	472	593	598	574	591	607	620	710	770	2.9	2.1	1.8
Europe	84	120	90	104	106	109	112	115	128	140	3.2	0.3	2.1
FSU	126	136	134	93	47	48	53	55	115	150	4.6	0.3	3.5
World	1,374	1,515	2,217	2,345	2,350	2,402	2,452	2,500	2,655	2,780	2.7	2.4	1.2

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: FAO, Production and Trade Yearbook Tapes; Gill and Duffus (actual);
World Bank, International Economics Department (projected).

Table A3: Cocoa Beans - Gross Exports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	339	615	1,002	1,077	1,000	1,030	1,060	1,100	1,200	1,300	6.2	5.6	1.4
LMICs	1,299	1,437	2,188	2,264	2,073	2,144	2,275	2,301	2,348	2,462	2.4	2.6	0.6
Africa	979	907	1,298	1,382	1,255	1,304	1,381	1,386	1,383	1,443	1.2	1.4	0.3
Ghana	378	221	255	330	250	270	285	290	315	348	-2.3	-1.9	0.4
Nigeria	238	167	143	147	108	145	155	160	165	175	-1.6	-2.5	1.3
Cote d'Ivoire	170	357	740	805	750	741	788	780	748	765	8.0	7.6	-0.4
Cameroon	98	100	124	118	102	103	106	106	100	95	0.8	1.2	-1.5
Americas	281	451	491	474	379	372	392	395	375	352	3.4	2.8	-2.1
Brazil	165	295	276	284	225	222	240	240	210	178	4.0	2.6	-3.3
Ecuador	45	83	105	103	85	82	80	83	85	87	5.0	4.3	-1.2
Asia & Pacific	39	79	399	408	439	468	502	520	590	667	19.0	12.3	3.6
Malaysia	3	35	229	215	210	213	219	221	204	197	26.5	24.2	-0.6
Indonesia	1	10	103	133	170	190	214	229	313	378	33.9	26.1	7.7
World	1,638	2,052	3,190	3,341	3,073	3,174	3,335	3,401	3,548	3,762	3.2	3.4	0.9

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005)./wir
b/ Estimate.

Sources: FAO, Production and Trade Yearbook Tapes; Gill and Duffus (actual);
World Bank, International Economics Department (projected).

Table A4: Cocoa Beans - Gross Imports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	1,319	1,612	2,667	2,803	2,588	2,673	2,809	2,864	2,988	3,169	3.3	3.6	0.9
Europe	824	1,096	1,754	1,888	1,743	1,801	1,892	1,929	2,013	2,134	3.8	3.8	0.9
United States	378	384	676	667	616	636	668	682	711	754	2.2	2.9	0.9
LMICs	306	417	502	525	485	501	526	537	560	593	3.7	2.5	0.9
	95	159	278	328	332	344	361	367	317	303		5.5	-0.6
Europe	85	122	90	104	106	109	112	115	128	140	3.2	0.3	2.1
FSU	126	136	134	93	47	48	53	55	115	150	4.6	0.3	3.5
World	1,625	2,029	3,169	3,328	3,073	3,174	3,335	3,401	3,548	3,762	3.2	3.4	0.9

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: FAO, Production and Trade Yearbook Tapes; Gill and Duffus (actual);
World Bank, International Economics Department (projected).

Table A5: Cocoa Beans - Prices, a/ 1950-91 (Actual) and 1992-2005 (Projected)

	(¢/kg)		
	Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/
Actual			
1950	63	386	509
1951	70	372	510
1952	70	355	489
1953	68	352	467
1954	116	620	792
1955	79	415	539
1956	57	289	381
1957	64	316	416
1958	88	426	559
1959	73	358	464
1960	59	285	370
1961	49	230	298
1962	46	214	274
1963	55	263	320
1964	51	236	285
1965	37	170	200
1966	52	232	273
1967	60	264	307
1968	72	322	361
1969	90	383	434
1970	68	269	305
1971	54	204	228
1972	64	224	247
1973	113	339	380
1974	156	384	474
1975	125	276	336
1976	205	446	535
1977	379	753	896
1978	340	587	657
1979	329	502	600
1980	260	362	425
1981	208	288	336
1982	174	244	284
1983	212	305	342
1984	240	352	387
1985	225	329	357
1986	207	256	272
1987	199	224	232
1988	159	166	171
1989	124	131	135
1990	127	127	127
1991	120	117	114
Projected			
1992	113	106	101
1993	119	108	103
1994	125	111	106
1995	131	113	108
2000	170	124	116
2005	215	136	122

a/ International Cocoa Organization (ICCO) average daily price for London and New York markets, nearest three future trading months.

b/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.

c/ Deflated by G-7 Consumer Price Index (CPI).

Sources: ICCO Secretariat; Financial Times (London) and FAO Trade Yearbook (actual); World Bank, International Economics Department (projected).

Tea

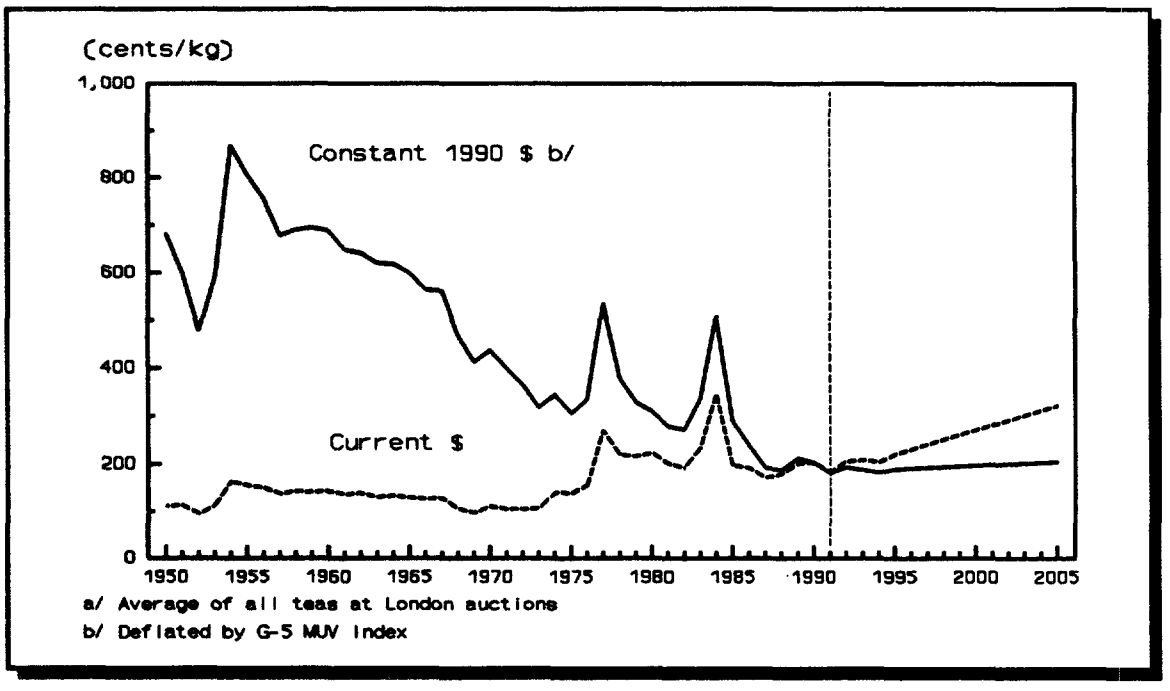
Summary

- World tea prices in real terms[1] at London auctions were at their lowest level in history in 1991. The main cause of the low prices has been the continuing increases in world output while world import demand has been stagnant or even declining.

- One of the key reasons for the continued growth in tea output in major producing countries has been the relatively high tea prices at auctions in producing countries themselves due, in the main, to the depreciations in their real exchange rates. As a result, producer prices in real local currency terms in India, Kenya, and Sri Lanka have not declined.

- World tea prices are projected to recover in 1992 and 1993 as a result of reduced production in South India, Sri Lanka, and Southern Africa due to drought. In terms of 1990 US dollars, prices are projected to average US¢191/kg over these two years--up from US¢181/kg in 1991--and to remain around US¢190/kg in the mid-1990s as world supply recovers and the import demand of the FSU remains low. Prices are expected to increase slowly in real terms in the late 1990s with a recovery in demand in the FSU and a slowdown in production growth in major producing countries.

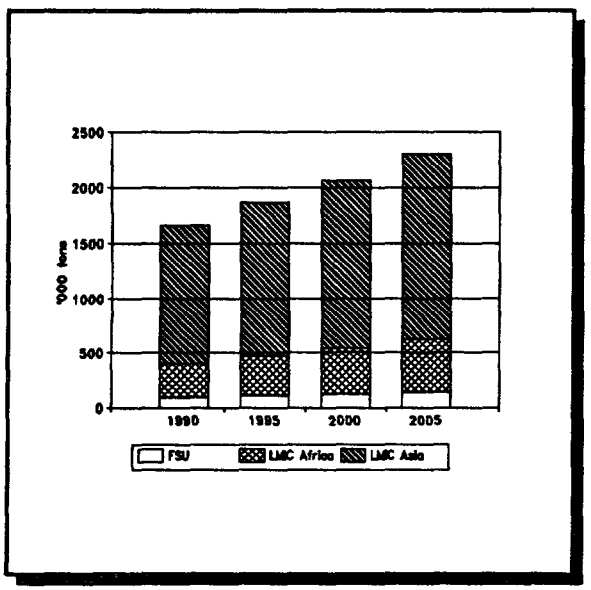
Tea Prices a/, 1950-2005



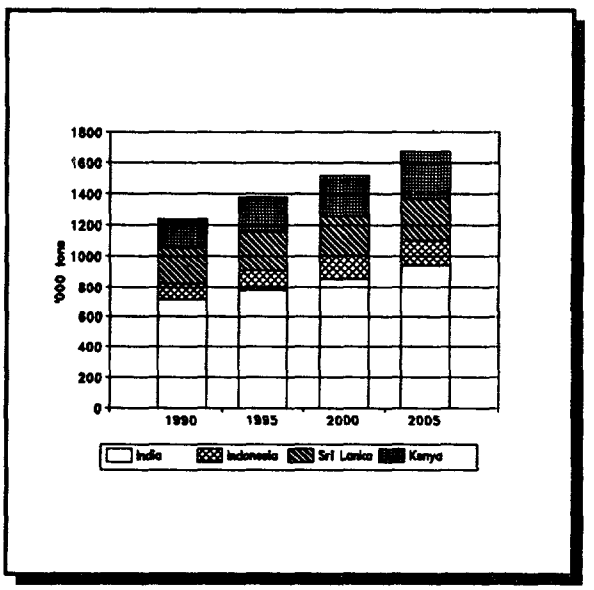
[1] World tea prices refer to the average auction price in London; real prices are expressed in terms of the nominal US dollar price deflated by the MUV index. Tea refers only to black tea.

- World tea output is projected to increase at 2% p.a. over the projection period. This is a considerably lower rate than that for the 1970-90 period when it averaged 4.8% p.a. Lower real prices are the main reason for expecting the slower growth in world output. Kenya is expected to be the largest tea exporter by 2005.

Projected Black Tea Output, by Region



Projected Black Tea Output, by Country



Recent Developments

Output increases while demand falls. Average London auction prices for tea in real terms in the first half of 1992 have been at their lowest level in history, falling to a level about 30% lower than real prices in the second half of the 1980s. The fundamental causes of the fall have been increases in output in the three major tea-exporting countries, India, Kenya, and Sri Lanka, and reduced import demand from the FSU and Iraq. Between 1989 and 1991, India's production increased by 58,000 tons, Sri Lanka's by 33,000 tons, and Kenya's by 23,000 tons. The combined increase corresponds to about 6% of world black tea production. The FSU's import demand declined from 231,000 tons in 1990 to 170,000 tons in 1991 and is expected to fall to about 100,000 tons in 1992. Due to the international trade embargo, Iraq's imports are estimated to have declined from 37,500 tons in 1989 to 27,500 tons in 1990, and to an estimated 20,000 tons in 1991. Tea prices increased in the second half of 1992 as supply in southern Africa, India, and Sri Lanka declined sharply because of droughts.

Price falls also as African teas dominate London market. Another reason for the decline in average London auction prices since the early 1980s has been the change in the composition of tea sold at the London auctions. Table 1 shows the quantities and prices of tea sold at London auctions. The share of Indian tea sold declined sharply between 1980 and 1990--from 31% to 21%. (With well-functioning auctions in producing countries, producers preferred to sell there rather than in London because the UK's share in world tea consumption is declining and finance costs are lower at auctions in producing countries as the sale proceeds are received more quickly.) At the same time, the share of

African tea increased from 53% to 69%. Prices of African teas are generally lower and have been weaker than those of Indian and Sri Lankan teas. The relative market strength of Sri Lankan and Indian teas in relation to African teas can be seen in Table 2, which shows trends in tea prices for the period 1980-90 at selected auctions in producing countries. In terms of real US dollars, tea prices at Calcutta and Colombo auctions have not shown any statistically significant decline while tea prices in Mombasa have declined by 6.5% p.a. The trend in real US dollar prices at the London auction was -5.5% p.a.

India loses price competitiveness. The main reasons for the higher prices in India have been the strong domestic demand and the earlier growth in demand from the FSU under a special trade agreement. As a result of the higher prices, Indian tea lost competitiveness in the world market and its share of exports to non-FSU countries declined from about 70% in 1980 to 49% in 1990. The reason for the relatively higher prices of Sri Lankan tea compared with African tea is that it is an orthodox type, in demand by countries in the Middle East. This type of tea is considerably more costly to produce than the CTC type which Kenya mainly produces (India's share of orthodox tea is about 20% of total production).

Exchange rate adjustments cushion producer price falls. The exchange rate adjusted by inflation is an important variable affecting the prices producers receive in real terms for exports. The value of one US dollar in terms of deflated local currencies of four major producers has been calculated and is shown in Table 3 in index form. In spite of inflation in these countries, the value of one US dollar was significantly higher in 1991 than in 1980 in India, Indonesia, and Kenya. This implies, for example, that even if world tea prices fell by 26% in terms of nominal US dollars, Indonesia's producer price in 1991 was the same as in 1980 in terms of constant Indonesian rupiahs, if it is assumed that there was no change in domestic marketing costs in real terms.

Table 1: Quantities and Prices of Teas Sold at London Auctions, by Origin, 1980-91

Origin	1980	1985	1988	1989	1990	1991
	(Pence/kg)					
Prices						
India	105	200	126	145	142	132
Sri Lanka	92	156	99	126	112	100
Africa	94	150	94	120	108	99
Average	96	159	101	126	115	105
	(tons)					
Quantities						
India	29,600	10,100	8,800	7,400	9,100	6,000
Sri Lanka	11,600	3,000	3,700	3,500	4,000	2,500
Africa	50,400	39,700	27,200	22,400	30,300	28,000
Total	95,200	55,300	42,100	33,800	43,700	36,600

Source: The Tea Brokers' Association of London.

Table 2: Trends in Real Tea Prices at Auctions in Producing Countries, 1970-90 and 1980-90 (percent per annum)

	UK:London		India:Calcutta		Sri Lanka:Colombo		Kenya:Mombasa	
	US$a/	£b/	US$a/	Rupeesb/	US$a/	Rupeesb/	US$a/	K. Shillingsb/
1970-90	-3.2	-4.0	1.6	1.3	No Trend	5.3	-3.5	-2.0
1980-90	-5.5	-5.7	No Trend	No Trend	No Trend	4.4	-6.5	No Trend

a/ Nominal US dollar deflated by MUV.
b/ Local currency deflated by CPI.

Source: World Bank, International Economics Department.

Table 3: Index of Real Value of Nominal US$1 in Major Tea Producing Countriesa/, 1980-91 (1980 = 1.0)

	India	Sri Lanka	Kenya	Indonesia
1980	1.00	1.00	1.00	1.00
1981	0.97	0.99	1.09	0.90
1982	0.99	0.96	1.09	0.86
1983	0.94	0.96	1.19	1.06
1984	0.98	0.88	1.17	1.08
1985	1.01	0.93	1.18	1.11
1986	0.95	0.89	1.12	1.22
1987	0.89	0.87	1.08	1.43
1988	0.88	0.82	1.08	1.35
1989	0.96	0.83	1.14	1.34
1990	0.95	0.76	1.14	1.30
1991	1.09	0.70	1.19	1.26

a/ Calculated by dividing the nominal exchange rate by the domestic CPI.

Source: World Bank, International Economics Department.

Production and Export Outlook

Because of the recent droughts in southern India, Sri Lanka, and southern Africa, output from these regions is projected to decline in 1992. The decline in these regions is expected to be partly offset by increases in output in other countries such as China, Indonesia, and Uganda. In aggregate, world output in 1992 is expected to be about 80,000 tons lower than in 1991. Over the 1991-2005 period, world black tea production is projected to increase on average at 2% p.a. The incremental output is expected to come mainly from India, and Kenya (see Table 4).

Table 4: Black Tea: Supply Projection

Regions and Countries	1990	1991	1992	1993	1995	2000	2005	Growth Rate 1991-2005
	('000 tons)							(% p.a.)
FSU	88	93	93	95	95	105	110	1.2
Developing	1766	1822	1745	1850	1965	2170	2400	2.0
Asia	1267	1301	1240	1315	1392	1525	1672	1.8
India	709	735	710	740	776	854	938	1.9
Indonesia	119	116	120	124	131	149	167	2.6
Sri Lanka	227	242	190	230	24	258	265	0.6
Africa	310	331	300	340	370	425	493	2.9
Kenya	188	204	190	209	226	260	305	2.9
World	1855	1916	1835	1950	2050	2283	2517	2.0

Source: World Bank, International Economics Department.

India needs to diversify export destinations, domestic demand strong. Tea prices in INDIA are likely to fall further with the further reduction in import demand from the FSU. Moreover, while the FSU has been importing more than 50% of its total tea imports from India, it is expected to diversify its imports with the opening up of trade by the republics. India will have to diversify its export destinations and this will push Indian tea prices closer to African prices. Some narrowing of the differential between Indian and African prices has already occurred; the ratio of average auction prices in Calcutta and Mombasa was only 1.43 in 1991 compared with 1.85 in 1990.

The expected loss of premium for Indian tea prices will have an important impact on tea output in India. Although the government has an ambitious program to expand production by releasing 53,000 ha of land for tea production between 1987 and 2000, it is hard to see an expansion of total tea area by 12% in the 1990s in the face of low producer prices. The World Bank's econometric model projects India's output to increase at an average rate of 1.9% p.a. to reach 854,000 tons in 2000 and 938,000 tons in 2005.

As demand for tea in India is projected to increase at about 3% p.a., India's exports are projected to decline to about 150,000 tons in 2000 and 135,000 tons in 2005; recently, exports have been at a level of 220,000 tons.

SRI LANKA's export prospects depend critically on demand in the Middle East. Supply prospects depend on the pace of replanting of old trees to higher-yielding varieties. The national plan aims at increasing output at 2.5% p.a. during the 1990s. It will be difficult to achieve this target given the expected low level of world tea prices.

Kenyan yields and export market share to increase. KENYA is projected to continue increasing production but at a much lower rate than in the past as land is becoming scarce due to the high population growth. Supply is projected to increase at about 3% p.a. By 2005, Kenya is expected to be the largest black tea exporter with a market share of 23% in 2005 compared with 17% in 1990. The additional output is expected to come mainly from yield increases in the smallholder sector where average yields are presently considerably lower than on estates.

MALAWI's output is projected to increase only marginally due to the already very high yields and the lack of suitable land for expansion. UGANDA's output has been increasing at a rapid rate, thanks to successful rehabilitation programs. Its output is expected to continue to increase at about 5% p.a. during the projection period. CHINA's exports are expected to stagnate or even decline during the projection period. China can adjust its black tea output depending on the relative prices of black and green tea. Growers are tending to convert to green tea which gets higher prices. Hence, China's exports are likely to increase when world black tea prices are high.

Demand Prospects

FSU and Middle East demand growth critical but uncertain. World black tea demand prospects are critically dependent on demand developments in the FSU and the Middle East, two regions where demand is fraught with uncertainty. Prospects for the FSU's imports depend on its economic growth and domestic tea production, which declined sharply in the late 1980s due to the Chernobyl incident. With low yields and poor quality, tea production in the FSU is hardly viable. Assuming domestic production growth of 1.2% p.a. for the projection period, imports are projected to increase at 3% p.a. The import demand of the countries in the Middle East depends on their economic activity and the migrating worker flow they generate which, in turn, depend heavily on world petroleum prices. Given the expected slow increase in real prices of petroleum, import demand in these countries is projected to increase at about 3% p.a. during the projection period.

Decreasing demand in tea-drinking OECD countries. Import demand in industrialized countries is expected to decline by about 1% p.a. during the 1991-2005 period. This decline is mainly due to the projected decline of 2% p.a. in UK import demand. Declining demand in the United Kingdom as well as in Canada and Australia is due to a large extent, to changing tastes. In these traditional tea-drinking countries, demand for coffee and other beverages has been increasing at a rapid rate.

India's consumption is projected to increase at 3% p.a.. This is a much lower rate than for the period 1970-90 when it averaged 4.6% p.a. The lower rate is expected due to slower population growth and the lower income elasticity of demand with the now higher per capita consumption level.

Price Prospects

Price recovery weak until after 1995. In 1992 and 1993, world black tea prices in real terms are expected to recover somewhat from the historically low level of 1991. World output in 1992 is expected to be about 80,000 tons lower than in 1991 due to droughts in southern India and southern Africa. However, the price recovery is expected to be weak due to the large carryover stocks and substantially reduced imports of the FSU. Assuming a return to normal weather in 1993, production should increase again and real prices are expected to decline to US¢182/kg in 1994 and US¢190/kg in 1995 and to fluctuate between US¢190/kg and US¢198/kg during the mid-1990s.

In the second half of the 1990s, real tea prices are projected to increase as production growth slows in Kenya and demand increases in the FSU and the Middle East. Tea prices, in constant dollars, are expected to reach US¢198/kg by 2000--which is only about one half of the average level for the 1970s. Prices are projected to reach US¢204/kg by 2005, the long-term equilibrium price according to our global model simulations.

Table A1: Tea - Prices, /a 1950-91 (Actual) and 1992-2005 (Projected)

	(¢/kg)		
	Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/
Actual			
1950	111	680	895
1951	113	600	822
1952	94	477	656
1953	113	588	782
1954	163	868	1,111
1955	154	807	1,046
1956	149	754	991
1957	137	677	891
1958	142	690	907
1959	141	694	902
1960	142	687	891
1961	136	646	834
1962	138	641	823
1963	131	620	757
1964	133	618	749
1965	129	598	704
1966	126	563	665
1967	127	561	654
1968	105	467	526
1969	97	412	465
1970	110	437	498
1971	105	399	445
1972	105	365	403
1973	106	317	356
1974	140	345	425
1975	139	306	375
1976	154	335	403
1977	269	534	636
1978	219	378	423
1979	216	328	394
1980	223	310	364
1981	202	279	327
1982	193	272	316
1983	233	335	376
1984	346	508	560
1985	198	289	314
1986	193	238	253
1987	171	192	199
1988	179	188	193
1989	202	213	219
1990	203	203	203
1991	184	181	175
Projected			
1992	206	193	185
1993	208	188	180
1994	205	182	173
1995	220	190	181
2000	272	198	185
2005	322	204	183

a/ Average of all teas at London auctions.
b/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.
c/ Deflated by G-7 Consumer Price Index (CPI).

Sources: International Tea Committee (actual); World Bank, International Economics Department (projected).

Sugar

Summary

- Since 1988-89, political developments in China, Eastern Europe, and the FSU have approximately halved the usually steady growth in sugar consumption, and the price, after peaking at around ¢15/lb in 1989, slipped to around ¢10/lb in mid-1992.

- Chinese consumption has not recovered the strong growth momentum lost when import controls were applied in 1989, and political upheavals in Eastern Europe and the FSU have greatly reduced sugar consumption and imports in those economies.[1]

- In the next five to ten years, not only will economic developments be important for the world sugar market, but also any number of political developments. On the balance of probabilities, these developments can be expected to slow up production growth in China and India and shift production away from Cuba, the FSU, and the United States towards Australia, Brazil, the EC, Thailand, and some other small, efficient exporting countries.

- It is virtually impossible to pick the timing of booms and troughs in the sugar price cycle since they depend on random factors such as the weather and largely unpredictable political factors. Statistically there is no detectable long-term trend in the world sugar price.[2] Since 1951 it has averaged ¢18.4/lb in 1990 values, and although the price has averaged only ¢11.5/lb since 1981, this low average is well within the normal range of volatility and statistically does not signify a downtrend.

- The long-term average price forecast is ¢13/lb (1990 dollars). However, while widespread government intervention prevails, price volatility will remain a feature of the market and sugar must continue to be regarded as a high risk crop.

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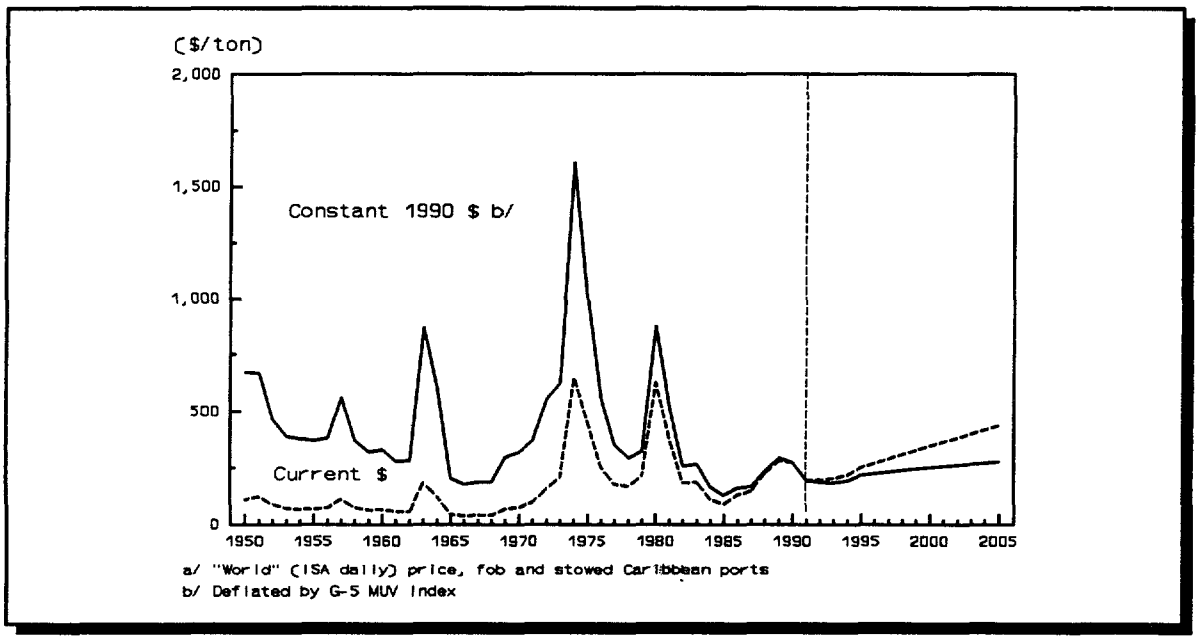
[1] Estimates indicate that the drop in Chinese, Eastern European and FSU consumption together could have caused a 30% decline in price. G. Wong, R. Sturgiss and B. Borrell, "The Economic Consequence of International Sugar Trade Reform," Australian Bureau of Agricultural and Resource Economics Division Paper (1989.7), AGPS, Canberra, 1989.

[2] The indicator price is raw, f.o.b., stowed at Greater Caribbean Ports.

Sugar Prices a/, 1950-2005



Consumption Outlook

Recent low growth rate unusual. The marked reduction in consumption growth since 1988 is evident from Table 1. Chinese average annual consumption growth slowed from 8.8% between 1983 and 1988 to virtually zero between 1988 and 1992. In Eastern Europe and the FSU, growth slowed from 1.8% to -4%. Only in the rest of Asia did growth remain strong at 3.4% p.a.--Pakistan 9.5%, Thailand 7.9%, and India 4.8%.

The recent slow growth in sugar consumption is unusual. Although political upheavals may occur in other countries in the next decade they are unlikely to be as disruptive of sugar consumption as those that have occurred in recent years in China and the FSU.

To maintain consumption per person at existing levels, world sugar consumption must expand by 1.7% p.a., the expected population growth rate. However, consumption growth should outpace population growth over the next 15 years for the following reasons:

Growth of competing sweeteners slows. The rate of growth of caloric sweeteners--mainly high fructose corn syrup--which rapidly penetrated the big sweetener markets of the United States and Japan during the 1980s, has now eased. Also, while intense sweeteners such as aspartame are gaining an increasing share of the sweetener markets in industrial countries, to a large extent they are creating their own market in the diet food and soft drink market where they are competing with high fructose corn syrup. Moreover, one outcome of the GATT Uruguay Round seems to be tighter scrutiny of agricultural trade protection, high levels of which encouraged the technical development and market penetration of alternative caloric sweeteners in Japan and the United States.

Table 1: Average annual growth in world sugar and caloric sweetener consumption, 1951-92

	Sugar		Caloric sweeteners	
	Average consumption	Growth Rate	Average consumption	Growth Rate
	(mill. tons)	%	(mill. tons)	%
1951-59 a/	1.99	5.2	—	—
1960-69 a/	2.01	3.6	—	—
1970-79	2.11	2.7	2.48	3.2
1980-88	2.20	2.3	2.50	2.5
1988-92	1.29	1.2		

a/ Corn syrup was not available during these periods.

Source: F.O. Licht, World Sugar Balances, 1992.

Positive consumption growth resumes in industrial countries. The negative sugar consumption growth which characterized industrial countries throughout most of the 1970s and 1980s (see Table 2) has been reversed in recent years, and modest growth in consumption is projected to continue. An increase in consumption of caloric sweeteners is associated with changing eating habits in industrial countries. By eating in restaurants, for instance, consumers demand foods with more sugar and/or demand a greater choice of ready-to-eat foods at the point of consumption than they would if eating at home. To manage a restaurant efficiently, large quantities of prepared food must be held in reserve and inevitably there is food wastage. Also, continuing, though modest, population growth--mainly in the United States--contributes to industrial country consumption growth.

Asian market potential as incomes and population grow. Asia has great potential for increasing sugar consumption. Per person consumption of sugar is low, around 12 kg/year, the region's income growth prospects are strong, and high population growth is expected to continue. Even assuming historically modest rates of consumption increase in Asia--3% compared with around 6% in the previous two decades--this region should remain the main source of world consumption growth (see Table 2). In China, the continuing rapid income growth and renewed steps toward price liberalization (the Chinese government recently abolished the use of sugar coupons and liberalized sugar prices) suggest a return to high levels of consumption growth. In Pakistan and India, the prospect of continuing strong income growth following economic reform augers well for a continuation of high rates of consumption growth in both countries. Continued strong economic growth in Thailand and Indonesia also should underpin strong Asian consumption growth.

Consumption increases with incomes in Central and South America. Central and South America are likely to be the other important sources of growth (see Table 2). In line with strong economic growth, sugar consumption has increased rapidly in Mexico since 1988. Economic reforms in Mexico are expected to underpin continued strong economic growth, and the removal of quantitative restrictions on imports of sugar will allow freer expansion of sugar consumption. Current and prospective economic reforms in Argentina, Bolivia, Chile, Columbia, Costa Rica, Ecuador, Honduras,

Table 2: Sugar (Centrifugal, Raw)—Apparent Consumption by Main Countries and Economic Regions

Countries/ Economies	Actual			Projected								Growth rates		
	1969-71	1979-81	1991	1992	1993	1994	1995	1996	1997	2002	2007	1961-91	1970-90	1992-2007
	('000 tons)											(% p.a.)		
High-income	28440	27610	25600	28519	26040	26264	26489	26716	29646	28127	29364	0.1	-1.1	0.9
United States	9861	9006	7900	7987	8075	8164	8253	8344	8436	8910	9411	-0.5	2.2	1.1
EC-10	11958	12025	11300	11368	11436	11505	11574	11643	11713	12069	12435	0.5	-0.5	0.6
Industrial Asia	2840	2917	2800	2834	2868	2902	2937	2972	3008	3193	3389	1.8	-0.7	1.2
Eastern Europe & FSU	13583	16361	17100	15900	14900	14975	15066	15389	15892	17374	18649	2.0	1.7	1.1
FSU	9536	11579	13200	12000	11000	11055	11166	11389	11844	13077	14088	1.9	2.0	1.1
Eastern Europe	4047	4782	3900	3900	3900	3920	3900	4000	4048	42297	4561	2.3	0.9	1.0
Developing	28563	44196	66400	68800	70599	72447	74347	76301	78308	89224	101765	4.8	4.6	2.6
Asia	11902	18823	34600	36200	37314	38463	39647	40868	42126	49031	57079	5.8	6.1	3.1
India	3940	5160	11500	12300	12669	13049	13441	13844	14259	16530	19163	5.4	5.9	3.0
China	1997	42399	7400	7800	8034	8275	8523	8779	9042	10483	12152	7.5	8.7	3.0
Indonesia	886	1797	2600	2800	2884	2971	3060	3151	3246	3763	4362	5.8	5.4	3.0
Pakistan	594	800	2500	2800	2912	3028	3150	3276	3407	4145	5043	9.3	8.3	4.0
Africa	4240	7127	9400	9700	9943	10191	10446	10707	10975	12417	14048	4.7	4.6	2.5
America	10663	15379	19300	19800	20211	20631	20161	21500	21949	24352	27039	3.7	2.9	2.1
Brazil	3999	5567	7000	7000	7105	7212	7320	7430	7541	8124	8752	3.4	2.9	1.5
Mexico	1910	3356	4500	5000	5150	5305	5464	5628	5796	6720	7790	4.7	3.8	3.0
Southern Europe	1731	2802	3100	3100	3131	3162	3194	3226	3258	3424	3599	4.2	3.0	1.0
World	70586	88167	109100	110519	111539	113685	115902	118406	121147	134725	149779	2.6	2.2	2.0

Sources: FAO (actual); World Bank, International Economics Department (projected).

Peru, and Venezuela also hold promise for higher income and sugar consumption growth in the 1990s than was achieved in the 1980s.

Since Eastern Europe and the FSU have experienced large falls in industrial and agricultural output in the past two years, and economic recovery seems some time off, consumption of sugar is projected to remain depressed at least until the mid-1990s and to grow modestly thereafter. Per person consumption of sugar is already reasonably high in Eastern Europe and the FSU; so even if economic recovery is strong in the mid- to late-1990s, consumption is unlikely to grow strongly for long although it may quite quickly resume previous levels.

World consumption growth of 2% p.a. possible. With the growth rates assumed, world sugar consumption is projected to increase by 36% to 150 million tons between 1992 and 2007--Table 2. This would represent an annual world consumption growth rate of around 2%. But income and consumption growth rates cannot be predicted with much certainty and small changes in growth rates can have a large effect on the size of the market and on the price of sugar. A 4% growth rate in Asia, instead of the 3% projected, would see world consumption reaching 159 million tons by 2007 and a world growth rate of 2.4%. Based on model results (Wong et al., 1989), an increase in consumption growth from 2% to 2.4% over a 20-year period could raise the average world price by around 35%.

Production and Trade Outlook

Sugar production, on average, will grow to meet the increased demand for sugar. But the regional pattern of production will depend importantly on what happens to the world price and governments' responses to any changes. Similarly, these and other economic and political developments will determine the pattern of trade.

Production to decline in Cuba. Sugar production is likely to decline in CUBA. Cuba is a large sugar producer and exporter: its output accounts for 6-8% of world production and its exports around 20% of traded sugar. Its previous bilateral trading arrangements with Eastern Europe and the FSU gave it terms of trade about two to three times better than what it could have commanded directly from the world market. Before its lucrative bilateral deals with Eastern Europe and the FSU, it was reliant upon a similarly lucrative bilateral arrangement with the United States. Removal of this assistance will likely result in a marked contraction in output.

Around 95% of Cuba's arable land is presently under sugarcane. While sugarcane received high levels of externally-funded assistance, other land-based activities such as beef and dairy production were severely discriminated against. Loss of FSU assistance to sugarcane production, therefore, is likely to cause a diversification away from sugarcane into other activities as relative producer prices change. Within the normal ranges of sugarcane growers' responses to price changes in other countries, a halving of prices---which seems likely--could reduce production by 30-40% or around 2.5% of world production and around 10% of world trade in sugar. Cuba would no longer be the world's largest exporter.

FSU and Eastern European producers uncompetitive. The direction of change in EASTERN EUROPE and the republics of the FSU is more difficult to predict. However, it seems unlikely that these countries could have a comparative advantage in the production of sugar. Their sugar production is based on sugarbeets and even the more efficient sugarbeet producers in the world have costs of production far in excess of efficient cane sugar producers. Moreover, Eastern Europe and the FSU costs of production are among the highest in the world with yields of sugar per hectare extremely low

(less than 2.5 tons in the FSU compared with around 11 tons in Australia). Even though there is considerable scope to adopt Western European beet growing technology to increase yields and lower costs, doubling of yields would still leave the FSU with low productivity. Moreover, Western European technology is capital-intensive and the FSU's and Eastern Europe's immediate advantage lies in having lower wage rates than Western Europe. Besides, despite its sophisticated beet growing technology,Western Europe is not low-cost by world standards and production is sustained only by massive subsidies--4 billion ECUs per year--from EC consumers.[3]

In line with the severe falls in industrial output across Eastern Europe and the FSU in the past two years, sugar production has also fallen--by around 20%. Production is likely to remain depressed over the next two seasons at least. It may decline even further while shortages of inputs persist and while the paralysis created by the uncertainty of changing over to a market-based economy continues. What happens once property rights for land and sugarbeet factories are redefined will depend closely on what pricing and industrial policies the countries of Eastern European and the FSU pursue.

Only with very high levels of subsidization does it appear possible for these countries to maintain existing output. Although this may seem to be an unpopular (not to mention uneconomic) and, therefore an unlikely scenario, many countries less well-off than the countries of Eastern Europe and the FSU force their consumers or taxpayers to subsidize sugar producers--China, India, and Thailand, to name but a few. Further, if some countries of Eastern Europe are successful in joining the EC, the scenario of eventually receiving subsidies from the EC Common Agricultural Policy should not be ruled out. Former East Germany has already become a recipient of such subsidies.

Further falls in FSU and Eastern European production likely. A factor mitigating against big subsidy payments in the FSU is the current pattern of production and trade between the members of the FSU. The Ukraine has traditionally produced a large surplus of sugar (around 5 million tons) for transfer to other republics and is the only republic with a surplus. Deficit republics as independent states will seek their sugar imports from the cheapest source and are unlikely to subsidize the Ukraine. The Ukraine will be forced to sell on the world market. If the Ukraine attempted to subsidize such a large quantity of exports, the economic cost of doing so would be highly visible, making such an outcome unlikely. The Ukraine may be forced to reduce production substantially since it is unlikely to be able to compete with other exporters.

Technology transfer may eventually bring about higher yields and production in the other republics if existing levels of subsidies are maintained. However, it seems unlikely that subsidies would be maintained, given their high costs. The most likely outcome is that production will fall further before technology transfer from the west eventually starts to promote a gradual increase later in the decade. Therefore, Eastern Europe and the FSU are likely to remain important importers over the projection period, and indeed may even increase their dependence on imports in the latter half of the period.

Subsidies encourage continued growth in EC production. In WESTERN EUROPE (mainly the EC) the outlook is for increases in production. Increases in EC subsidies in the mid-1970s and early 1980s led to two surges in sugarbeet and sugar production that changed the status of the EC from importer to large exporter. Although subsidies are confined to quota sugar, sugar produced in excess of

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[3] I.M. Roberts and P. Whish-Wilson, "Domestic and World Market Effects of EC Sugar Policies," Australian Bureau of Agricultural and Resource Economics Discussion Paper (91.1), AGPS, Canberra, 1991.

quota (called C sugar) is indirectly supported by subsidies. Also, historically, the EC Commission has agreed to increases in quotas whenever EC producers have agitated for them during periods of price boom on the world market.

If the world price again rises above the otherwise high EC support prices applying to quota sugar, pressure will rise for further increases in quota. Moreover, not only will rising world prices provide a direct stimulus to over-quota production, but any increases in quota will provide an indirect stimulus for further increases in over-quota sugar and exports because of the implicit subsidy through the prices paid for quota sugar. Although EC policy requires that over-quota sugar must be exported without any direct government support, pooling of quota and over-quota returns in some countries means producers face average returns higher than the world price for the extra sugar they produce. In other countries, the high subsidies given on the sales of quota sugar cover the fixed costs of production, making it profitable and less risky to produce additional over-quota sugar even if the world price covers marginal costs only. No EC producers produce over-quota sugar exclusively--which is evidence of the dependence of over-quota production on quota production.

Reduced cereal support prices also may stimulate sugar production. Given the security and cost advantage afforded EC producers of over-quota sugar, the more efficient sugar producers in the EC (such as France) will be well placed to quickly increase production in response to any increases in world price. Further, the recent announcement that the EC plans to reduce cereal prices by 30% could provide impetus to expand sugar production. Although sugarbeet and cereals are complementary products on EC farms, implying that a cutback in cereals production will lead to cutbacks in sugar production, this appears to be true only in the short run. Research by Larson et al. (1991) on the relationships between cereals, oilseeds and sugarbeet production in West Germany suggests that, over the long term, declines in cereal prices will cause farm resources to be transferred to sugar production--the 30% decline in cereal prices could lead to increases in over-quota production of around 25%.[4] The requirement that EC farmers wishing to qualify for direct income support in place of price support must place 15% of their land in fallow could serve to stem the flow of resources into sugar production. But given that income support will have an upper limit, large farms are likely to find it more attractive to switch from cereals to sugar than to fallow land--currently, nearly 20% of the largest farms in the EC produce about 80% of the output.

Despite EC farmers' high costs of production and despite pressures through the GATT to cut back on subsidies a decline in sugar output from the EC seems unlikely over the projection period. The EC Commission tends to regard the excesses of the Common Sugar Policy to be largely held in check. The cost of the policy is borne largely by EC consumers and efficient exporting countries, and it does not make big claims against the EC budget. Over the past 15 years, EC production has expanded by between 30-40%. The most realistic scenario for the projection period seems to be for growth of 20-30%, though external pressures from efficient sugar-exporting countries for the EC to further constrain its agricultural support may slow this growth. Cuba's imminent decline alone is likely to leave the EC--despite its gross inefficiencies--as the world's largest exporter.

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[4] D.F. Larson, S. Glance, B. Borrell, M. Ingco, J. Coleman, "Abolishing Green Rates: The Effects on Cereals, Sugar and Oilseeds in West Germany," Policy Research Working Paper No. 607, World Bank, Washington, D.C., 1991.

US sugar production to fall as cereal prices rise. In the UNITED STATES, the growth in sugar production which occurred over the 1980s is unlikely to continue in the 1990s and may well be reversed. Declining cereal support prices in the EC should help raise world cereal prices, and this is likely to encourage increased cereal production in the United States in place of sugarbeets. Each 10% rise in US farm gate cereal prices could bring about an estimated 6% reduction in US sugar production (Wong, et al. 1989).

NAFTA's effect on US market. The effects of the North American Free Trade Agreement (NAFTA) on the Mexican market for high fructose corn syrup may have adverse consequences for US net sugar imports. Nearly 50% of MEXICO's sugar is presently used in the production of soft drinks, and at the moment, import restrictions prevent high fructose corn syrup entering Mexico. The removal of border restrictions under NAFTA could result in corn syrup displacing sugar in Mexican soft drinks--as it has done in the United States (although this would be a large, high-risk investment). Displaced Mexican sugar would cross into the United States and either displace sugar imported from other sources or lead to subsidized exports of US sugar. Whichever of these two options might be adopted, the outcome would be the same: a large reduction in net US import demand from other countries. One estimate is that the developments mentioned above could lower the average world price by around 13% over the long term and increase its variability by about 6%.[5]

Strong Asian production growth to continue. In Asia, annual growth in sugar production has been exceptional over the past five years--nearly 11% in CHINA, nearly 8% in INDIA, nearly 15% in THAILAND, and about 7.5% overall. The continuing drive toward self-sufficiency in China and India is likely to result in further growth in sugar output over the projection period but this is likely to occur at a declining rate.

In India, production has been stimulated by the increase in farm and mill prices resulting from the progressive reduction of the proportion of sugar that producers must sell at a discount to state-run stores. However, soon all sugar will be sold to the protected and higher-priced private market, so the scope for further increases in prices and effective protection is limited. Increases in production will then be restricted to efficiency gains brought about through technological advance.

In China, the recent consumer sugar price reforms have made more visible the subsidies offered sugar producers there--producers receive higher prices than consumers pay. This visibility should create pressures to extend price reforms to sugar producers as well. As a result, as its export trade and foreign exchange earnings continue to grow, China seems likely to progressively source its growing needs for sugar from the world market rather than from high-cost domestic sources.

Thailand captures growth in world market. Thailand is likely to be a source of exports for China. It is a low-cost producer which exports 70-80% of its output. Although Thai producers receive high prices from sales to their domestic market, the domestic market is relatively small and, in the main, producers respond to the world price. Thai producers have been highly competitive on the world market in recent years. During the 1980s they expanded exports by 250% despite historically low world prices. Among the three major low-cost exporters--AUSTRALIA, BRAZIL, THAILAND--Thailand is the only one without rigid production controls. For political reasons, both Australia and Brazil have been unable to remove these controls, which are mostly a holdover from the days of the last International Sugar Agreement. The controls greatly restrict Brazil's and Australia's competitiveness and enhance that of Thailand. While these controls persist, Thailand is well placed to capture growth in the world market

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[5] B. Borrell and J.R. Coleman, "Gains from Trade in Sugar and the US-Mexico Free Trade Agreement," Centre for International Economics, Canberra, 1991.

ahead of its major competitors. Accordingly, despite the great potential of Australia and Brazil to increase production efficiently, Thailand can be expected to capture a larger share of increases in world consumption than its rivals.

Australian production increases constrained by government regulation. Conservative estimates are that Australia could profitably expand exports by over 60% within several years if production controls were lifted.[6] However, growers are resisting federal government moves to open up the industry. Existing growers are attempting to reserve expansion opportunities for themselves rather than share them with other landholders who are currently locked out of the industry. The compromise position prescribes small annual increases. But given the very high opportunity costs of maintaining such a policy it seems reasonable that Australia will eventually deregulate its sugar industry. However, the effects of this are unlikely to show up until the later half of the 1990s.

Production controls on sugar seem set to continue in Brazil given its on-going commitment to ethanol production. Although sugarcane would be considerably more valuable for producing sugar instead of ethanol, the high proportion of Brazil's motor vehicles which now rely on ethanol as a fuel makes switching politically difficult. The most likely outlook seems to be for only a gradual switching toward sugarcane for sugar.

Drought and uncertainty dampen African production. Despite the lifting of trade sanctions against South Africa, there is little evidence that efficient African countries such as MAURITIUS, SOUTH AFRICA, SWAZILAND, and ZIMBABWE are likely to expand production and export growth over the projection period. The 1992 drought has had disastrous effects on sugar production in Eastern Africa. Zimbabwe, for example, will likely produce no sugar in 1992 or 1993. Production and exports stagnated over the 1980s. The uncertain political outlook in South Africa is reflected in an equally uncertain outlook for its sugar industry.

Price Prospects

Long-run average price likely to rise 20% (real terms). Table 3 sets out an assessment of the likely influence of developments in various countries on the long-term world market price. This influence is expressed as a range, in percentage terms, and is based on parameters from the model of Wong et al. (1989). The average of the range is given in each instance. This evaluation suggests that likely developments in all major countries together seem more likely to cause an increase in the long-run average world price over the projection period than a decrease. The 12.5% average increase derived suggests that compared with prices since the last boom of 1980-81, when the world price averaged around ¢11.5/lb (1990 dollars), during the projection period world prices could average around ¢13/lb. However, a subjective assessment of the most likely developments in each country suggests a higher price rise of 20% (column 3, Table 3). With a rise of that magnitude, the world price would average around ¢14/lb.

Reduced government intervention would lessen price volatility. The assessments made in Table 3 put the price forecast in a realistic range given the costs of production of efficient producers. Nonetheless, while government intervention continues to constrain producers and consumer from responding directly to the world price, the long-run average world price will remain highly sensitive to average rates of growth in consumption and political factors affecting production. If the Uruguay Round of the GATT is successful in lowering protection and intervention by up to 30%, the world price is likely

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[6] B. Borrel, D. Quirke and D. Vincent, "Sugar: Winning in a Corrupt World Market," Centre for International Economics, Canberra, 1991.

Table 3: Price Impacts of Various Country Developments

	Range of impact on price	Average	Assessment
	(%)		
Cuba	0 - 30	15	20
Eastern Europe/FSU	-30 - 40	5	10
EC	-30 - 10	-10	-20
China	-10 - 30	10	10
US/Mexico	-20 - 40	10	0
Brazil	-50 - 0	-25	-5
India	-20 - 60	20	20
Thailand	-10 - 0	-5	-10
Australia	-5 - 0	-2.5	-5.0
Alternative sweeteners	-10 - 0	-5.0	-2.5
Rest of world	0	0	0
Overall impact		12.5	20.0

Source: World Bank, International Economics Department.

to become considerably less volatile. Removing protection in OECD countries could increase the long-run average world price by an estimated 33%, although removing production controls in Brazil and Australia would create pressures in the opposite direction. Both developments would tend to make the world price less variable.[7]

It is hard to say what would happen to the average world price if all intervention ceased. However, what is clear is that price would be less variable and there would be a shift in production away from high-cost subsidized producers to lower-cost producers (most of which are developing countries). So the market would be likely to more closely reflect the costs of production of efficient producers than now. This would seem to put the real price in the 10-15¢/lb bracket. But the world market has been so distorted for so long, making sense of how it would change involves a lot of guesswork. Besides, the chances of quickly removing all interventions seem remote. From a producer's or an investor's point of view, the sugar industry remains a high-risk industry.

[7] B. Borrell and R.C. Duncan, "A Survey of the Costs of World Sugar Policies," Policy Research Working Paper No. 522, World Bank, Washington, D.C., 1990.

Table A1: Sugar - Prices, a/ 1950-91 (Actual) and 1992-2005 (Projected)

	($/ton)		
	Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/
Actual			
1950	110	672	885
1951	126	668	915
1952	92	466	641
1953	75	392	520
1954	72	383	490
1955	71	374	485
1956	77	386	509
1957	114	563	740
1958	77	375	493
1959	66	323	419
1960	69	334	434
1961	60	283	365
1962	61	285	366
1963	184	873	1,063
1964	127	594	717
1965	45	206	243
1966	40	179	211
1967	42	187	218
1968	42	187	210
1969	71	299	339
1970	81	323	367
1971	99	375	420
1972	160	556	616
1973	208	624	700
1974	654	1,608	1,984
1975	449	994	1,213
1976	255	556	666
1977	179	356	423
1978	172	297	332
1979	213	325	388
1980	632	878	1,031
1981	374	518	605
1982	186	261	304
1983	187	269	301
1984	115	169	185
1985	90	130	142
1986	133	165	175
1987	149	168	173
1988	225	236	243
1989	282	298	306
1990	277	277	277
1991	198	194	188
Projected			
1992	200	188	179
1993	205	185	177
1994	220	195	186
1995	254	220	209
2000	350	255	239
2005	441	280	251

a/ For 1950-60, New York World Contract No. 4, f.a.s. Cuba; from 1961 onward, International Sugar Council "World" (ISA daily) price, f.o.b. and stowed Caribbean ports.

b/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.

c/ Deflated by G-7 Consumer Price Index (CPI).

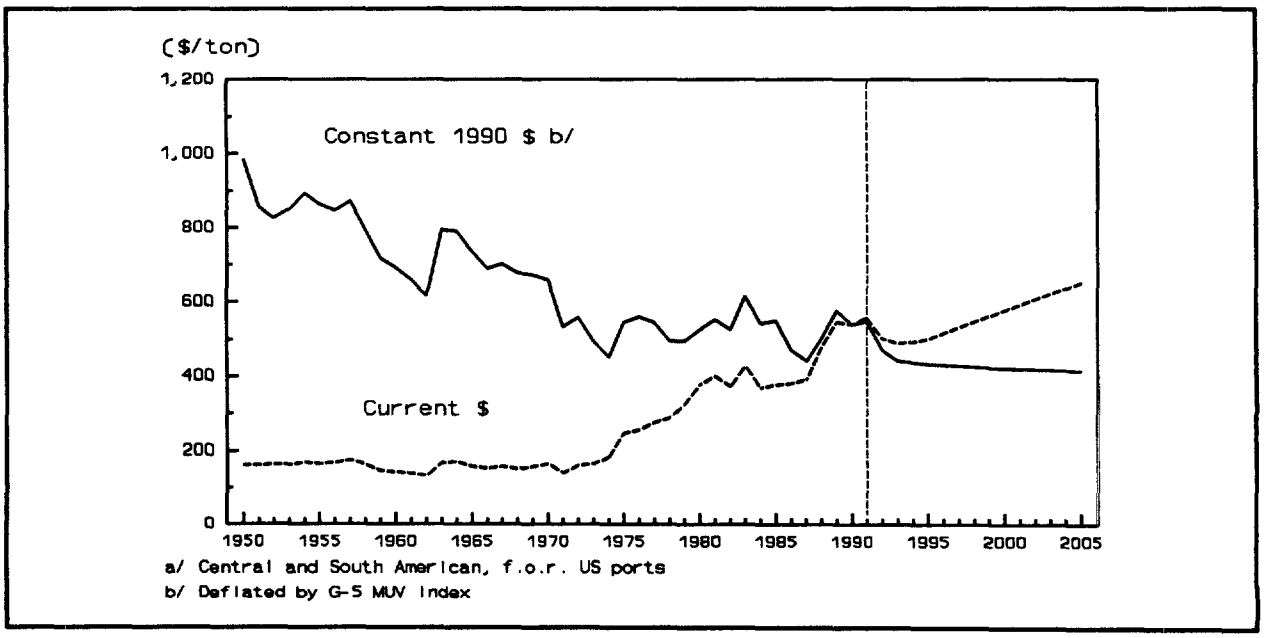
Sources: International Sugar Organization and FAO Trade Yearbook (actual); World Bank, International Economics Department (projected).

Bananas

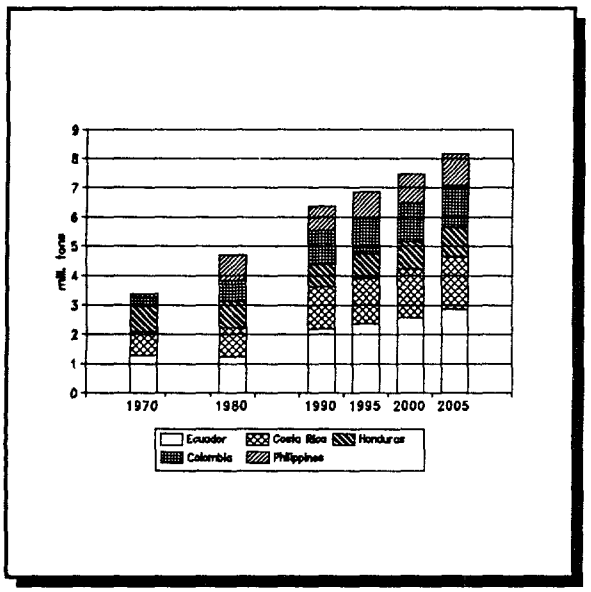
Summary

- World trade in bananas is expected to slow during the period 1991-2005, with an annual growth rate of 1.6% p.a. compared with 2.3% p.a. during 1961-90.
- High-income countries should remain the major market for banana imports but their rate of demand growth is expected to slow while that of the LMICs, the FSU, and Eastern Europe should increase.
- Ecuador is likely to remain the leading exporter of bananas and the efficient producers of Central and South America are projected to have the fastest growth in banana exports.
- Over the short run, banana prices in current dollar terms are expected to decline from the high prices of 1991 as export availabilities exceed import requirements; in the longer run, increasing productivity means that prices in real terms should continue their downward trend of the last four decades (from $549/ton in 1991 to $434/ton in 1995 and to $414/ton in 2005, in 1990 constant dollars).
- The effect of the EC's post-1992 proposed banana regime on world trade, banana prices, and exporters' earnings is unclear, but will depend on the extent to which imports of dollar zone bananas are restricted in order to protect the EC's preferential suppliers in the EC, Africa, the Caribbean, and the Pacific.

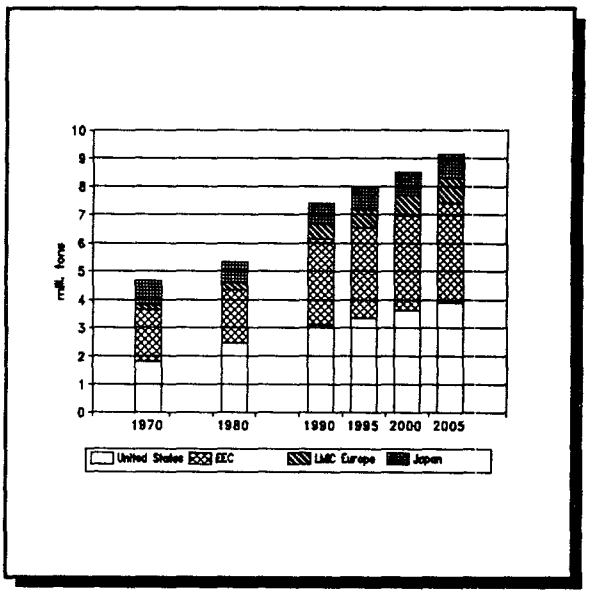
Banana Prices a/, 1950-2005



Projected Banana Exports, by Producer



Projected Banana Imports, by Consumer



Outlook for Import Demand

World imports of bananas increased by around 10% in 1990 from the previous year. Strong demand in a number of European countries contributed to the substantial growth. Imports into Germany increased by 33%--from 926,000 tons to 1,232,000 tons. Imports into France and the United Kingdom increased by 9% and 8%, respectively. Imports into LMIC Europe increased by 54%--mainly due to the increase by Yugoslavia of three and a half times. The major factors contributing to the strong import growth in 1990 were: effective marketing promotions by traders, increased consumer preference for natural convenience foods, increasing health consciousness, competitive pricing of bananas, reunification of Germany, political and economic reforms in Eastern Europe, and changes in EC policy. These factors, together with Korean trade liberalization in January 1991 and the EC single market policy in 1993, will continue to affect the import demand for bananas for some time.

Growth slows but new market potential emerges. Imports by LMICs are projected to grow faster than those of high-income countries because of higher projected income growth and income elasticities. However, high-income countries should remain the major import markets because of higher per capita consumption levels. World banana imports are expected to increase from 9 million tons in 1991 to 11.2 million tons in 2005, an average annual growth rate of 1.6%, compared with 2.3% p.a. during the 1961-90 period.

The political and economic changes in Eastern Europe and the FSU should lead to a substantial increase in banana imports because per capita consumption of bananas is comparatively very low in relation to income levels in these markets. Per capita consumption in Eastern Europe and the FSU averaged only 0.4 kg in 1990 compared with 17.1 kg in Austria and 11.4 kg in the United States. However, imports into Eastern Europe and the FSU decreased by 13% in 1990 due to the economic disruptions. When economic growth resumes, imports of bananas should increase substantially.

Imports by the Republic of Korea should increase rapidly as a result of import liberalization. Because of the previous import restrictions, historical imports cannot be used as a guide for import projections. Therefore, it is assumed that per capita consumption will increase to about the

current levels in Hong Kong (5.6 kg) by 2005 from the 0.5 kg in 1990. Thus, total imports into the Republic of Korea are projected to increase from 22,000 tons in 1990 to 270,000 tons in 2005.

Imports by Germany will be affected by two special factors. Reunification should increase imports into the former East Germany but EC policy changes after 1992 are likely to depress banana consumption. Currently, Germany is virtually a free market for bananas. However, after 1992, if the proposed changes in EC policy are effected, Germany will have to impose a common tariff of 20% on banana imports from the dollar area. This should increase retail prices and have a negative effect on banana consumption.

The United States is the largest importer of bananas. Its imports have returned to an upward trend since the 1989 decline due to supply problems and import demand is expected to continue growing. However, the rate of growth should slow because of the already high per capita consumption (11.4 kg), low income elasticity (about 0.3), and low population growth (0.8% p.a).

Outlook for Export Supply

Reliable data on total banana production (as distinct from commercial production for export) are not available in most developing countries. Therefore, it is not possible to project exports as the difference between production and consumption. Banana exports are determined by expected import demand, because export supply is highly responsive to demand.

Under normal circumstances, the volume of banana exports can be varied by 5-15% by changing export quality standards. The short production cycle (11-14 months between planting and harvesting), together with the very high yield per hectare and the fact that many estates own ample reserves of land, means that banana supplies can be adapted to most developments in import demand with a lag of little more than one year.

Because of the importance of geographical location and preferential arrangements in determining trade flows, the exports of each country are determined primarily by demand in their export markets. The 1988-90 trade matrix (Table 1) has been used as the basis for making export projections. The trade patterns existing at that time are assumed to remain unchanged during the projection period and, therefore, the market shares of the various exporting countries in specific import markets are assumed to remain fairly constant. In addition, likely important changes in production have been taken into account in particular exporting countries, such as Ecuador, Colombia, Costa Rica, and Jamaica.

Ecuador and Costa Rica continue to expand production. Exports from ECUADOR doubled from 1.1 million tons in 1985 to 2.2 million tons in 1990. This increase was attributed mainly to government export promotion policies which expanded areas under bananas from 51,000 ha in 1985 to 85,000 ha in 1990. Ecuador is expected to remain the world's largest exporter as the production expansion is continuing, although a possible constraint to expansion is the black sigatoka fungus which affects almost one third of the country's banana plantations.

COSTA RICA is the world's next largest exporter of bananas after Ecuador. It is likely to remain in that position during the projection period because banana companies are expanding acreage and increasing production. Companies have plans to increase banana areas from the current 32,000 ha to

Table 1: World Trade of Bananas, 1988-90 Average ('000 tons)

	Importing Countries																	
Exporting Countries	US	Canada	Japan	Austria	Belgium Luxembourg	Denmark	Finland	France	Germany	Ireland	Italy	Netherlands	Norway	Sweden	Switzerland	United Kingdom	Saudi Arabia	Hungary
Colombia	410.1	42.1	4.7	15.8	14.0	4.3	2.8	-	155.4	9.2	51.3	53.2	4.5	2.8	6.2	39.8	-	17.4
Costa Rica	601.3	51.5	-	40.9	10.6	14.8	18.2	-	227.4	1.2	104.5	15.4	14.6	30.0	16.4	16.6	-	-
Ecuador	916.4	149.4	93.4	9.9	13.2	3.3	11.8	-	164.1	6.3	65.7	16.5	0.6	6.7	0.4	15.5	39.3	2.4
Guatemala	262.5	7.1	-	2.6	1.5	0.3	-	-	12.6	-	10.5	-	0.7	4.1	0.5	3.2	15.6	-
Honduras	548.3	13.6	-	5.4	9.3	6.0	10.2	-	68.7	6.4	23.5	12.4	4.6	34.2	9.5	-	8.3	-
Mexico	109.7	14.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nicaragua	-	-	-	13.5	5.7	-	3.8	-	21.2	-	-	2.8	-	-	0.3	1.4	-	5.2
Panama	110.9	18.1	-	31.0	29.8	12.4	18.1	-	277.4	1.5	45.5	26.8	21.8	56.7	34.8	2.7	1.9	-
Belize	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25.3	-	-
Dominican Rep.	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Jamaica	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	44.7	-	-
Suriname	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30.2	-	-
Dominica	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	51.0	-	-
Grenada	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.3	-	-
St. Lucia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	104.7	-	-
St. Vincent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	67.3	-	-
Guadeloupe	-	-	-	-	-	-	-	95.4	-	-	-	-	-	-	-	-	-	-
Martinique	-	-	-	-	-	-	-	190.3	-	-	-	-	-	-	-	10.1	-	-
Cameroon	-	-	-	-	-	-	-	53.4	-	-	-	-	-	-	-	1.4	-	-
Côte d'Ivoire	-	-	-	-	-	-	-	83.3	-	-	-	-	-	-	-	0.3	-	-
Somalia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.9	-
China	-	-	60.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Philippines	-	-	600.5	-	-	-	-	-	-	-	43.6	-	-	-	-	-	59.9	-
World	2,963.6	297.6	763.7	120.6	98.2	43.5	66.8	461.3	966.6	45.6	403.1	142.5	48.4	135.6	72.6	430.5	165.7	34.4

Source: FAO, Banana Statistics, CCP: BA 91/6, April 1991.

45,000 ha within three years. Fertile soils, the favorable political and economic climate, and expertise in producing top quality fruit have attracted banana companies to invest in Costa Rica.

Growth despite problems in Colombia; incentives for Honduran producers. In COLOMBIA, bananas are produced in two regions on the Atlantic coast, Uraba and Santa Marta. Uraba now accounts for about 70% of banana exports, compared with 90% a decade ago. This decline is due to labor problems which have plagued Uraba's banana industry since the mid-1980s. It is believed that Uraba could improve productivity considerably if social stability returned to the region. The banana area in Santa Marta is expanding, which suggests that exports from Colombia should continue to grow as its export markets grow.

Banana exports from HONDURAS stagnated during the 1980s. The Honduran Congress passed the Banana Production Incentive Law on May 21, 1991 in order to improve competitiveness of Honduran bananas in the international market and to attract new investment in banana production. This law created the National Banana Council to direct banana production, marketing, and export policy. For new areas brought into production, the law provides an exemption from export taxes for the first three years and a 60% reduction of export taxes for the following three years. The Banana Development and Expansion Fund, financed by a US$0.03/box export tax, was created to assist the expansion of local independent banana producers and cooperatives. This policy should stimulate banana production in Honduras.

Caribbean and Philippines' growth limited by market demand. Some CARIBBEAN banana growers are increasing production. However, their exports are constrained by the expected slow growth of their traditional export markets. Generally, Caribbean producers have higher production costs and cannot compete with Latin American producers. However, three Caribbean countries, Belize, Dominican Republic, and Jamaica have the potential for large increases in production. JAMAICA is still recovering from the devastation of hurricane Gilbert in 1988. It has continued to implement its plantation projects and has an export target of 120,000 tons by 1994. In December 1989, the DOMINICAN REPUBLIC became a beneficiary member of the Lomé Convention which allows bananas to be exported to the EC duty free. Its exports increased from 1,500 tons in 1989 to 7,900 tons in 1990. The country reportedly plans to expand production to 106,000 tons over the next few years. BELIZE reportedly plans to increase its production to 100,000 tons. Whether these expansion plans will be realized depends heavily on the size of their protected markets.

Exports from the PHILIPPINES have been constrained by the growth of the Japanese market, which took 76% of its exports in 1990. However, the liberalization of imports in the Republic of Korea since 1991 should give the Philippines an opportunity to increase exports, although it could encounter competition from the major Latin American exporters in these markets.

Banana production is expected to grow faster than import requirements, causing export availabilities to exceed actual exports. A comparison of export availabilities forecast by the FAO for 1994 and our forecast of exports for the same year illustrates this situation (see Table 2).

Price Outlook

Banana prices increased from $541/ton in 1990 to $560/ton in 1991, up 3.5%. Factors contributing to the price increases were shipment interruptions due to infrastructure damage caused by

Table 2: Export Availabilities and Exports of Bananas, 1994

	Export Availabilities	Projected Exports
	('000 tons)	
Cameroon	70	63
Colombia	1,300 - 1,400	1,214
Costa Rica	1,550 - 1,650	1,517
Côte d'Ivoire	100	96
Ecuador	2,400 - 2,600	2,316
Guatemala	480 - 530	405
Honduras	980 - 1,050	835
Jamaica	100 - 120	80
Panama	800	791
Philippines	900 - 950	895
Windward Islands	296 - 316	271

Sources: FAO, "Medium-Term Outlook for World Trade in Bananas," CCP:BA 91/3, April 1991 (export availabilities); World Bank, International Economics Department (projected exports).

the earthquake in Costa Rica and Panama in April and crop damage from floods in Honduras and from a typhoon in the Philippines; price disputes between growers and importers in Ecuador; and labor unrest in Honduras. Stronger demand was evident in the Republic of Korea as a result of the liberalization of banana imports; higher import demand was seen in the United States because of the drop in orange production in California due to a freeze; and consumption increased in Europe due to the unification of Germany and changes in Eastern Europe.

Real long-term trend continues downward. In the absence of further natural disasters and export disruptions, export availabilities are expected to exceed import requirements by 1994, causing downward pressure on banana prices. Over the longer run, the trend in banana prices in real terms has reflected the impact of increasing productivity--constant dollar prices have decreased at an average annual rate of 1.5% during the period 1950-91. This downtrend in real prices is expected to continue. The long-term price projections assume that yields in Latin America will increase by 1% p.a., compared with 2% p.a. in the period 1961-90. The lower growth in productivity is expected because most of the banana producing countries have already switched to high-yielding varieties. Over the longer run, therefore, projected prices (in 1990 constant dollars) in the US market are expected to trend downwards from $549/ton in 1991 to $434/ton in 1995 and to $414/ton in 2005. Banana prices in other markets could have different trends because of differing cost elements, geographical isolation of markets, or preferential trading arrangements.

The EC Banana Policy

The EC has long been a major importer of bananas. In 1990, the EC was the single largest importer, accounting for 37% of world imports. The major suppliers of bananas to the EC are producers in the Caribbean, Africa, and Central and South America (see Table 1). In 1990, 40% of EC bananas were supplied by overseas territories and ACP countries and the remaining 60% were supplied by Central and South American countries. Trading patterns with these suppliers have shown only minor changes since the EC was established in 1958. The trade links were formed by import policies and preferences granted by member countries.

EC, except Germany, continues import restrictions. The EC has a common external tariff of 20%. Only Belgium, Denmark, Ireland, Luxembourg, and the Netherlands apply this tariff exclusively. Other EC countries, except for Germany, apply other restrictions as well as the 20% tariff on banana imports from nonpreferred suppliers. Banana imports from ACP countries are duty free under the Lomé Convention between the EC and the members' former colonies.

Under a special protocol of the Treaty of Rome, Germany has a zero tariff and an unlimited quota on bananas. By increasing its quota in line with demand, Germany imports virtually all of its bananas without duties.

France has always maintained a managed market such that two thirds of its market is reserved for imports from the French Overseas Departments (Guadeloupe and Martinique) and one third for African franc zone countries such as Cameroon, Côte d'Ivoire, and Madagascar. French imports of bananas from these protected producers accounted for 92% of its total imports in 1988-90. Imports from other origins are subject to licensing, which is only granted when import prices exceed a certain level.

The United Kingdom has traditionally granted unrestricted duty-free access to Commonwealth producers such as Belize, Dominica, Grenada, Jamaica, St. Lucia, and St. Vincent, and to Suriname. Imports from dollar area countries[1] are subject to tariff and licenses that may be granted if supplies from Commonwealth countries fall short of market requirements. Licenses are issued by the Department of Trade and Industry every month, following recommendations from the Banana Trade Advisory Committee. However, a licensed minimum level of 33,500 tons has been guaranteed since 1990. Approximately 80% of the UK banana imports were from traditional suppliers in 1988-90.

Italy grants free access to banana imports from overseas EC territories and ACP countries, but imports from third countries are allowed only within the limit of a global quota. This quota has been increased slowly since the 1970s and was set at 320,000 tons in July 1989. Somalia is a traditional supplier to Italy with a preferential status. However, it supplied only 11% of the Italian market in 1988-90 due to production difficulties. The rest was supplied mainly by Latin American countries with a small share by the Philippines.

Spain and Portugal restrict imports to protect producers in their overseas territories--Canary Islands of Spain and Madeira of Portugal. This is permitted until 1995 under their treaties of accession to the EC. Portugal has opened its market considerably under a tender system but gives preference to bananas from Madeira. Spain gets virtually all of its bananas from the Canary Islands. Greece has a high tax on bananas, which curtails consumption and therefore restricts imports.

Single EC policy proposed after 1992 protects ACP, restricts dollar zone. The EC will become a single internal market after 1992 when all internal trade barriers are scheduled to be removed. The protected markets of France, Greece, Italy, Portugal, Spain, and United Kingdom, as well as the free market of Germany will no longer exist. A new unified regime for banana trade will replace the current regimes of individual member states.

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[1] The "dollar area" consists of Bolivia, Canada, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, the Philippines, United States, and Venezuela.

On April 7, 1992, the EC Commission adopted a general "decision of principle" regarding the post-1992 EC banana regime. The Commission simply stated that there should be (i) a minimum GATT-bound quota on Latin American bananas subject to a 20% duty; (ii) an additional "autonomous quota;" and (iii) EC financial assistance to Community and ACP producers. A Commission Working Party, made up of members of the Commission's Inter-Service Group, was instructed to prepare a more detailed proposal based on these general guidelines.

On May 12, 1992, the Commission Working Party issued a report entitled "Setting Up the Internal Market in the Banana Sector" which proposed a new banana regime after 1992. The proposed system includes a GATT-bound minimum quota on dollar zone bananas of 1.4 million tons, with a 20% GATT-bound customs duty. The report suggests that this minimum quota should be increased by 3% p.a. over a period of ten years. In addition to this minimum quota, the report provides for an "autonomous quota" on dollar zone bananas. Two variants are set forth regarding how this autonomous quota might operate, both of which involve Commission discretion to adjust the import volumes, reallocate licenses, and perhaps increase the tariff to assure adequate protection for the preferential bananas. In August 1992, the Commission reached a final proposal for decision in September 1992. The final proposal differs little from the two options presented previously. The quota was increased to 2 million tons from the originally proposed 1.4 million tons.

Overall impact on restrictiveness of markets unclear. As a result of ambiguity and the complexity of the options presented in the report, it is difficult to gauge the impact on banana trade. However, in general, the quota system places quantitative restrictions on dollar zone bananas. The restrictions on supply would raise prices in the open market of Germany and in the tariff-only countries and could lower them in the markets currently restricting access by licenses and quotas. The larger the quota, the greater the price decline in markets currently protected. But lower prices would reduce earnings of preferred suppliers. The effect of the proposed quota system on world prices depends on the extent to which imports are restricted. If the new regime is more restrictive than the present regime, then world prices would fall. Conversely, if the new regime is less restrictive than the current regime, then world prices would rise.

The aim of the EC in protecting preferred banana suppliers is to support former colonies whose economies have a narrow production base. However, among many policy options, the quota-based option is most costly in terms of transferring aid. Borrell and Cuthbertson have estimated that under the quota-based policy options it could cost the EC as a whole between $2 and $3 for every dollar of aid received by the preferred suppliers. (This estimate does not include the administrative costs associated with such options.[2]) In addition, the proposed new regime would involve enormous administrative costs.

[2] B. Borrell and S. Cuthbertson, "EC Banana Policy 1992," Center for International Economics, Australia, 1991.

Table A1: Bananas - Gross Exports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	520	358	539	544	550	555	561	569	601	641	0.0	-0.8	1.2
OECD	196	251	486	494	502	510	518	526	569	616	2.4	1.5	1.6
LNICs	5,410	6,542	8,801	8,882	9,013	9,184	9,342	9,499	10,278	11,165	2.4	1.4	1.6
Africa	389	246	234	229	231	232	234	236	247	259	-3.4	-4.5	0.9
Americas	4,807	5,331	7,665	7,680	7,851	8,002	8,141	8,278	8,955	9,733	2.2	1.5	1.7
Ecuador	1,262	1,230	2,188	2,200	2,212	2,269	2,316	2,362	2,584	2,848	0.6	0.8	1.9
Costa Rica	824	1,000	1,434	1,442	1,463	1,492	1,517	1,542	1,664	1,803	5.1	0.5	1.6
Honduras	895	906	781	726	808	822	835	850	925	1,006	1.9	0.3	2.4
Panama	603	546	745	756	768	779	791	803	865	932	2.9	1.2	1.5
Colombia	275	707	1,148	1,159	1,164	1,185	1,214	1,223	1,316	1,421	7.0	9.0	1.5
Guatemala	197	332	359	382	389	397	405	413	451	495	6.2	2.3	1.9
Asia & Pacific	200	958	890	903	920	938	955	973	1,064	1,161	11.1	4.5	1.8
Philippines	132	883	847	859	875	892	908	925	1,011	1,103		5.6	1.8
World	5,929	6,900	9,339	9,368	9,563	9,739	9,903	10,068	10,879	11,806	2.2	1.3	1.7

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: FAO, Trade Yearbook Tapes (actual);
World Bank, International Economics Department (projected).

Table A2: Bananas - Gross Imports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	5,097	5,861	7,902	7,939	8,046	8,155	8,266	8,379	8,910	9,503	2.3	1.5	1.3
OECD	5,042	5,760	7,764	7,793	7,899	8,005	8,113	8,224	8,741	9,318	2.3	1.5	1.3
United States	1,798	2,455	3,099	3,114	3,172	3,230	3,289	3,349	3,611	3,910	2.9	2.7	1.6
Canada	200	252	341	312	316	321	326	331	352	377	2.5	2.3	1.4
Germany	606	647	1,232	1,252	1,272	1,293	1,314	1,335	1,443	1,563	1.4	1.2	1.6
United Kingdom	337	318	470	472	475	477	480	483	499	518	0.1	1.3	0.7
Italy	290	292	429	432	434	437	440	443	459	476	3.0	1.8	0.7
Japan	857	741	758	764	771	778	785	792	829	867	4.4	-1.5	0.9
France	445	449	497	499	501	503	505	507	517	528	0.6	-0.2	0.4
LMICs	545	908	996	1,015	1,051	1,122	1,174	1,227	1,446	1,696	2.5	0.5	3.7
Americas	280	372	252	252	251	251	251	251	250	249	-0.3	-0.2	-0.1
Asia & Pacific	3	15	39	59	84	110	135	160	223	287	12.1	11.7	12.0
Middle East & North Africa	85	238	151	148	156	162	169	176	220	274	4.5	0.0	4.5
Europe	160	274	545	547	551	590	609	629	741	872	5.6	0.7	3.4
World	5,641	6,769	8,898	8,952	9,097	9,277	9,440	9,606	10,356	11,199	2.3	1.4	1.6

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: FAO, Trade Yearbook Tapes (actual);
World Bank, International Economics Department (projected).

Table A3: Bananas - Prices, a/ 1950-91 (Actual), 1992-2005 (Projected)

	($/ton)		
	Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/
Actual			
1950	161	985	1,298
1951	161	855	1,171
1952	163	827	1,138
1953	163	850	1,129
1954	168	894	1,142
1955	165	865	1,124
1956	168	847	1,114
1957	176	873	1,148
1958	163	793	1,042
1959	146	718	931
1960	143	692	900
1961	139	660	852
1962	132	616	789
1963	168	796	969
1964	170	792	957
1965	159	735	866
1966	154	691	815
1967	159	702	817
1968	152	679	762
1969	159	673	762
1970	165	659	748
1971	141	534	598
1972	161	559	618
1973	165	494	554
1974	184	453	559
1975	247	546	666
1976	257	561	673
1977	275	546	650
1978	287	496	554
1979	326	496	594
1980	379	527	618
1981	401	555	649
1982	374	526	613
1983	429	617	692
1984	370	544	598
1985	378	551	599
1986	382	472	501
1987	393	442	457
1988	478	502	516
1989	547	578	593
1990	541	541	541
1991	560	549	532
Projected			
1992	502	471	450
1993	490	443	424
1994	494	439	417
1995	502	434	412
2000	579	422	395
2005	652	414	371

a/ Central and South American, first-class quality tropical pack, importer's price to jobber or processor, f.o.r. US ports.

b/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.

c/ Deflated by G-7 Consumer Price Index (CPI).

Sources: US Bureau of Labor Statistics, Food and Agriculture Organization, and Union de Paises Exportadores de Banano (actual); World Bank, International Economics Department (projected).

Fresh Citrus Fruit

Summary

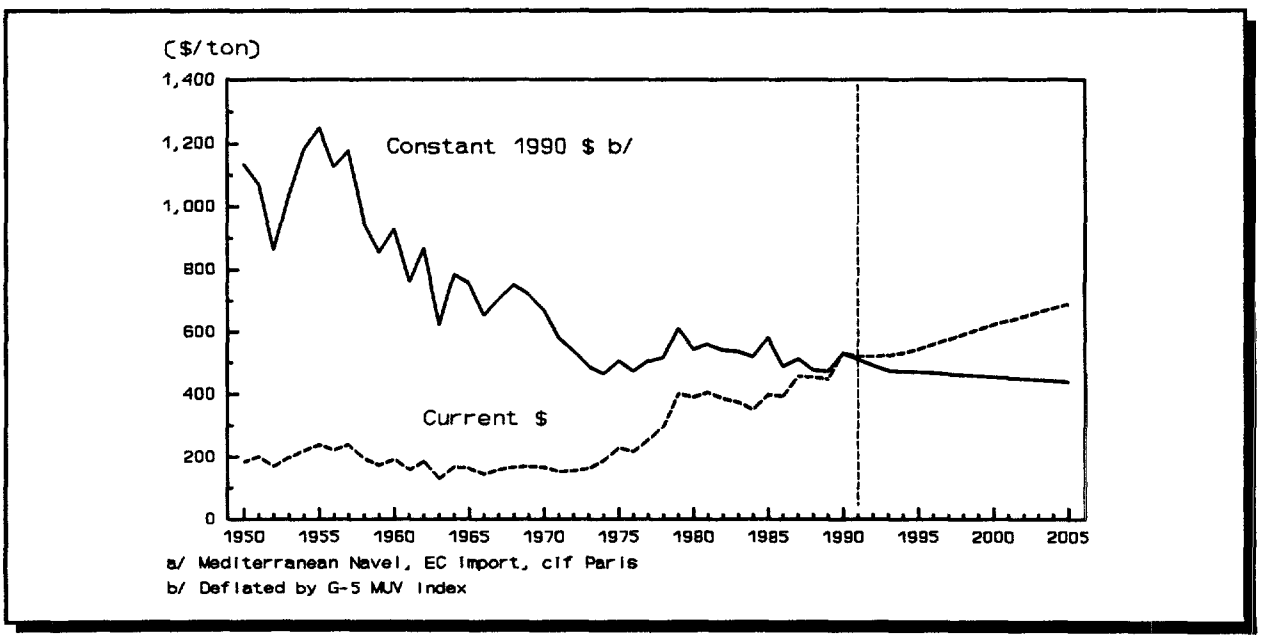
- Citrus production and consumption are projected to grow from 76 million tons in 1991 to 97 million tons in 2000 and 112 million tons in 2005. Substantial increases in citrus production are expected in Brazil, China, Cuba, Spain, and Turkey, while production in Japan, Italy, Lebanon, and Gaza is expected to decline.

- Citrus consumption is expected to grow faster in developing countries than in industrial countries, reflecting faster growth in income and population. Consumption in China is expected to increase substantially as production expands and in the long run citrus consumption in Eastern Europe and the FSU is also expected to increase significantly.

- Imports of citrus fruits are expected to reach 12 million tons by 2005; 8.8 million tons of oranges and tangerines, 1.8 million tons of lemons and limes, and 1.6 million tons of grapefruit. Large increases in exports from Spain, the United States, and Cuba will be responsible for most of this increase in export growth. Although industrial countries should remain the major importing area, growth in their imports is expected to be slower while imports into the Republic of Korea, Eastern Europe and the FSU are expected to increase substantially.

- Orange prices have been on a declining trend in real terms, but they fluctuate sharply from year to year mainly because of changing weather conditions in major producing countries. The long-term price projections reflect the historical tendency of supply to grow faster than demand at a given price level. In 1990 constant dollars, prices are expected to decline from $511/ton in 1991 to $470/ton in 1995, to $453/ton in 2000, and to $436/ton by 2005.

Orange Prices a/, 1950-2005



Supply Outlook

Supply projections are based on past trends modified by information on production development plans, new plantings, yield developments, area available for expanded production, introduction of new varieties, improvements in planting methods, spread or control of diseases, and government policies in the major producing countries. The projections assume that production trends will not be affected by unusually adverse weather during the projection period.

Projected growth of production 2.8% p.a., fastest in LMIC Asia. Total citrus production is expected to increase from 76 million tons in 1991 to 112 million tons in 2005, representing an annual growth rate of 2.8%. Over the same period, oranges and tangerines production is expected to grow at 2.8% p.a., while lemons and limes are expected to grow at 2.9% p.a. and grapefruit at 2.9% p.a. (see Table 1). Production in LMIC Asia is expected to grow fastest, mainly due to rapid growth in China.

Citrus production in China has increased rapidly in recent years as increasingly large numbers of trees have come into production. Production has grown from 0.4 million tons in 1975 to 5 million tons in 1990. This rapid expansion was largely a result of major economic reforms which gave individuals more freedom in production decisions through the production responsibility system, decontrol of citrus marketing and prices, and encouragement of regional specialization in cash crops. Citrus has been one of the most profitable cash crops. The regional governments in the main citrus-growing areas have been developing hilly land suitable for orchards. In 1987, it was estimated that about 60% of the planted area was non-bearing and most of the bearing trees had not reached full maturity. New plantings have continued to increase in recent years. As these trees reach maturity, further increases in citrus production will be realized. Although Chinese production is mainly for domestic consumption, ultimately the increased production could have some effect on international markets.

Production growth in Latin America is mainly attributed to the developments in Cuba and Brazil. Citrus production in Cuba has grown very fast since the government embarked on an extensive planting program in 1967. The fast growth is expected to continue as more new plantings are made. The national target for citrus production in 1995 is 1.6 million tons, including one million tons of oranges and 500,000 tons of grapefruit, and 112,000 tons of lemons. The target for exports in 1995 is 830,000 tons. Cuba exported about 500,000 tons in recent years, mostly to Eastern Europe and the FSU under reciprocal trade agreements. Cuban exports will face more competition in these major markets as they change their economic systems. This could become a constraint on its production expansion.

Brazil is the world's largest producer of citrus fruit, mainly oranges for processing into frozen concentrated orange juice (FCOJ) for export. Orange production in Brazil is likely to continue with strong growth as further new plantings are made and yields continue to improve. Its growth has been encouraged by recent high FCOJ prices due to the shortfalls in Florida because of frost. After the recovery of orange production in Florida, orange production growth in Brazil will depend on the development of new markets such as Japan, the Middle East, Eastern Europe, and the FSU. Demand for FCOJ in these markets is expected to increase significantly.

Spain and the United States to increase production while Italy and Japan contract. Among the OECD countries, Spain and the United States will be the major countries contributing to citrus production growth whereas production in Japan and Italy is expected to decline. Spain is the world's largest exporter of fresh citrus. Production has increased substantially since Spain joined the EC in 1986,

Table 1: World Citrus Production, 1988-90 to 2005

	Annual Average 1988-90	1991	1992	1993	1994	1995	2000	2005	Growth Rates 1991-2005
	(million tons)								(% p.a.)
Oranges and Tangerines									
High-Income	18.6	19.3	19.7	20.1	20.5	20.9	22.9	25.2	1.9
OECD	17.3	18.0	18.4	18.7	19.1	19.5	21.5	23.8	2.0
Non-OECD	1.3	1.3	1.3	1.3	1.3	1.4	1.4	1.4	0.5
LMICs	40.8	43.4	44.7	46.1	47.5	49.0	57.1	66.8	3.1
Africa	1.2	1.2	1.3	1.3	1.3	1.4	1.5	1.7	2.5
America	23.1	24.3	24.8	25.4	26.0	26.7	30.0	33.8	2.4
Asia	8.4	9.3	9.7	10.2	10.7	11.3	14.4	18.4	5.0
Europe	2.4	2.6	2.6	2.7	2.8	2.9	3.3	3.8	2.8
Middle East & N. Africa	5.7	6.0	6.2	6.4	6.6	6.8	7.9	9.1	3.0
World	59.5	62.7	64.4	66.1	68.0	69.8	80.0	92.0	2.8
Lemons and Limes									
High-Income	2.2	2.3	2.3	2.3	2.4	2.4	2.6	2.9	1.7
OECD	2.1	2.2	2.2	2.2	2.3	2.3	2.5	2.7	1.7
Non-OECD	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2.5
LMICs	4.5	4.8	4.9	5.1	5.3	5.4	6.4	7.6	3.4
Africa	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	2.8
America	2.0	2.1	2.2	2.3	2.4	2.5	3.1	3.8	4.2
Asia	0.9	0.9	0.9	0.9	1.0	1.0	1.1	1.2	2.0
Europe	0.5	0.6	0.6	0.6	0.6	0.6	0.7	0.8	2.5
Middle East & N. Africa	0.9	1.0	1.0	1.1	1.1	1.1	1.4	1.6	3.5
World	6.6	7.0	7.2	7.4	7.7	7.9	9.1	10.5	2.9
Grapefruit									
High-Income	2.8	2.9	2.9	3.0	3.0	3.0	3.3	3.5	1.4
OECD	2.4	2.4	2.5	2.5	2.5	2.6	2.8	3.0	1.5
Non-OECD	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	1.0
LMICs	1.9	2.1	2.2	2.3	2.4	2.5	3.1	3.9	4.5
Africa	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	2.0
America	0.9	1.0	1.0	1.1	1.1	1.2	1.5	1.8	4.6
Asia	0.6	0.7	0.7	0.7	0.8	0.8	1.1	1.4	5.2
Europe	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	6.7
Middle East & N. Africa	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	4.0
World	4.7	5.0	5.1	5.2	5.4	5.5	6.4	7.4	2.9
Total Citrus									
High-Income	24.1	25.0	25.4	25.9	26.4	26.9	29.5	32.4	1.9
OECD	22.2	23.0	23.5	23.9	24.4	24.9	27.4	30.1	1.9
Non-OECD	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.2	0.9
LMICs	48.0	51.1	52.7	54.4	56.1	57.9	67.8	79.7	3.2
Africa	2.0	2.1	2.1	2.2	2.2	2.3	2.5	2.8	2.3
America	26.1	27.5	28.2	29.0	29.7	30.5	34.8	39.6	2.6
Asia	10.0	11.0	11.5	12.0	12.6	13.2	16.7	21.1	4.8
Europe	3.0	3.2	3.3	3.4	3.5	3.6	4.1	4.7	2.8
Middle East & N. Africa	6.9	7.4	7.6	7.8	8.1	8.3	9.7	11.4	3.2
World	72.1	76.1	78.1	80.3	82.5	84.8	97.3	112.0	2.8

Source: World Bank, International Economics Department.

and is expected to continue to rise as new plantings come to maturity. Spain will enjoy EC full membership in 1995. After that time, elimination of import duties and eligibility for export subsidies should stimulate further production growth. However, climatic and water supply constraints are likely to prevent any significant increase in area, so increases in production will have to come mainly from improvements in yields.

The United States is the largest citrus producer in the OECD. However, its major producing area, Florida, is susceptible to freeze damage. There were five frosts causing damage to Florida citrus in the 1980s. Bearing acreage dropped sharply from 1980 to 1986 due to the freezes and increased only marginally from 1986 to 1990. Because of new plantings to replace trees killed by the frosts and the development of new groves, nonbearing areas have increased substantially--from 20,478 ha in 1980 to 66,898 ha in 1990. This dramatic increase in nonbearing area suggests that citrus production in Florida will increase substantially through 2005.

Citrus production in Japan is expected to decline as a result of the government-sponsored production adjustment programs, which aim to reduce the production of Mikan tangerines. This area has already declined from 173,000 ha in 1973 to 87,000 ha in 1990. The liberalization of citrus imports in 1991 and 1992 could accelerate the reduction in citrus production.

Citrus production in Italy is also forecast to decline, particularly for lemons. The area devoted to citrus is expected to decline as old groves are phased out and alternative crops are promoted. Also, the EC's more stringent policy on market withdrawals will have a negative effect on citrus production. Further, the increased incidence of mal secco disease in traditional lemon-growing areas suggests reduced lemon production.

Demand Outlook

Per capita consumption to continue expanding, overall consumption growth to decline. Consumption[1] projections have been made on the basis of income growth, estimated income elasticities, projected population levels in each region, and price projections. Likely changes in trade policies, processing practices, and domestic production were also taken into account.

World per capita consumption of citrus fruit is projected to increase from 13.8 kg in 1988-90 to 15.8 kg in 2005. Per capita consumption of oranges and tangerines is projected to increase from 11.5 kg to 13 kg, while per capita consumption of lemons and grapefruit is projected to increase from 1.3 kg to 1.5 kg and from 0.9 kg to 1.0 kg, respectively (see Table 2). World consumption of citrus fruit is projected to increase from 72 million tons in 1988-90 to 112 million tons in 2005. The increase represents an average growth rate of 2.8% p.a., compared with 3.9% p.a. growth during 1961-90. The slower growth in the projection period reflects slower expected income and population growth together with lower income elasticities. Total consumption in the LMICs is expected to grow faster than in high-income countries due to higher growth of income and population (see Table 3).

[1] In this section, "consumption" refers to apparent consumption of fresh citrus fruit, including that used for direct human consumption and for industrial processing.

Table 2: World Per Capita Consumption of Citrus Fruit, 1988-90 to 2005

	1988-90	1995	2000	2005
	(kg/year)			
Oranges and Tangerines	11.45	11.77	12.35	12.99
Lemons and Limes	1.28	1.31	1.39	1.47
Grapefruit	0.87	0.91	0.97	1.04

Source: World Bank, International Economics Department.

Consumption in LMIC Asia is expected to grow the fastest, largely due to the rapid expansion in citrus production in China. Consumption in the Republic of Korea is also expected to increase substantially as a result of high income growth and the phased liberalization of import quotas on oranges, which began in March 1991 and is to be completed in 1997. Consumption in Eastern Europe and the FSU is also expected to grow rapidly as a result of the move towards market-oriented economies. However, the increase is expected to be rather long term. In the Middle East, consumption is expected to grow rapidly though at a slower rate than in the past because a high level of per capita consumption has already been reached.

Trade Outlook

Import requirements and export availabilities were calculated for the seven major economic regions and major countries in those regions for each kind of citrus fruit on the basis of the differences between production and consumption. From these calculations we derived projections of imports and exports by taking into account likely re-exports and intraregional trade.

Spain and the United States to remain largest exporters, Cuba to grow significantly. Trade in fresh citrus is expected to reach 12 million tons by 2005, consisting of 8.8 million tons of oranges and tangerines, 1.8 million tons of lemons and limes, and 1.6 million tons of grapefruit. Spain is expected to remain the world's largest exporter, followed by the United States. Exports from Cuba should grow substantially because of the large expansion in its production; Cuba should become the world's third largest exporter of citrus fruit by the year 2005. The large increase in citrus production in China is mainly for domestic markets. However, over time China might become a significant exporter, particularly to other Asian markets. Although Brazil is the world's largest producer of oranges, most of its production is processed into FCOJ for export.

Although Spain has been a member of the EC for more than six years, the Spanish citrus industry will receive the full economic incentives available to other EC member states only after the transition period ends in 1995. Under the terms of the accession agreement, EC import duties charged on Spanish citrus are being eliminated over a ten-year period. So after 1995, Spanish exports of citrus fruit to the EC market will have an advantage over other exporters to the EC such as Cyprus, Israel, Morocco, and Tunisia, and exports from Spain to the EC market should grow faster at the expense of these countries.

Table 3: World Citrus Consumption, 1988-90 to 2005

	Annual Average 1988-90	1991	1992	1993	1994	1995	2000	2005	Growth Rates 1991-2005
		(million tons)							(% p.a.)
Oranges and Tangerines									
High-Income	20.0	20.7	21.1	21.4	21.8	22.2	24.2	26.7	1.8
OECD	18.7	19.4	19.7	20.1	20.4	20.8	22.6	24.8	1.8
Non-OECD	1.3	1.3	1.3	1.4	1.4	1.4	1.6	1.9	2.6
LMICs	39.7	42.0	43.3	44.7	46.1	47.6	55.8	65.3	3.2
Africa	0.8	0.9	0.9	0.9	1.0	1.0	1.2	1.3	3.1
America	22.6	23.6	24.2	24.8	25.4	26.0	29.1	32.3	2.3
Asia	8.4	9.3	9.7	10.2	10.7	11.3	14.3	18.3	5.0
Europe	2.6	2.7	2.8	2.8	2.9	3.0	3.7	4.4	3.6
Middle East & N. Africa	5.2	5.6	5.7	5.9	6.1	6.3	7.6	9.0	3.5
World	59.7	62.7	64.4	66.1	68.0	69.8	80.0	92.0	2.8
Lemons and Limes									
High-Income	2.2	2.3	2.4	2.4	2.5	2.5	2.8	3.1	2.0
OECD	2.1	2.2	2.2	2.3	2.3	2.4	2.6	2.8	1.8
Non-OECD	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	5.1
LMICs	4.4	4.7	4.9	5.0	5.2	5.4	6.3	7.5	3.3
Africa	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	3.0
America	1.8	2.0	2.0	2.1	2.2	2.3	2.8	3.4	3.9
Asia	0.9	0.9	0.9	0.9	1.0	1.0	1.1	1.2	2.0
Europe	0.6	0.7	0.7	0.7	0.7	0.7	0.8	0.9	2.5
Middle East & N. Africa	1.0	1.0	1.1	1.1	1.2	1.2	1.5	1.8	3.8
World	6.7	7.0	7.2	7.4	7.7	7.9	9.1	10.5	2.9
Grapefruit									
High-Income	3.0	3.1	3.1	3.2	3.3	3.3	3.6	4.0	1.8
OECD	2.7	2.8	2.7	2.9	2.9	3.0	3.3	3.6	1.8
Non-OECD	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	1.5
LMICs	1.7	1.9	2.0	2.0	2.1	2.2	2.7	3.4	4.5
Africa	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	1.6
America	0.6	0.7	0.9	0.8	0.8	0.8	1.1	1.3	4.4
Asia	0.6	0.7	0.7	0.7	0.8	0.8	1.1	1.4	5.3
Europe	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	4.2
Middle East & N. Africa	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	4.0
World	4.7	5.0	5.1	5.2	5.4	5.5	6.4	7.4	2.9
Total Citrus									
High-Income	25.7	26.6	27.0	27.6	28.1	28.6	31.3	34.5	1.9
OECD	23.9	24.8	25.2	25.7	26.2	26.6	29.0	31.9	1.8
Non-OECD	1.8	1.8	1.8	1.9	1.9	2.0	2.3	2.6	2.7
LMICs	46.6	49.4	51.1	52.7	54.4	56.2	66.0	77.5	3.3
Africa	1.5	1.6	1.6	1.7	1.7	1.8	2.0	2.2	2.6
America	25.2	26.5	27.3	27.9	28.6	29.3	33.2	37.2	2.5
Asia	10.0	10.9	11.4	12.0	12.6	13.2	16.6	21.0	4.8
Europe	3.4	3.5	3.6	3.7	3.8	3.9	4.7	5.6	3.4
Middle East & N. Africa	6.5	6.9	7.2	7.4	7.7	8.0	9.6	11.4	3.6
World	72.3	76.1	78.1	80.3	82.5	84.8	97.3	112.0	2.8

Source: World Bank, International Economics Department.

Imports into Eastern Europe and the FSU are expected to increase substantially because of the expected large increase in consumption as almost all consumption requirements in these countries are met by imports. However, the major part of the projected increase in imports is expected in the latter part of the projection period.

Japanese orange imports are expected to increase significantly as a result of the elimination of the import quota restriction in April 1991. Another factor contributing to increases in Japanese imports will be the declining production of Mikan tangerines caused by the reduction in planted area due to the government's production adjustment program. The United States should benefit from the expansion in Japanese imports since it already supplies most of Japan's orange imports. Also, the Japanese market is known for its quality consciousness and the United States supplies premium quality citrus fruit.

The Republic of Korea could become a significant citrus importer as a result of the phased liberalization of import quotas on oranges and orange juice which began in March 1991 and will be completed in 1997. This expectation is further supported by expected strong economic growth in the Republic of Korea.

Price Outlook

Declining real prices to continue. In this report, price forecasts are made for oranges only. Orange prices have been on a declining trend in real terms over the past four decades. However, prices fluctuate sharply from year to year, reflecting supply variations caused primarily by changes in weather conditions. For instance, orange prices increased from $445/ton in 1989 to $531/ton in 1990, as a result of adverse weather in 1990 in major producing countries such as the United States and Italy.

The high prices were sustained in 1991 due to a severe freeze in California, which cut the navel orange crop by 60%. In the short run, orange prices should decline unless adverse weather prevails.

Over the long run, the declining trend in real prices is expected to continue because consumption will not keep pace with production growth (resulting from the support being given to the citrus industry in many countries) unless prices fall. Orange prices in 1990 dollars are expected to decline from $511/ton in 1991, to $470/ton in 1995, $453/ton in 2000, and $436/ton in 2005.

Trade Policy Issues

EUROPEAN COMMUNITIES. ***Impact of Uruguay Round on EC protection unsure.*** The single internal market will be established at the end of 1992, when a unified trade policy will be implemented. However, as far as citrus is concerned, a single market already exists through the common organization of the market, in areas such as external tariffs and price supports. The EC applies a common external tariff to imports of oranges, mandarins, lemons, and grapefruit. The rates for oranges vary seasonally, with higher duties in the winter (20% for the period October 16 to March 31) when the citrus supply is abundant in Mediterranean countries, and lower duties in other periods (ranging from 4% to 13%). This regime benefits the summer suppliers such as the United States, South Africa, and Brazil. However, the EC gives significant reductions in tariffs to most Mediterranean and ACP countries.

The EC uses a reference price system to protect EC producers against low-priced imports. EC reference prices act as minimum imports prices. The regime provides for the application of countervailing charges, uniform across all member states, on imports from third countries whenever entry prices (landed prices at the EC border) fall below reference prices. This charge equals the difference between the reference price and the entry price, excluding the import duty. Citrus fruits covered in this system are oranges, mandarins, and lemons. The reference price system applies during December 1 to May 31 for oranges, November 1 to February 28 for mandarins, and June 1 to May 31 for lemons. The ultimate impact of the GATT Uruguay Round on these policies is still an open question.

UNITED STATES. ***NAFTA should encourage Mexican exports.*** There are no quota restrictions on citrus imports into the United States. However, there are tariffs imposed on citrus imports. A tariff of 1 cent/lb for oranges, limes, and grapefruit (for grapefruit ¢0.8 /lb during October and ¢1.3/lb during November 1 to July 31), and ¢1.25/lb for lemons. Imports from the Caribbean Basin, including 24 countries in the Caribbean and Central America, are duty free. The Caribbean Basin Initiative has promoted an increase in citrus production and exports in Belize and Costa Rica. Import duties on imports from Israel are 20% lower than the general rates.

Within the NAFTA the tariffs on FCOJ will be phased out over 15 years. Currently, the United States imposes ¢9.25/liter on FCOJ imports. Mexico is a large orange producer with 1.8 million tons of production in 1990. It exported 170 million liters of FCOJ to the United States in 1990, accounting for 15% of total US imports in that year. With its proximity to the United States, its cost advantage through lower labor rates, and its potential for expansion, the creation of NAFTA could result in keen competition for Mexico with Florida production and Brazilian exports of FCOJ.

JAPAN. Japan lifted quota restrictions on orange imports in April 1991 and on orange juice imports in April 1992. As a result, Japan is expected to increase imports of both oranges and orange juice substantially. Japan maintains a 40% tariff on imports of oranges during the main marketing season (December 1 - May 31) and 20% in the off-season (June 1 - November 30), as well as a 10% tariff on imports of grapefruit and 20% on imports of tangerines and mandarins throughout the year.

REPUBLIC OF KOREA. A phased liberalization of the import quota on oranges began in March 1991 and will be completed in 1997. Imports of oranges are expected to increase as a result. Imports of lemons and grapefruit have grown rapidly following liberalization in the mid-1980s, despite the still high import duties--40% for lemons and 50% for grapefruit.

Table A1: Oranges - Prices, a/ 1950-91 (Actual), 1992-2005 (Projected)

	($/ton)		
	Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/
Actual			
1950	185	1,133	1,492
1951	201	1,068	1,463
1952	170	861	1,186
1953	199	1,038	1,377
1954	221	1,178	1,506
1955	239	1,250	1,624
1956	223	1,126	1,483
1957	238	1,177	1,548
1958	195	948	1,245
1959	173	853	1,107
1960	192	928	1,205
1961	160	760	982
1962	186	866	1,110
1963	131	622	757
1964	168	784	946
1965	163	755	890
1966	146	653	771
1967	159	703	818
1968	168	750	841
1969	170	720	816
1970	168	670	760
1971	153	579	648
1972	155	538	595
1973	163	488	548
1974	189	464	573
1975	228	504	616
1976	216	471	564
1977	254	505	601
1978	299	516	577
1979	400	610	729
1980	391	543	637
1981	405	560	655
1982	385	541	630
1983	373	537	602
1984	352	518	570
1985	398	581	631
1986	394	487	517
1987	456	513	530
1988	453	476	490
1989	445	471	483
1990	531	531	531
1991	521	511	496
Projected			
1992	520	488	466
1993	523	473	452
1994	530	471	448
1995	543	470	446
2000	622	453	424
2005	687	436	391

a/ Navel, Mediterranean exporters, EC Indicative Import Price, c.i.f. Paris.
b/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.
c/ Deflated by G-7 Consumer Price Index (CPI).

Sources: Marches Europeens des Fruits et Legumes (actual); World Bank, International Economics Department (projected).

Grains

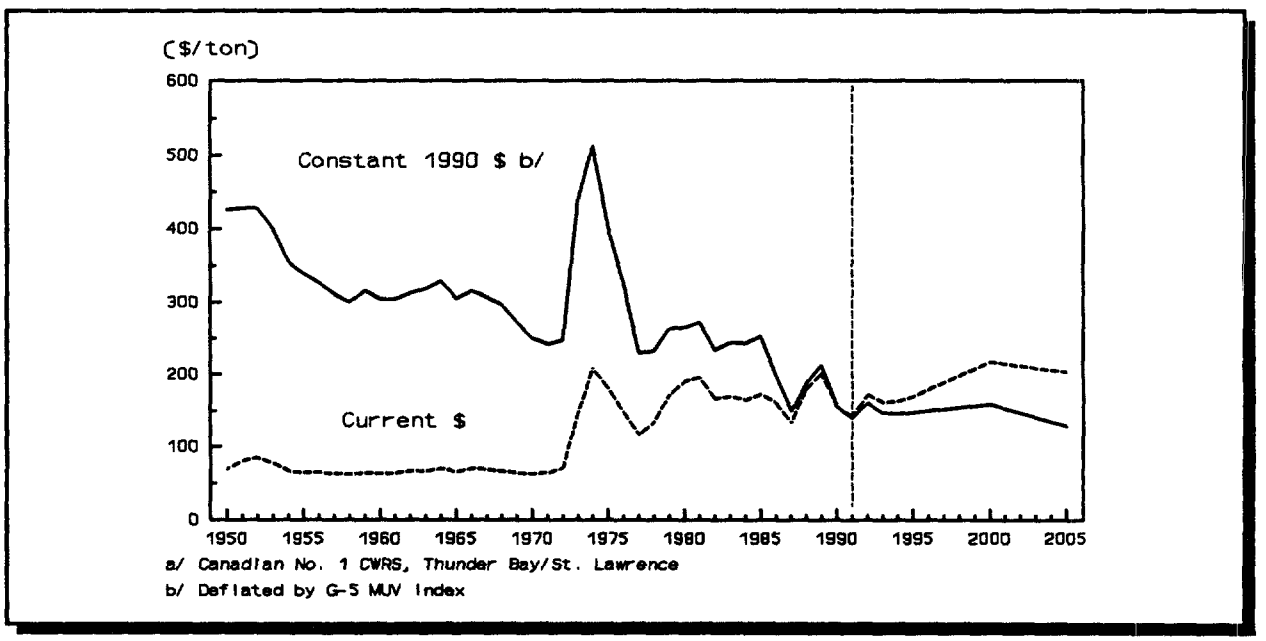
Summary

- The world's grains markets are expected to remain in relative surplus during the first half of the decade and then tighten if projected income growth in the developing countries materializes. The two factors believed to be most critical to the world grains market for the period to 2005 are the grain import requirements of the FSU and Eastern Europe, and the rate of economic growth of developing countries. Several other factors could emerge as important, including a GATT agreement which substantially reduces both restrictions on trade and domestic agricultural support programs.

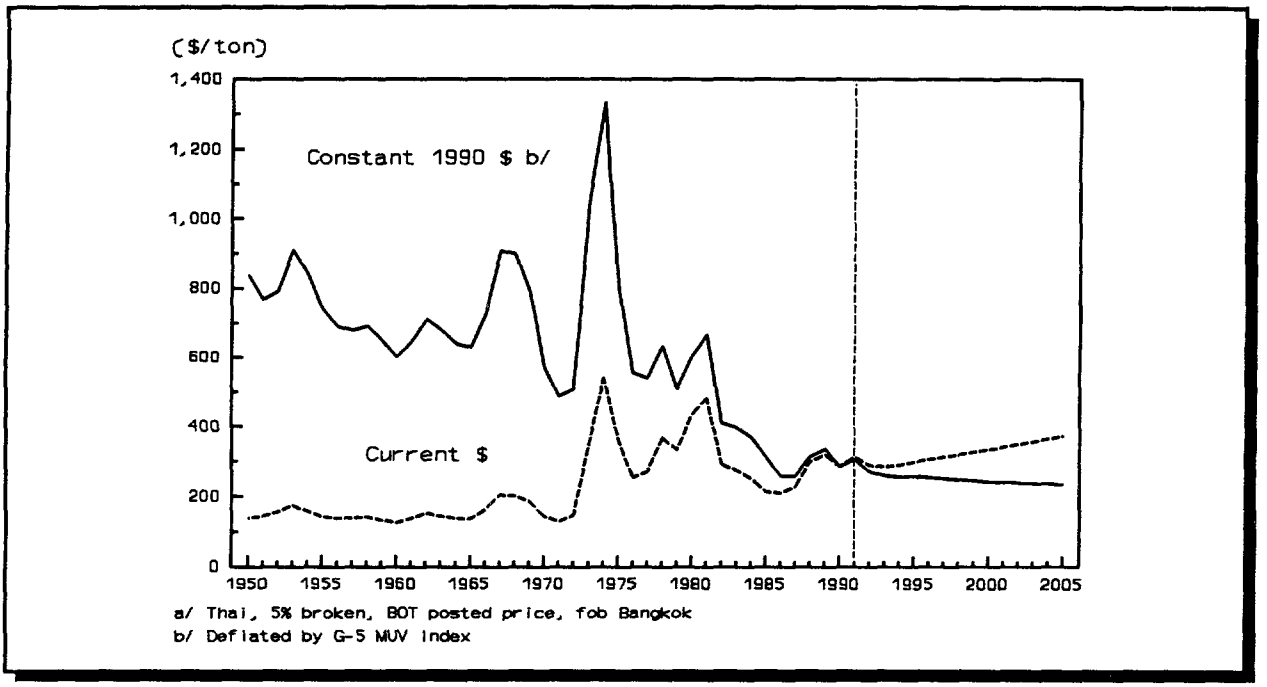
- Grains prices are projected to remain nearly constant in nominal dollars for the next several years. Wheat prices, which rose rapidly in 1992, should decline over the medium term as production increases and import demand (especially in the FSU) declines. Maize and sorghum prices did not rise along with wheat prices and are not expected to change significantly from current levels. Rice prices have remained near $300/ton for several years and are projected to remain near this level for several more years.

- For the longer term, grains prices are expected to rise slightly in real terms during the latter half of this decade and to decline subsequently. The main factor expected to cause lower prices beyond 2000 is reduced import demand by Eastern Europe and the FSU as they begin to benefit from market reforms. Biotechnology advances could also have a significant impact.

Wheat Prices a/, 1950-2005



Rice Prices a/, 1950-2005



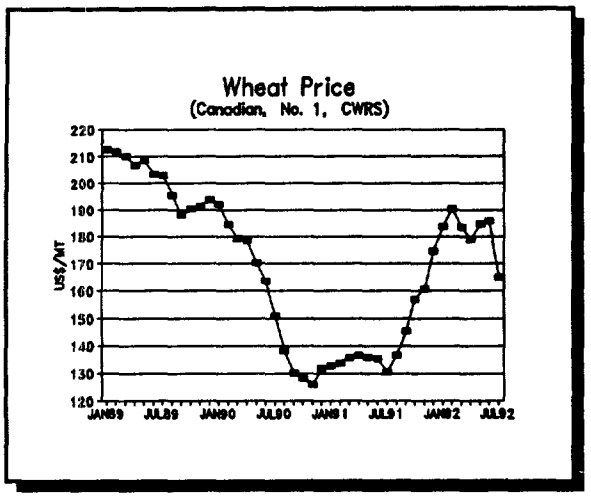
Recent Grain Market Developments

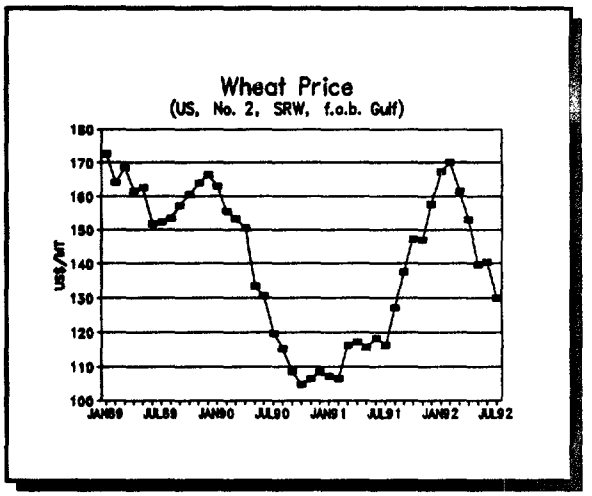
Wheat prices rise with poor harvests, stocks low. Reduced world wheat production and strong import demand in 1991/92 (July-June) led to a drawdown in stocks and boosted wheat prices over 1990/91 levels. Wheat prices have increased over 50% during the last year for the Bank's indicator price (Figure 1). The major factor driving up wheat prices has been the very large imports by the FSU. Their imports are expected to total 40 million tons for the 1991/92 crop year. The largest share, 23 million tons, will be taken as wheat, while coarse grains imports should total 16 million tons. Grain imports by the FSU are expected to be approximately 20% of world trade in 1991/92. The FSU's large grain imports were necessitated by the lowest grain harvest since 1984/85, totaling only 175 million tons--82% of the average of the past five years.

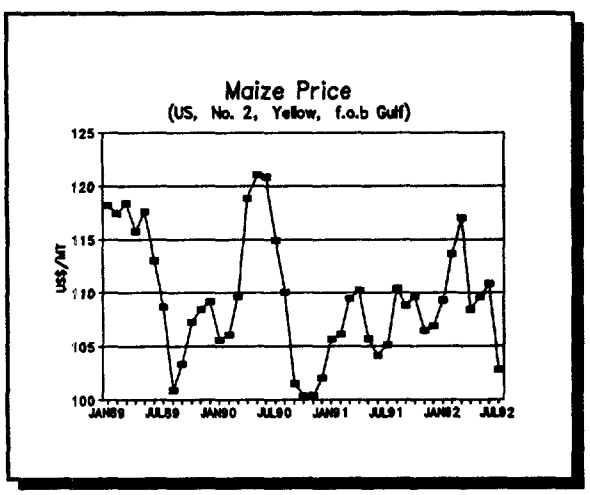
World grain stock levels were low prior to the recent imports from the FSU, and wheat stocks were especially low by historical standards (see Figure 2). World wheat stocks are estimated to fall to 125 million tons by the end of the current crop year, which is about 22% of utilization. Measured relative to use, wheat stocks have not been this low since 1974/75. The low level of world wheat stocks leaves the market vulnerable to any production shortfalls.

Unusually high yields for coarse grains in 1990/91 resulted in production increases of 34 million tons and prices fell sharply (Figure 1). However, yields were close to normal in 1991/92 and world coarse grain production is estimated to reach 800 million tons, 34 million tons less than in 1990/91. Major declines in production occurred in the United States where drought reduced the US maize crop to 190 million tons, as compared with 202 million tons in 1990/91. The FSU's crop of 91

Figure 1: World Grains Prices (monthly) 1989-92







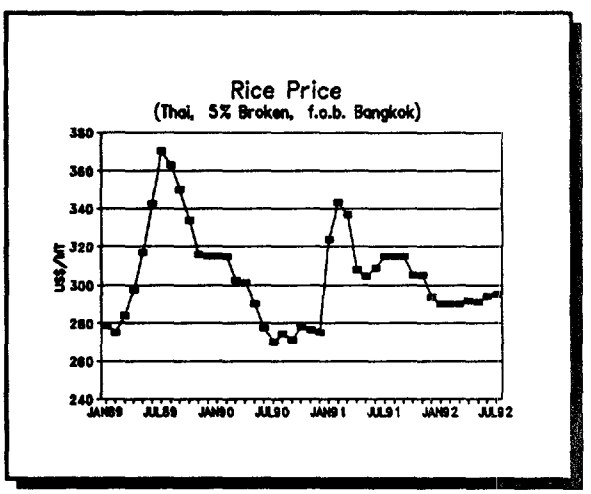
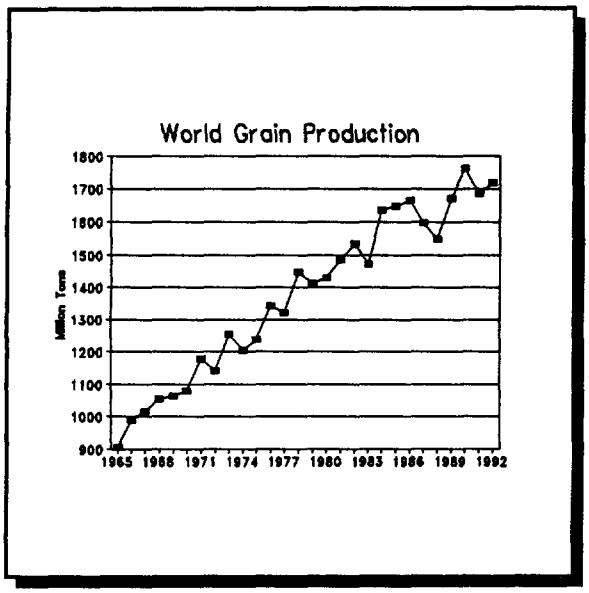
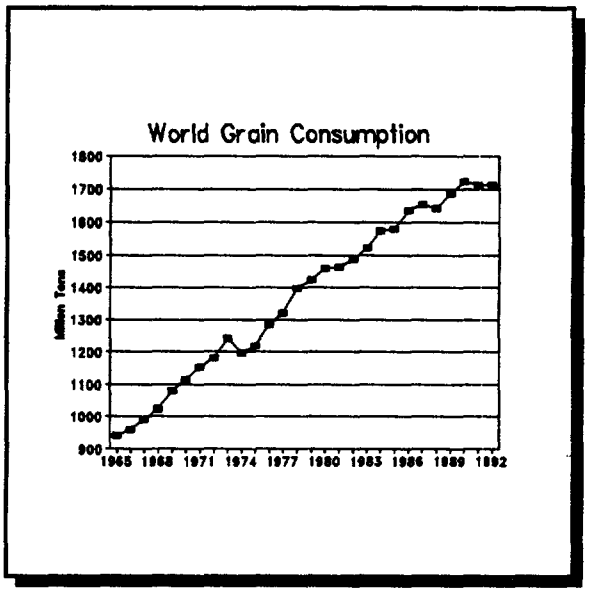
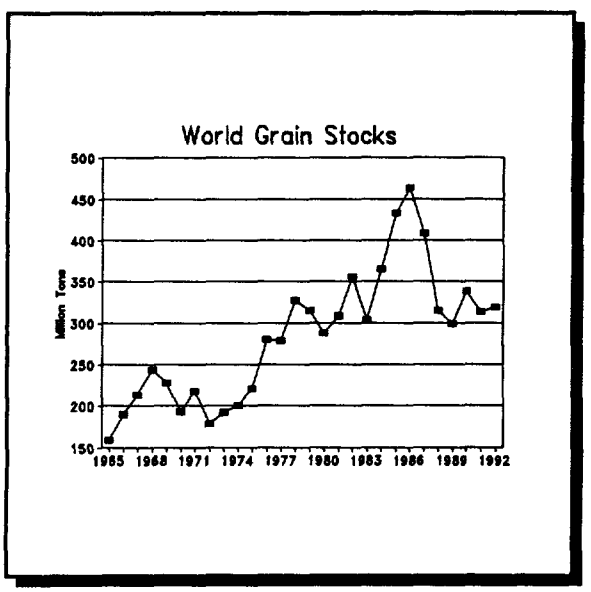
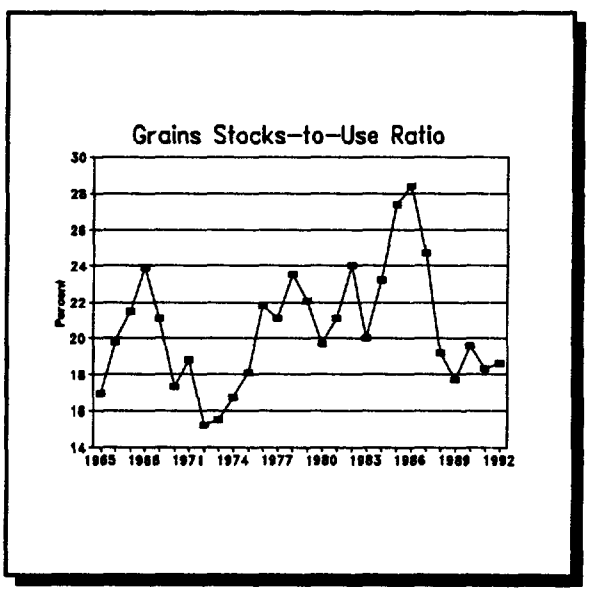


Figure 2: World Grain Production, Consumption, and Stocks, 1965-92









million tons is 22 million tons less than in 1990/91 and the smallest since 1984. In response to the reduced grain harvest, prices rose beginning July 1991. However, maize prices did not rise to the same extent as wheat prices.

The spread between wheat and maize prices has been unusually wide with the ratio of wheat to maize export prices in February 1992 at 1.68 compared with an historical average of 1.41 since 1960. We expect the spread to narrow to more typical levels as demand and supply adjust. The relationship between the two prices is established in the short run primarily by adjustments in demand and in the longer run by adjustments in both demand and supply. Strong substitutability in both demand and supply ensures that prices will return to a more normal relationship.

After expanding rapidly for several years, world rice production and consumption growth have slowed since 1985, with consumers diversifying their diets and several countries turning to more profitable crops. While comparative shortages and tight supplies have recurred since the mid-1980s, relative surpluses were longer lasting. The world rice market has near normal stock levels and rice prices have declined from a year ago. The world demand/supply balance is estimated to tighten slightly in 1992, although a shortage is not expected. Supplies are near normal in the major producing countries, including China, Bangladesh, Indonesia, and Thailand.

African drought drastically cuts maize production. The worst drought of the century hit southern Africa and extended north along the eastern half of Africa to Egypt. South Africa and Zimbabwe are the worst affected, but all countries in the southern region are affected. The drought is blamed on the El Niño which has affected weather patterns in other world regions, but not to the extent it has in Africa. Grain supplies were already low due to poor harvests last year. Countries most affected include: Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, and Zambia. Drought effects are less severe in Tanzania, Kenya, Somalia, Ethiopia, Sudan, and Egypt. Western Africa is not affected and prospects there appear good for an above-average harvest.

Countries in southern Africa traditionally produce and consume white maize. There is little yellow maize produced in the region, except for South Africa which has a significant commercial livestock industry using yellow maize. When white maize is not available, countries blend white maize and imported yellow maize for human consumption. Wheat is a good substitute for maize and is preferred to yellow maize in some countries; however, it is more expensive and therefore not as commonly available. Rice is seldom imported because of its high cost. South Africa is typically the world's largest producer and exporter of white maize; however, this year it does not have enough for its own consumption. It has purchased nearly all of the white maize available from the world market to supplement production. According to an FAO source, South Africa will have to import 4 million tons of maize this year. The southern region as a whole is reported to need 7 million tons of food imports over the next year.

Transportation will be a problem both because of high land transport costs and limited port capacity. Nearly all the grain imported into the southern region will enter through South Africa and then be shipped by rail or truck to various countries. With South Africa already importing substantial maize for its own use, imports for other African countries may be delayed at the port.

Grain Price Forecasts

Prices to fall through 1994, then rise slowly. Forecasts of grains prices are summarized in Table 1 and presented in detail in the Annex Tables. Grains prices are projected to decline slightly from their 1991-92 levels over the next two years and then increase in nominal terms through the end of the decade. Prices should rise in real terms by the latter part of the 1990s. The price forecasts for the 1995-2000 period are lower than in our 1990 forecasts due primarily to the major changes in Eastern Europe and the FSU.

Coarse grains prices are projected to decline and remain at relatively low levels over the medium term as production capacity in major producing countries remains large. With the large reserves

Table 1: Grains Price Forecasts, 1992-2005 a/

	Wheat		Maize	Sorghum	Rice	MUV* Deflator 1990=100
	Canadian	US				
Actual						
1988	179.5	140.7	106.9	98.5	301.4	95.31
1989	201.2	161.3	111.5	105.9	320.2	94.65
1990	156.2	129.1	109.3	103.9	287.2	100.00
1991	142.9	126.1	107.4	105.1	314.4	102.11
Forecast						
1992	172.0	144.0	105.0	102.8	290.0	106.53
1993	161.9	142.3	104.1	101.9	288.1	110.53
1994	164.2	145.6	106.9	102.7	290.4	112.58
1995	171.3	153.7	110.2	105.2	300.4	115.59
1996	179.8	161.4	112.5	107.4	304.5	119.63
1997	189.0	169.2	117.4	114.5	307.5	123.82
1998	198.8	177.9	124.0	120.3	313.4	128.15
1999	209.1	186.6	130.6	126.6	327.7	132.64
2000	218.1	195.0	138.7	133.9	336.3	137.28
2005	203.9	190.5	130.2	125.1	374.4	157.60

a/ Prices are for the calendar year in nominal dollars per ton and refer to the following:

Wheat (Canadian), No.1, Western Red Spring (CWRS), in Store, Thunder Bay;
Wheat (US), No. 2, Soft Red Winter, f.o.b. Gulf Port;
Maize (US), No. 2 Yellow, f.o.b. Gulf Ports;
Sorghum, Grain (US), No. 2, Milo Yellow, f.o.b. Gulf Ports;
Rice (Thai), White, Milled, 5% Broken, f.o.b. Bangkok.

* The MUV deflator is the unit value index in US dollar terms of manufactures exported from the G-5 countries weighted proportionally to the countries' exports to the developing countries.

Source: World Bank, International Economics Department.

of area that could be brought into production, a sustained price increase would be unlikely. However, prices of maize and sorghum should increase in real terms in the longer term with import demand in developing countries tending to increase faster than production capacity.

The international rice market remains in a state of surplus, with few countries importing regularly. The emergence of Viet Nam as a major exporter in recent years has added to the downward pressure on prices. Fundamental changes in import policies to favor wheat over rice when a shortfall occurs and more generally the increasingly diverse diets of Asian consumers should prevent rice prices from rising significantly relative to other grains.

Wheat is also characterized by surplus capacity but to a lesser extent than coarse grains. US production in 1991/92 is 29% below the peak of 1981/82 with the US wheat area harvested estimated to be 28.4% below the 1981/82 record level. When the yield improvements of the past decade are taken into account, it appears that substantial productive capacity is available if market conditions justify. However, environmental constraints and long-term area reduction programs will reduce the responsiveness of wheat production.

Wheat prices (Canadian, CWRS, #1) are projected to fall from $172/ton in 1992 to $162/ton in 1993 and then rise to $171/ton by 1995 in current dollars. These levels are well below the $201/ton reached in 1989. Maize prices (US #2, Yellow) are forecast to decline from $105/ton in 1992 to $104/ton in 1993 and then increase to $110/ton by 1995. Sorghum prices (US #2, Yellow) are projected to fall from $103/ton in 1992 to $102/ton in 1993 and then rise to $105/ton in 1995. Thai rice prices are forecast to decline from $314/ton in 1991 to $290/ton in 1992. A further decline to $288/ton by 1993 is projected, but then prices should turn upwards to $300/ton in 1995.

REVIEW OF PAST GRAINS PRICE FORECASTS. ***Wheat price forecasts the most accurate.*** Comparisons of the nominal price forecasts made in 1986, 1988, 1990, and 1991 with actual prices are shown in Table 2. The forecasts made in mid-year 1986 were correct in forecasting lower prices in 1987 and higher prices for all grains during 1988-90. The forecasts also correctly forecast small increases for wheat and large increases for other grains. The average error was 7.3% for the 1990 price forecasts made in 1986 for the four grains. During the intervening period, the average price increase for the four grains was 22.9% compared with a projected increase of 30.3%. Wheat prices were projected to increase 10.3%; they actually increased only 4%. Rice prices increased 37.5% as compared with a projected 33.9% increase.

The 1988 forecasts correctly projected further price increases for all grains in 1989 following the US drought in 1988, as well as the decline in prices in 1990. The 1990 forecasts correctly projected the price decline in wheat and coarse grains in 1991. However, the surge in prices in 1992 following the collapse of the FSU was not anticipated. Also, the increase in rice prices in 1991 due to drought in several Asian countries resulted in a large error in the 1991 rice price forecast.

Overall, the forecasts have been rather accurate with the wheat price forecasts the most accurate. Forecasts of maize and sorghum prices have not been as good, with maize and sorghum prices declining further than projected for 1987 and remaining lower than forecast in the period since. The slower growth in maize and sorghum prices relates to the generally weak demand for imports by developing countries. Import trends of the 1970-80 period have not been maintained because of increased foreign debt and reduced foreign exchange earned from primary commodity exports such as petroleum, metals and minerals.

Outlook: Production, Consumption, Trade, and Stocks

MARKET BALANCES. ***Global trends to slow down.*** The total grain balances are shown for the world and major regions in Figure 3 with historical data to 1991 and projections to 2005. The overall trends in global grain production, consumption, and stocks are expected to slow, with world consumption increasing 1.6% p.a. from 1991 to 2005 compared with 2.4% during the previous 15-year period. Production is expected to keep pace with consumption; however, we know that unforeseen factors could alter the year-to-year path significantly.

The developing countries are expected to continue expanding their net grain imports to satisfy demand from increasing incomes and populations. By 2005, they are projected to have net grain imports of 180 million tons compared with 90 million tons in 1990. At these levels net grain imports will account for 13.5% of total grain consumption compared with 8.7% in 1990 and 5.9% in 1975. The higher imports will be primarily in the form of wheat for human consumption and coarse grains for livestock and poultry feed. Total grain consumption in developing countries is projected to increase at about 2.2% p.a. to 2005 compared with 2.5% during the 1980s.

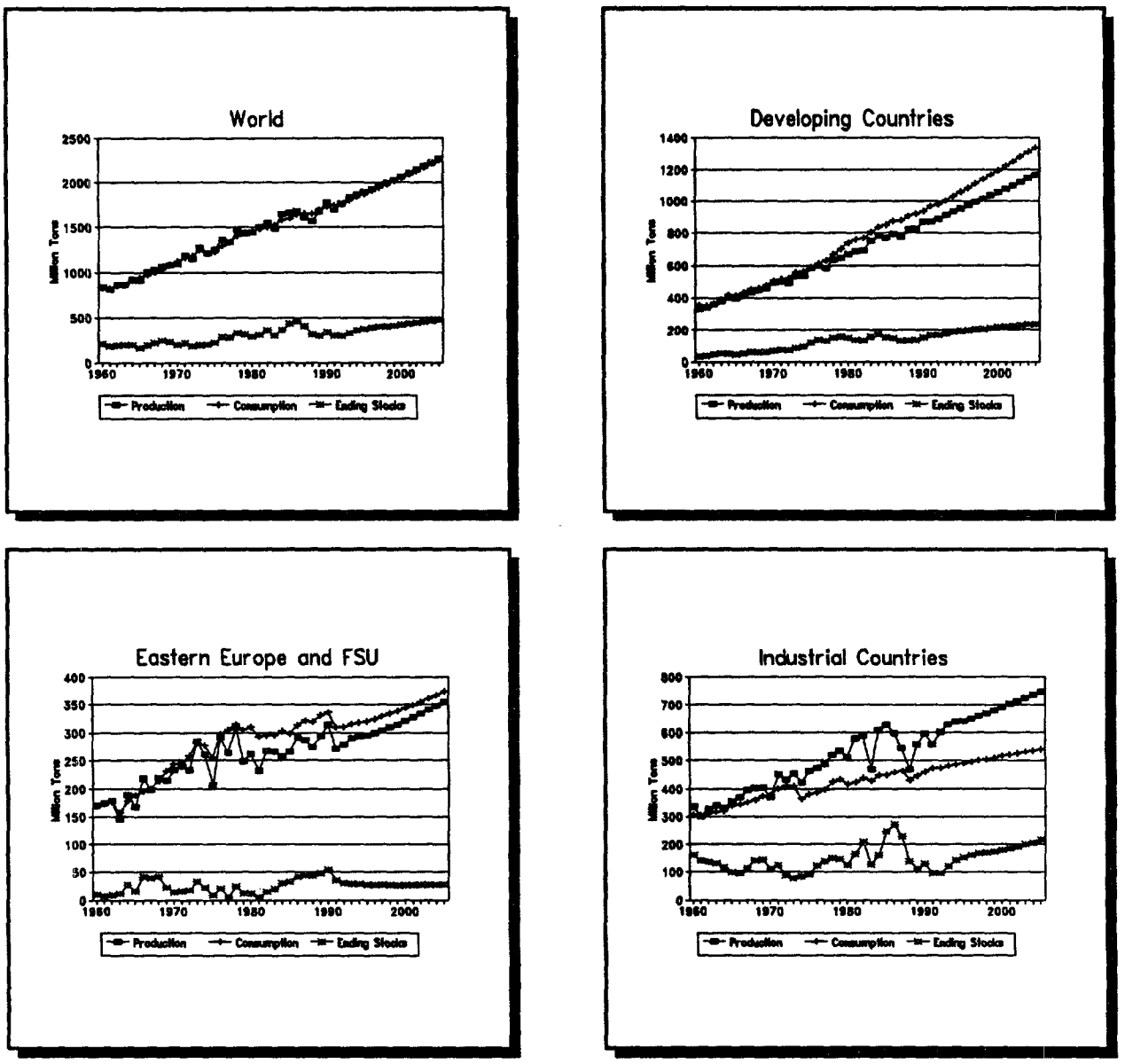
Table 2: Review of Past Price Forecasts, 1985 to 1992

		1985	1986	1987	1988	1989	1990	1991	1992
		(nominal US$/ton)							
Wheat									
	Actual Price	173.3	161.0	133.5	179.5	201.2	156.2	142.9	176.6*
	1986 Forecast		159.8	138.3	152.8	168.7	177.6		
	1988 Forecast				176.1	186.7	156.5		
	1990 Forecast						155.7	141.0	143.0
	1991 Forecast							143.0	148.0
Rice									
	Actual Price	215.9	210.5	230.3	301.4	320.0	287.2	314.4	291.3*
	1986 Forecast		209.5	220.1	243.0	267.4	281.8		
	1988 Forecast				303.0	296.6	250.0		
	1990 Forecast						287.3	270.0	264.0
	1991 Forecast							314.0	300.0
Maize									
	Actual Price	112.2	87.6	75.7	106.8	111.7	109.3	107.4	107.4*
	1986 Forecast		98.7	116.8	123.1	123.1	120.7		
	1988 Forecast				107.8	109.5	98.4		
	1990 Forecast						109.1	105.8	101.9
	1991 Forecast							107.0	110.0
Sorghum									
	Actual Price	103.0	82.4	72.8	98.5	106.1	103.9	105.1	106.0*
	1986 Forecast		93.7	110.8	116.7	116.7	114.5		
	1988 Forecast				100.2	102.2	90.5		
	1990 Forecast						103.7	99.6	95.9
	1991 Forecast							105.0	104.0

*January-September average.

Source: World Bank, International Economics Department.

Figure 3: World and Regional Grain Balances, 1960-2005



Eastern Europe and FSU to increase production, reduce imports. The countries of Eastern Europe and the FSU are currently undergoing dramatic changes and projecting their grain balances is difficult if not impossible. These countries have been large net importers since the mid-1970s. From 1980 to 1990, net imports averaged more than 40 million tons and accounted for about 20% of world grain trade. Some analysts have suggested that this region could shift to being a major exporter. Our forecast takes the middle ground and projects net grain imports declining to about 22.4 million tons by 2005. A more rapid shift would lead to lower grain prices than forecast and cause grain exporting countries to lower production and exports.

The grain balance in the industrial country region is expected to remain in surplus with large exports to the developing countries and possibly to Eastern Europe and the FSU. The level of exports will depend primarily on imports by developing countries. The production growth necessary to meet the expected export demand will be less than during the 1970s and appears to require no more than trend yield growth. Stock levels should increase during the 1990s from the extreme low levels of the past several years. How stock levels and production are brought into balance will depend on policy decisions in the exporting countries. The recent policy shift in the United States toward reducing stock levels will force other exporters either to hold higher stocks or to impose production restrictions on producers.

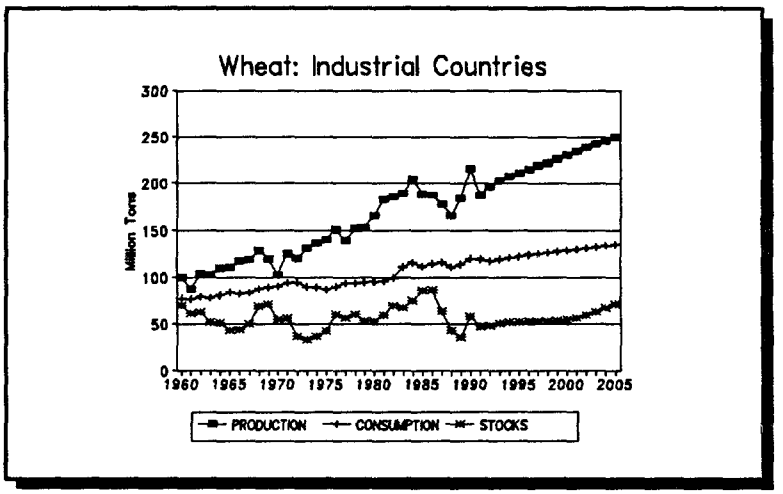
If Eastern Europe and the FSU reduce their grain import demand more rapidly than projected, which is a possibility given their very high per capita consumption levels, then industrial countries are likely to produce even greater surpluses, and, while the level of grain imports projected for 2005 has been sharply reduced from our previous forecast, even the present forecast could be too high.

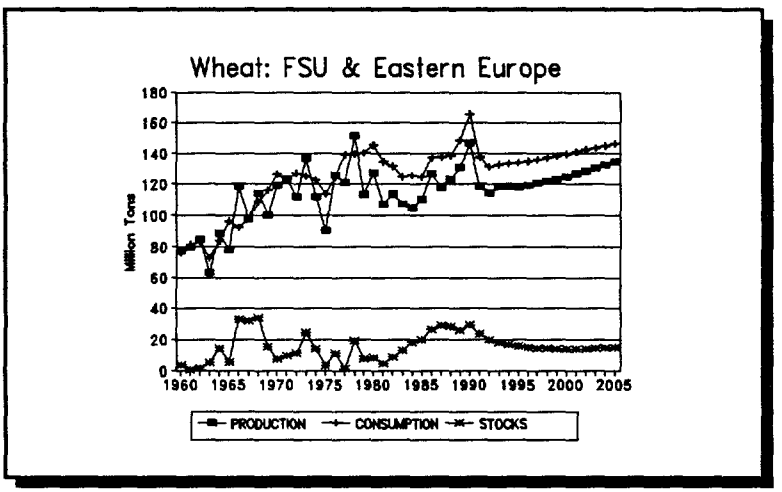
Forecasts for production, consumption, and ending stock levels are shown Figures 4-6 for wheat, rice, and coarse grains for the major regions. Additional country detail is presented in the Annex Tables.

Near-term wheat supplies remain tight. Supplies of wheat are likely to remain tight in the near term, while coarse grains and rice supplies are expected to improve slightly from last year. World wheat production in 1992/93 (July/June) is expected to increase only slightly (0.5%) from the reduced levels in 1991/92. Projected increases in the United States, the FSU, and Australia will be offset by declines in Canada and Eastern Europe. The expansion in supplies is likely to be largest in the United States due to the increase in area planted and harvested as land set-aside requirements are further reduced.

Coarse grain stock levels to recover in 1992/93. World coarse grains production is also expected to increase in 1992/93--by about 3.2%--to 823.8 million tons. Forecast increases in the United States (+14%), the FSU (+20%), and India (+13.4%) should offset projected declines in several major regions including the EC, Eastern Europe, and China. With only a slight increase expected in world consumption, 1992/93 ending stocks of coarse grains are forecast to recover by over 8% from last year's low levels. However, the supply/demand balance will remain relatively tight in the near term. The stocks-to-utilization ratio is forecast at slightly above 17%, a marginal improvement from the very low levels since 1989/90. Utilization should be fueled by stronger demand for livestock products in several countries--particularly in Asian countries where incomes are growing rapidly. Imports by the FSU are likely to decline in the next several years as production increases and consumption declines, reflecting the removal of price controls and subsidies. The medium- and long-term outlook presented here is based on a continuation of the price- and income-support policies in the major industrial producing countries.

Figure 4: Wheat Production, Consumption, and Trade Projections, 1960-2005





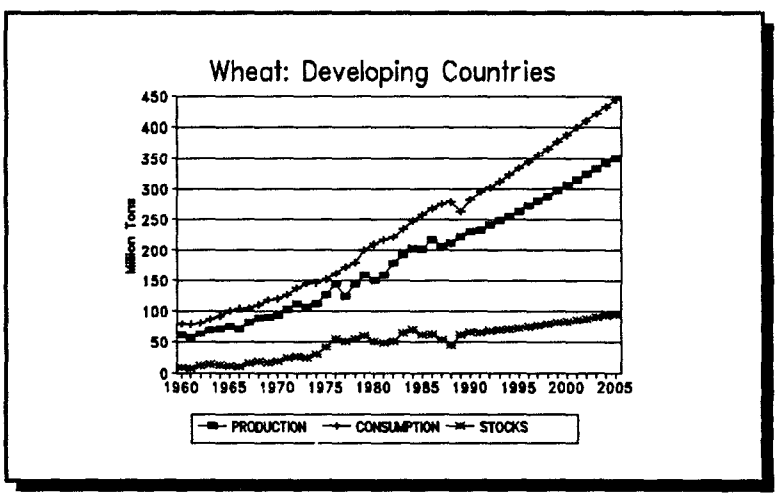
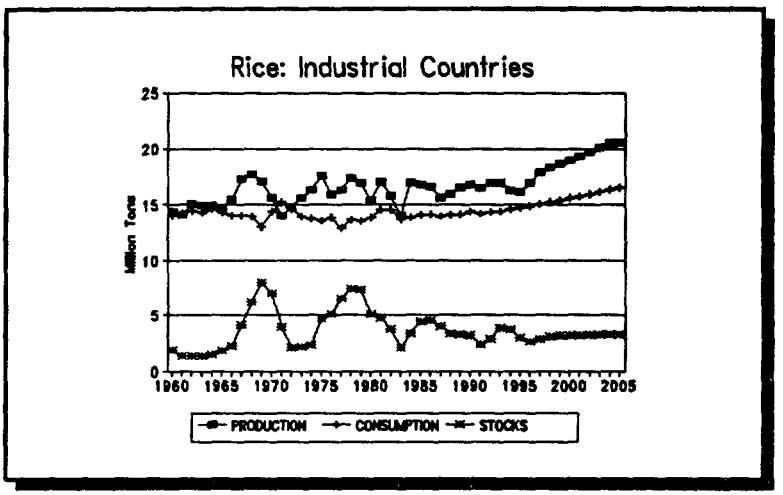
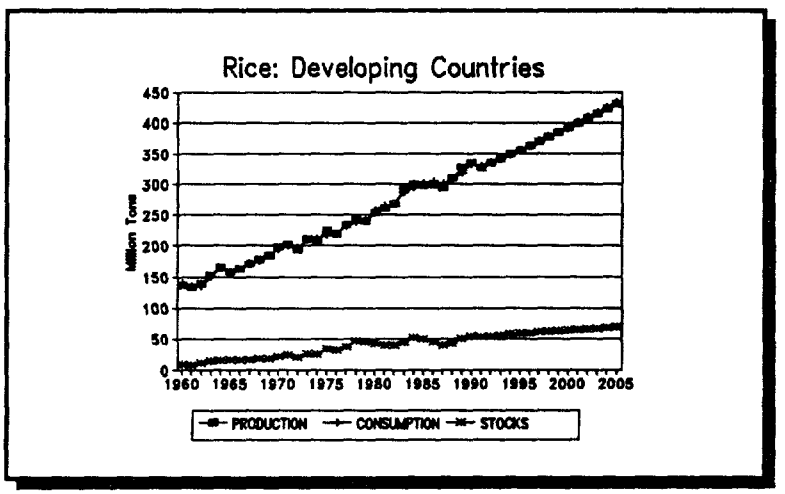


Figure 5: Rice Production, Consumption, and Trade Projections, 1960-2005





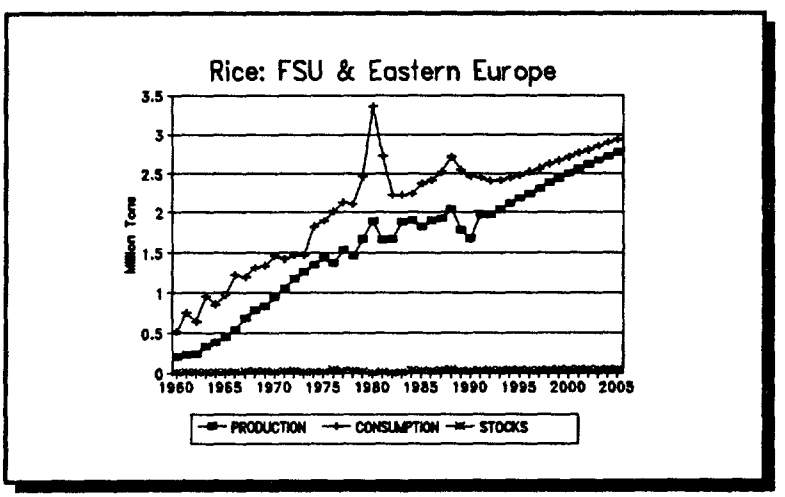
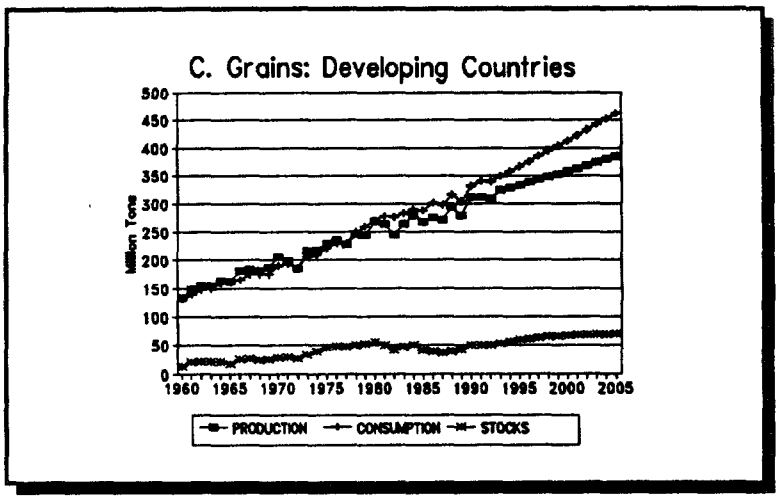
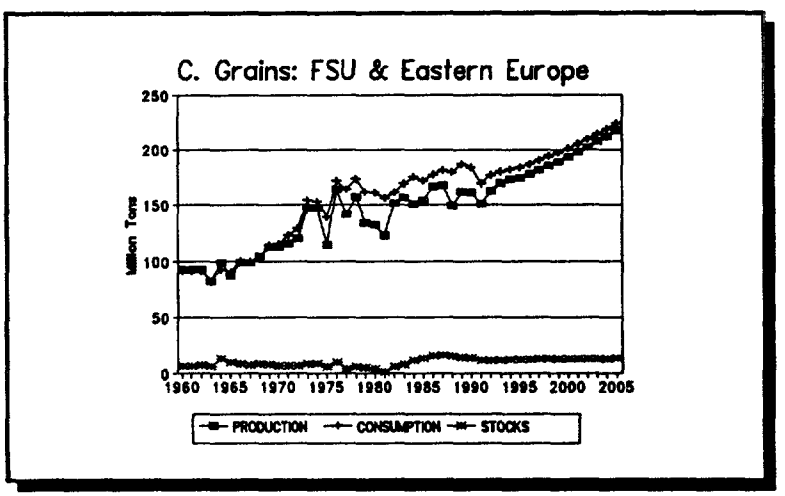
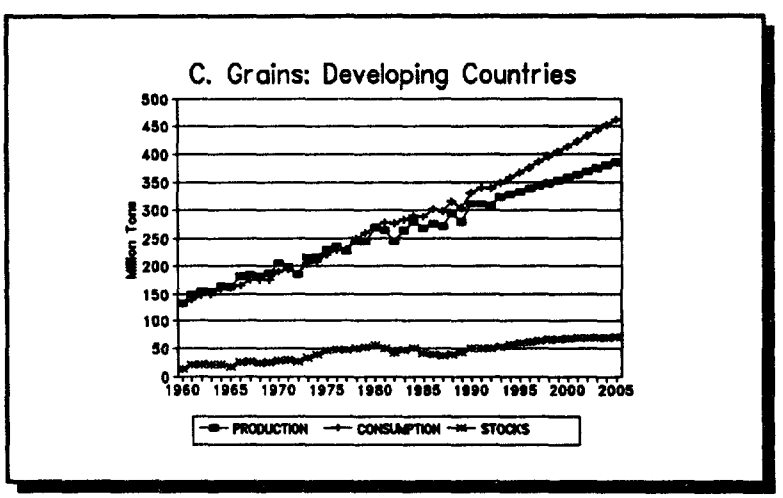


Figure 6: Coarse Grains Production, Consumption, and Trade Projections, 1960-2005







Several developments that could alter the medium- and long-term outlook include the multilateral trade liberalization talks still in progress, policy changes in Eastern and Western Europe and the shift to market economies in the FSU. These issues and their likely effects on the world grains markets are discussed in a later section.

PRODUCTION OUTLOOK. ***World production to grow more slowly during 1992-2005.*** World grains production is projected to grow more slowly during the forecast 1992-2005 period than during the past two decades because of slower growth both in developing countries (because yields are not expected to grow at the high rates of the 1970s) and in industrial countries (because the demand for exports will not increase enough to require rapidly increasing production). In the countries of Eastern Europe and the FSU, however, we expect to see grain production expanding more rapidly than during the period since about 1975 in response to the infusion of investment and technology from western countries.

The slower growth expected in yields in developing countries is attributed to their reaching both the limits to the expansion of areas planted to high-yielding varieties and the yield cap on the existing high-yielding varieties. Much of the growth in rice production in Asia, for example, has come from extending the areas planted to higher-yielding varieties. With this source of growth closed, further growth must come from increased yields; but evidence is mounting that this is not occurring and yields may even be falling in some countries because of soil fertility problems resulting from years of intensive production. The International Rice Research Institution in the Philippines has begun work on developing a series of new rice varieties to replace those used in the green revolution of the 1960s and 1970s. However, the impact of these successors is not expected to be felt before 2000.

Industrial countries are expected to adjust production to their domestic and export markets, as they have done historically. The potential for greater production exists and should continue through the forecast period. However, neither domestic nor export markets are expected to grow fast enough to encourage an all-out production effort. Overall, grain production is expected to grow by about 2.2%, with wheat growing slightly faster than coarse grains.

CONSUMPTION OUTLOOK. ***Wheat consumption increases as incomes rise.*** Over the past two decades both the mix and levels of per capita food consumption in many countries have changed significantly (see Figures 7 and 8). Per capita direct consumption of wheat and indirect consumption, through livestock feeding, of both maize and wheat have increased while consumption of staple cereals such as rice has declined in Asian countries and has stagnated in developing countries as a whole.

Rice is still the dominant cereal food consumed in low-income countries, but average per capita consumption in low-income countries appears to have stabilized at about 80 kg/person since the mid-1980s.

Grain consumption in developing countries is influenced by several factors, including population and income growth, urbanization, relative grains prices, changes in production, and domestic and international policies. The increase in wheat consumption in developing countries reflects, in part, increasing urbanization in these countries. In urban areas incomes are higher and more diversity in the diet and convenience foods are demanded. As incomes increase, the percentage of wheat and meat products in food consumption tends to increase, while that of staple cereals tends to decline. At higher income levels, food consumption of rice and coarse grains tends to decline in countries where they are

a staple. However, the increased demand for meat at these income levels results in an increase in derived demand for coarse grains and also for feed wheat.

Per capita grain consumption levels for major world regions are shown in Table 3 for historical years and for the projection period. Consumption levels in the developing countries are expected to increase significantly during the 1995-2005 period as rapid income growth translates into higher per capita grain consumption. However, in Eastern Europe and the FSU reduced consumption levels in the 1990s are projected due to lower income levels along with higher domestic prices, and greater efficiency of livestock and poultry feeding. The industrial countries are projected to show modest increases in per capita consumption levels--0.9% p.a..

TRADE OUTLOOK. ***Net imports to fall for FSU and Eastern Europe.*** Eastern Europe and the FSU are projected to reduce net grain imports from about 40 million tons in 1991/92 to about 22 million tons in 2005. Per capita grain consumption levels are very high relative to other countries. For example, in 1988 per capita grain consumption in the FSU was 783 kg compared with 571 kg in the industrial countries. Despite these high levels of grain consumption, consumer diets are lower in terms of meat consumption and higher in terms of direct grain consumption in Eastern Europe and the FSU than in the industrial countries. Livestock feeding is less efficient than in the west; rations are not properly balanced for protein according to some reports. The extent and impact of economic reforms including efficiency gains are a matter of conjecture at this time. However, it appears certain that grain consumption levels will fall either because income levels fall or because greater efficiency in usage and handling allow food consumption levels to be maintained with lower total grain consumption. Production efficiencies are also possible, but again the rate of these improvements is a matter of conjecture.

Developing countries main source of import growth. The developing countries are projected to be the major source of growth in world grain imports during the 1990s. An important question facing the grains markets during the 1990s is whether the developing countries' imports will continue to increase rapidly, particularly in the Asia Pacific region. The large imports projected are primarily income driven and reflect what some may consider to be rather optimistic assumptions about economic growth in the large countries of the region during the latter half of the decade. Rapid income growth translates into rapid growth in grain import demand as domestic production cannot match the expected growth in food demand. Given this pressure to increase exports, wheat and coarse grains prices should rise in real terms towards the end of the decade. It is of some interest to note that even with the fast rate of growth projected in their imports, the developing countries' per capita consumption growth is slower than during the 1960s and 1970s.

Wheat imports are expected to account for the greatest share of total grain imports. As the decade progresses, however, coarse grain imports are expected to increase more rapidly than wheat as consumers increase meat consumption. Rice is expected to remain a minor commodity in world trade with countries substituting wheat imports for rice when domestic rice production falls short of requirements. With nearly 60% of world population and the fastest projected income growth, Asia is expected to have the largest growth in grain imports. Latin America continues to expand grain imports, but from a relatively low base. North Africa also remains a major importing region, while Sub-Saharan Africa's imports are expected to be severely constrained by slow income growth. Total net wheat imports of the developing countries have grown from 36.6 million tons in 1975 to an estimated 65 million tons in 1990.

Table 3. Summary of Per Capita Total Grain Consumption Levels, 1965-2005

Region	1965	1975	1985	1990	1995	2000	2005
	kg/person/year						
World	286.2	302.7	331.5	333.9	330.6	338.3	347.4
Developing	181.5	199.7	233.4	234.4	240.2	249.2	258.9
Industrial	506.4	519.5	573.7	573.7	587.3	600.3	611.8
Eastern Europe and FSU	565.1	701.7	763.4	839.6	774.2	814.5	866.5

Source: World Bank, International Economics Department.

Figure 7: Per Capita Food Consumption in Selected Asian Countries, 1961-89

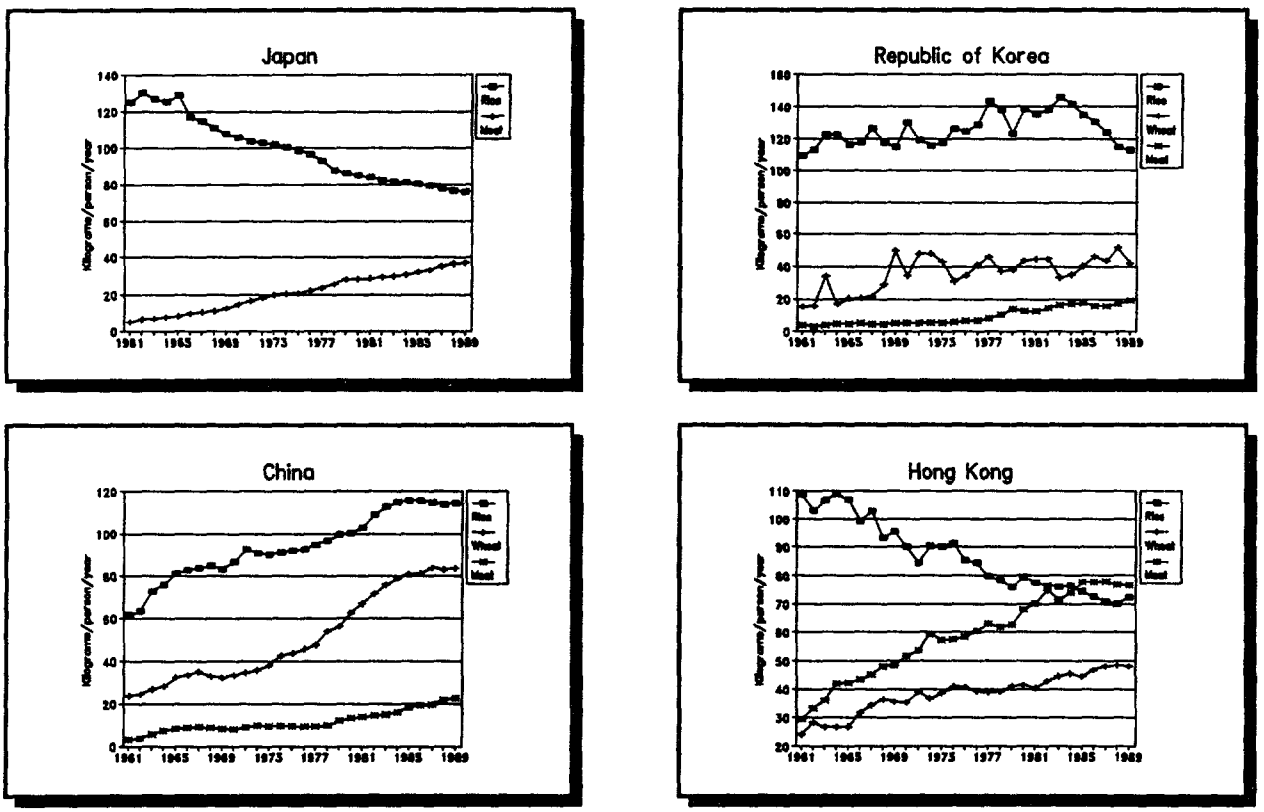
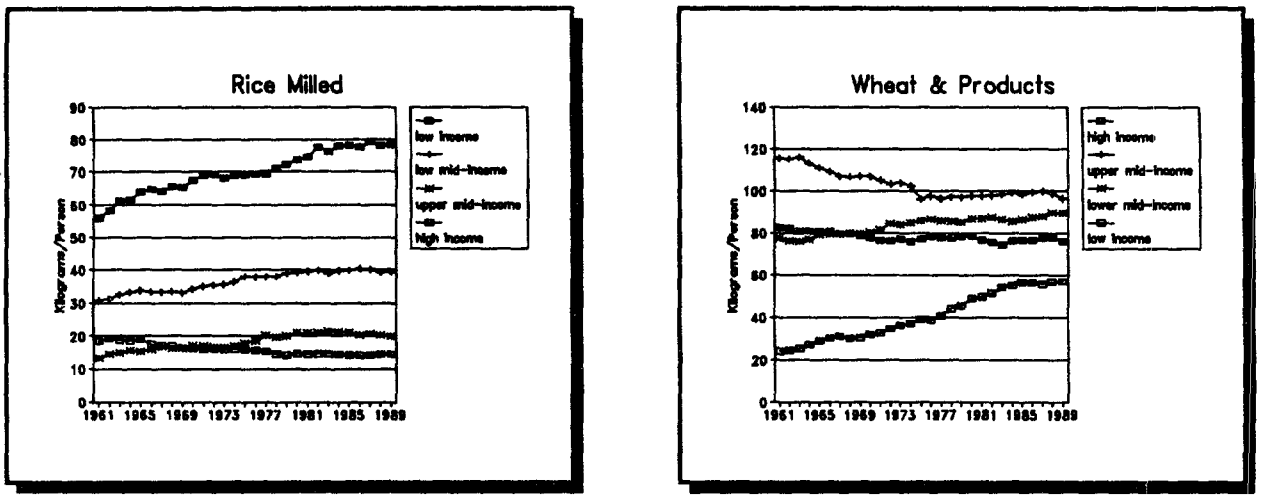


Figure 8: Cereal Per Capita Food Consumption By Income Group[1], 1961-89



Industrial countries main exporters. The industrial countries are the major grain exporters and their total exports are projected to rise from about 140 million tons in 1989 to 200 million tons by 2005. Growth is likely to be concentrated in the second half of the forecast period as sustained high income growth in the developing countries increases imports. Most of the increased production needed for the large increases in exports could be accommodated by yields increasing at trend rates, with the area of major grains harvested expanding at less than 0.5% p.a.

Major Policy Developments

DEVELOPMENTS IN THE URUGUAY ROUND. ***Dunkel proposal would reduce subsidies and price supports.*** The Uruguay Round of multilateral trade negotiations has now passed several deadlines. In December 1991, a package of reform proposals (the Dunkel reform package) was advanced to provide a basis for completing the Round, but agreement has not yet been reached. However, the Dunkel proposals indicate the broad nature of any likely agreement. The proposals in respect of agriculture include reductions in support over six years (1993-99) in the areas of market access, domestic support and export subsidies. More specifically, the Dunkel package proposes: (i) conversion of nontariff barriers into tariff equivalents, and reductions of such tariff equivalents from a base period (1986-88) by an average of 36% for agricultural products as a whole for each country, with a minimum reduction of 15% for each individual tariff; (ii) a 20% reduction of the total value of domestic supports which are trade distorting; (iii) a 36% reduction of budgets for export subsidies and a 24% reduction of volumes of subsidized exports from their 1986-90 averages. Several forms of domestic support are exempted including: government support for research, training, and extension; public stockholding for food security; domestic food aid; decoupled income support where payments are not related to the volume of

[1] The 185 economies are divided into income groups using the World Bank's Global Economic Prospects' classification.

production and prices; government insurance; structural adjustment assistance; payment for natural disasters; and environmental programs. Developing countries would have the option to implement the reduction commitments at lower rates (with a minimum set at two thirds of the above rates) over ten years. The Dunkel proposals, if adopted completely, would likely increase grains prices. The elimination of subsidies and price supports would lower production and increase consumption in producing countries, while the elimination of trade barriers should stimulate world import demand. Adopted in their present form, the impact of the proposals would depend on the form of implementation by each country. Given the significant flexibility in implementation provided by the package, the potential gains may be limited. For instance, countries could satisfy the requirements by reducing tariffs on important commodities by less than 36% while tariffs for other items were cut by more than 36%. Also, the base period (1986-88) was a time of low world prices relative to support prices in major countries; hence, the tariff equivalents would be much higher than for other periods. The insistence of the EC on a "Community preference" which would involve increasing the EC intervention price by 10% in determining base period tariff equivalents would also limit the effects of the proposals.

US to increase agricultural support if agreement delayed. The United States responded to the absence of an agreement in the Round by including several production and trade initiatives called "GATT triggers" in the US Budget Reconciliation Act of 1990. These provisions were to be activated if no agreement was reached by June 30, 1992. The GATT triggers stipulate the following provisions: (i) an increase in the US export promotion program levels by $1 billion during the 1994 and 1995 fiscal years (starting October 1, 1993); (ii) an authorization for the Secretary of Agriculture to waive any minimum level of area reduction program for the 1993-95 crops of wheat, feed grains, upland cotton, and rice; (iii) the institution of a marketing loan program for 1993-95 wheat and feed grain crops. If no GATT agreement is in force by June 30, 1993, the US Secretary of Agriculture is authorized to consider the following: (i) waiving all or part of the requirements for reductions in agricultural spending under the Budget Reconciliation Act of 1990; and (ii) increasing the level of funding for export promotion programs and/or implementing marketing loans for the 1993-95 wheat and feed grains crops. These initiatives would increase US production and exports and reduce world prices.

EFFECTS OF EC CAP REFORMS AND MCA ELIMINATION.[2] ***Limited impact on grain prices and trade.*** In May 1992, the EC Agricultural Council of Ministers approved a CAP reform package which included the following: (i) reduction in internal grain support prices from the reference buying-in price of 155 ECU/ton in 1991 to a target price of 110 ECU/ton and an intervention price of 100 ECU/ton to be phased in over three years beginning in 1993; (ii) direct income payments to compensate producers for the reduction in support prices; and (iii) an area reduction program of 15% for producers planting more than 20 ha.

The CAP reforms could enable the EC to satisfy some of the requirements in the Dunkel reform package. However, significant areas such as reductions of export subsidies are not addressed. The effects of these reforms in reducing the depressing impact of the CAP on world prices are likely to be limited by the following: (i) farmers are likely to set aside their poorest land; and (ii) the exemption of

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[2] See Ingco, M.D. and D.O. Mitchell, "How EC 1992 and Reforms of the Common Agricultural Policy Would Affect Developing Countries' Grain Trade," Policy Research Working Paper No. 848, World Bank, Washington D.C., 1992.

producers with less than 20 ha implies that about 25% of the land planted to cereals would be exempted from the set-aside requirements.

In general, the new agrimonetary arrangements to remove Monetary Compensation Amounts (MCAs) involves the revaluation of the so-called "green rates" in countries with positive MCAs and devaluation of the green rates in countries with negative MCAs. The effects of this would be a gradual increase in grain prices in France, the United Kingdom, Ireland, Italy, and Greece compared with prices in countries with strong currencies such as Germany and the Netherlands. The effects on world grain prices and trade of the elimination of the MCAs are estimated to be small partly due to the inelastic supply response and the offsetting effects of exchange rate policies in member countries. In effect, each member country's macroeconomic policies have affected the level of protection in EC agriculture. Analysis of the effects of proposals under consideration in trade negotiations to reduce protection in EC agriculture should therefore consider the effects of macroeconomic policies, including exchange rate variations, on agricultural protection.

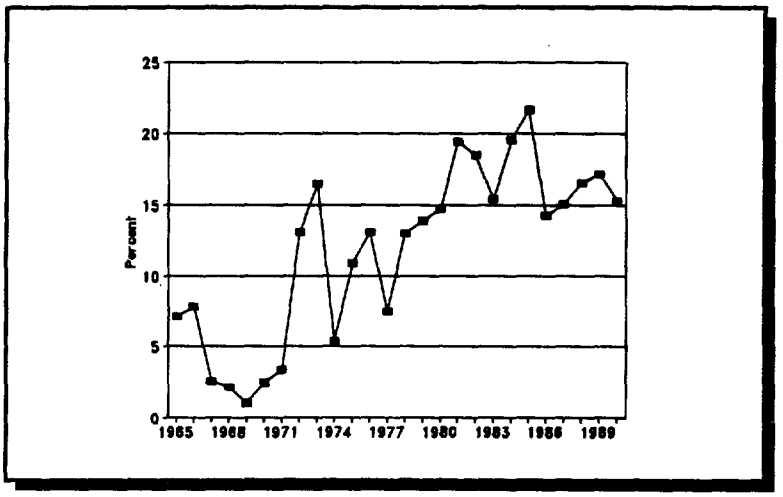
Under current EC macroeconomic policies, large price reductions would be necessary in order to bring production in line with demand. Since such large price cuts are currently politically infeasible, policies designed to remove land and farmers from grain production are likely to be more important. However, it is likely that the land set-aside schemes will have to be implemented with much higher compensation payments than now contemplated before they will have a significant effect on production. The elimination of the CAP and a return to pre-CAP growth paths for yields would result in a significant decline in EC production and net grain exports--resulting in substantially higher world wheat and coarse grains prices.

IMPLICATIONS OF THE BREAKUP OF THE FSU ON THE WORLD'S GRAINS MARKET. ***Success of economic reforms will be critical.*** The impact on the world's grains markets of the breakup of the FSU into independent republics could be monumental--perhaps as important as the emergence of the FSU as a major grain importer during the early 1970s. The FSU has imported 15-22% of world grain trade in recent years (see Figure 9). The ongoing economic and social restructuring are markedly reducing incomes in the FSU. They should lead to higher consumer prices for grains and much lower levels of grain consumption. Over the next several years actual imports will be heavily influenced by the policies of western countries on export credit assistance, food aid, and concessional sales. While this much seems reasonably clear, the impact of the reforms on grain production is highly uncertain--it is not clear whether production will be facing incentives to increase or decrease production.

When the FSU first imported large quantities of wheat in 1974, it signaled the beginning of a period of increases in trade prices and investment, the effects of which still linger after almost two decades. The level of world trade increased substantially during the 1970s as did the year-to-year price volatility as fluctuations in FSU production affected demand for imports.

Future changes in the grains markets due to the current changes in the FSU could be equally significant, but at present the outcome is highly uncertain, mostly because of doubts about the success of the economic reforms. Many opportunities for increased productivity exist. It is likely that crop yields can be increased and yield variability decreased by adopting improved varieties from Western Europe and the United States. Greater output of meat, milk, and eggs can be obtained by improving the breeding stock and feeding a better balanced ration while saving on feed inputs. More timely planting

Figure 9: FSU Grain Imports in World Trade



and harvesting could be possible with better machinery and machinery maintenance, and, better storage and grain handling could reduce post-harvest losses.

In the next few years, the FSU should remain a major grain importer, with the actual volume dependent on the availability of credit and assistance from supplying countries. In the long run, if market economies with private sector agriculture develop, the FSU could become a major grain exporter. A shift from importing about 20% of world grain trade to exporting an equal percentage is not unthinkable. This would reduce world grain prices substantially. On the other hand, if the new republics are not able to make the transition to stable market-based economies, then imports could remain at whatever levels can be financed and grain prices will not be so greatly affected.

It seems likely that the future level of FSU grain imports will be increasingly linked to developments in other sectors. The FSU has large reserves of oil, natural gas, coal, and timber. If the performance of these sectors improves and traditional exports of oil, gold and raw materials increase, the FSU will be in a better position to finance its grain import requirements.

Broad scope for productivity increases. If the FSU adopts western technology and allows the privatization of agriculture, it is very likely that productivity will increase. Grain production has stagnated since the late 1970s and the peak in grain production was reached in 1978. Wheat area harvested has fallen sharply over the past 20 years while coarse grain area trended downwards during the 1980s. Climatic factors have caused yields to fluctuate widely. Average grain yields have been much lower than in the United States and Western Europe (Figures 10 and 11). Three republics, the Russian Federation, Ukraine, and Kazakhstan account for more than 90% of grain production. Average yields in the Ukraine are nearly twice those of the Russian Federation and almost three times higher than those of Kazakhstan.

Due to the short growing season in the northern regions, grain production has depended on spring-sown grains which are lower yielding than winter varieties, while changeable weather conditions limit growth in winter grain regions and make its production very variable. Other production-related problems include heavy post-harvest losses and inadequate transport, storage, and distribution infrastructure. Reports indicate that some 20 million tons of grain are lost every year due to insufficient storage facilities and the inefficient transport system.

Figure 10: Wheat Yields

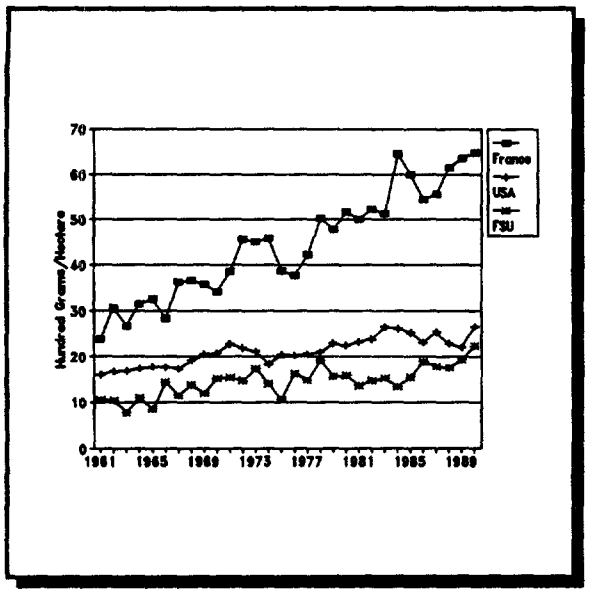


Figure 11: Coarse Grain Yields

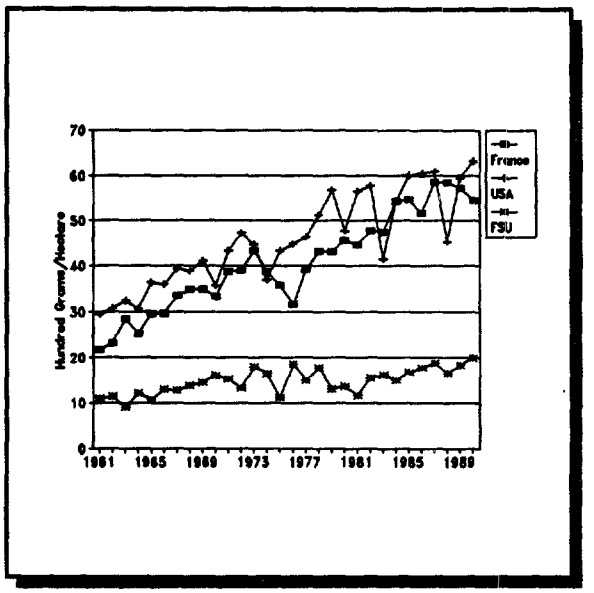


Table A1: Wheat - Production By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	110,509	162,751	211,914	173,799	196,428	202,788	207,788	211,581	230,964	250,053	2.9	3.0	2.6
OECD	110,270	162,528	211,646	173,626	196,228	202,588	207,588	211,381	230,764	249,853	2.9	3.0	2.6
United States	40,040	66,225	74,532	54,772	66,900	63,346	66,439	67,792	75,591	86,210		2.1	3.3
Canada	13,901	20,426	32,710	32,500	28,700	32,019	32,155	32,529	34,728	37,086	2.4	4.0	0.9
Australia	9,014	14,468	15,402	11,500	13,194	13,130	13,007	13,196	14,369	15,552	2.6	3.2	2.2
France	14,288	22,036	33,700	34,800	33,774	34,748	35,567	36,356	39,406	41,908	3.9	4.4	1.3
Japan	557	570	952	860	866	890	915	940	1,072	1,215	-0.9	7.9	2.5
LMICs	213,244	277,388	382,608	362,396	351,672	367,873	374,494	382,452	431,507	486,117	3.3	2.7	2.1
Africa	2,845	3,289	3,770	4,050	4,958	5,157	5,373	5,609	6,702	7,469	3.2	2.1	4.5
Nigeria	6	24	50	70	144	158	172	186	260	340		10.9	12.0
South Africa	1,461	1,965	1,702	2,100	2,774	2,894	3,033	3,185	3,844	4,218	4.3	2.0	5.1
Americas	11,137	14,961	20,304	18,384	16,136	22,058	23,003	23,862	26,878	26,523	3.0	3.9	2.7
Argentina	5,873	8,060	10,500	9,000	8,500	9,720	10,346	10,893	12,411	14,007	1.9	3.1	3.2
Brazil	1,192	2,591	3,200	3,200	3,000	5,015	5,201	5,383	6,259	3,672	12.7	6.8	1.0
Mexico	2,027	2,660	3,900	3,500	3,500	4,228	4,321	4,412	4,857	5,345	3.7	4.1	3.1
Asia & Pacific	58,213	106,830	165,547	166,076	170,306	176,699	180,424	186,494	220,092	255,730	6.3	5.6	3.1
India	20,859	34,550	49,652	54,000	54,556	55,173	56,753	59,425	71,782	84,084	6.2	4.8	3.2
China, People's Rep.	29,682	59,193	98,229	94,000	101,000	102,852	105,359	108,048	125,696	145,314	6.6	6.3	3.2
Pakistan	6,796	10,760	14,315	14,500	14,922	15,351	15,783	16,279	18,691	21,106	4.9	4.0	2.7
Europe	127,726	134,282	166,712	144,986	138,228	138,879	138,739	138,663	144,826	156,909	1.5	0.5	0.6
FSU	92,804	89,827	108,000	85,500	84,900	80,306	79,242	78,284	80,329	85,195	0.8	-0.4	0.0
Middle East & North Africa	13,323	18,027	26,275	28,900	24,962	25,080	26,955	27,824	33,009	39,486	2.6	2.6	2.3
Egypt	1,508	1,863	4,286	4,800	5,310	5,374	5,419	5,461	5,678	5,908	2.5	3.0	1.5
World	323,753	440,139	594,522	536,195	548,100	570,661	582,282	594,033	662,471	736,170	3.1	2.8	2.3

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: USDA Foreign Agricultural Service (actual);
World Bank, International Economics Department (projected).

Table A2: Wheat - Apparent Consumption By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	88,759	92,313	121,686	105,127	117,135	119,157	120,708	122,062	128,462	134,779	1.6	1.6	1.8
OECD	87,152	90,244	119,231	102,530	114,772	116,753	118,272	119,599	125,870	132,060	1.6	1.6	1.8
United States	21,721	21,891	37,495	34,428	28,420	29,077	29,577	29,989	32,151	34,590		2.5	0.0
Canada	4,671	5,294	6,705	6,900	6,395	6,449	6,504	6,564	6,856	7,010	1.7	1.8	0.1
Australia	2,688	3,164	4,100	3,500	3,418	3,531	3,621	3,723	4,221	4,715	1.4	0.7	2.2
France	9,700	10,716	13,300	13,600	12,803	13,024	13,193	13,341	14,040	14,731	1.0	1.8	0.6
Japan	5,253	6,085	6,100	6,100	6,657	6,655	6,662	6,672	6,745	6,817	1.3	0.8	0.8
LMICs	244,402	352,986	444,993	441,675	430,965	445,831	456,880	468,333	527,125	590,395	3.6	3.1	2.1
Africa	4,358	7,105	9,376	8,937	9,426	9,769	10,114	10,471	12,299	14,283	5.0	4.4	3.4
Nigeria	330	1,463	400	420	792	911	1,010	1,094	1,448	1,911	9.1	1.9	11.4
South Africa	1,337	1,932	2,522	2,400	2,611	2,727	2,833	2,949	3,459	3,911	3.7	3.3	3.5
Americas	15,885	22,213	25,820	25,411	263,389	28,899	29,667	30,539	34,207	38,341	3.0	2.5	3.0
Argentina	4,393	4,090	4,800	4,600	4,915	5,433	5,434	5,499	5,602	5,765	0.7	0.4	1.6
Brazil	3,315	6,667	7,500	7,200	7,512	8,258	8,514	8,877	10,121	11,575	5.0	3.8	3.4
Mexico	2,097	3,633	4,425	4,500	4,404	5,078	5,303	5,514	6,756	8,070	4.8	3.8	4.3
Asia & Pacific	69,329	130,566	186,324	193,357	203,475	210,970	218,510	226,211	263,923	303,762	5.6	5.5	3.3
India	22,436	35,555	49,102	52,300	56,123	57,991	60,522	63,586	77,669	92,029	4.7	4.2	4.1
China, People's Rep.	32,930	73,811	106,029	107,500	108,732	112,745	116,235	119,399	136,380	155,522	6.4	6.9	2.7
Pakistan	7,831	11,062	15,845	16,450	16,944	17,502	18,074	18,685	21,675	24,700	3.9	3.6	2.9
Indonesia	549	1,349	1,920	2,160	2,210	2,365	2,539	2,721	3,575	4,439	14.9	6.6	5.3
Thailand	69	192	395	505	344	366	389	412	502	604	8.5	8.3	1.3
Europe	134,745	158,631	175,822	165,534	139,560	141,150	141,761	142,353	148,345	155,455	1.9	0.8	-0.4
FSU	96,032	110,469	118,500	109,500	96,152	95,025	94,951	94,818	96,970	99,884	1.7	0.4	-0.7
Middle East & North Africa	20,085	34,471	47,651	48,436	53,384	55,043	56,828	58,759	68,351	78,554	4.5	4.3	3.5
Egypt	4,057	7,434	10,786	11,283	10,940	11,258	11,580	11,910	13,358	14,797	4.5	4.6	2.0
World	333,161	445,299	566,679	546,802	548,100	564,988	577,588	590,395	655,587	725,174	3.1	2.7	2.0

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: USDA Foreign Agricultural Service (actual);
World Bank, International Economics Department (projected).

Table A3: Wheat - Gross Exports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	46,548	91,213	98,273	92,027	92,256	93,874	198,053	102,412	106,973	116,233	4.0	3.7	1.7
OECD	46,429	91,021	98,223	91,977	91,725	93,821	97,997	102,353	106,915	116,107	4.0	3.7	1.7
United States	17,630	42,275	29,064	29,937	30,315	31,094	33,938	35,190	43,469	47,212		2.1	3.3
Canada	11,662	16,864	22,109	24,000	24,510	24,950	25,210	25,661	27,851	30,018	2.4	2.7	1.6
Australia	8,327	11,261	12,100	7,500	9,094	9,411	9,578	9,659	10,191	10,867	3.1	3.3	2.7
LMICs	9,449	7,789	12,780	17,220	9,200	9,653	10,663	10,735	19,940	34,700	1.2	2.6	5.1
Americas	1,799	4,162	5,550	4,820	5,150	5,302	5,448	5,501	7,007	8,476	3.1	6.8	4.1
Argentina	1,640	4,079	5,300	4,700	5,000	5,148	5,289	5,841	6,802	8,229	3.2	6.9	4.1
World	55,997	99,001	111,053	109,247	101,456	103,527	108,716	113,147	126,913	150,933	3.6	3.5	2.3

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: USDA Foreign Agricultural Service (actual);
World Bank, International Economics Department (Projected).

Table A4: Wheat - Gross Imports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	20,460	20,578	23,421	20,119	20,220	20,321	20,422	20,525	21,050	21,574	1.0	0.4	0.5
OECD	18,966	18,581	20,920	17,664	17,752	17,841	17,930	18,020	18,481	18,941	0.8	0.2	0.5
Japan	4,741	5,672	5,600	5,600	5,818	5,788	5,764	5,745	5,679	5,606	2.1	0.4	0.0
LMICs	34,300	76,306	81,763	91,972	81,236	83,206	88,294	92,622	105,863	129,359	4.4	4.6	2.5
Africa	1,809	4,007	5,614	4,963	5,664	5,726	5,837	5,962	6,826	7,901	6.9	6.4	3.4
Americas	6,230	11,676	11,220	11,590	11,291	11,177	11,626	12,141	14,208	16,538	2.8	1.6	2.6
Brazil	2,005	4,357	4,200	4,000	3,588	3,244	3,317	3,502	3,872	4,318	0.9	-0.3	0.5
Mexico	154	1,059	490	1,000	778	871	998	1,122	1,921	2,749	17.9	11.4	7.5
Asia & Pacific	12,830	21,018	23,099	29,345	28,792	31,923	34,345	36,112	41,183	58,616	2.5	3.2	5.1
India	2,621	683	150	100	1,455	2,712	3,686	4,282	6,453	8,608			37.5
China, People's Rep.	3,918	11,951	9,500	14,500	10,160	11,095	11,682	12,091	11,870	12,735	4.1	6.9	-0.9
Indonesia	542	1,358	2,000	2,100	2,220	2,375	2,549	2,731	3,585	4,449	14.8	6.6	5.5
Pakistan	1,062	445	920	1,300	2,040	2,170	2,310	2,424	3,002	3,612	-2.3	-0.7	7.6
Thailand	72	203	385	490	344	366	384	412	508	610	8.3	8.2	1.6
Europe	6,757	22,910	17,975	23,469	14,108	12,338	13,540	14,420	14,494	11,697	5.1	5.9	-4.9
FSU	1,719	16,142	15,000	21,000	14,040	14,772	14,262	15,342	16,548	14,986	13.0	11.7	-2.4
Middle East & North Africa	6,674	16,695	23,855	22,605	21,381	22,042	22,946	23,987	29,152	34,607	7.5	6.9	3.1
Egypt	2,548	5,402	6,500	6,500	5,633	5,886	6,163	6,452	7,682	8,891	5.5	5.2	2.3
World	54,760	96,885	105,184	112,091	101,456	103,527	108,716	113,147	126,913	150,933	3.4	3.5	2.1

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: USDA Foreign Agricultural Service (actual).

Table A5 : Wheat - Prices, 1950-91 (Actual) and 1992-2005 (Projected)

	($/ton)					
	US a/			Canadian b/		
	Current $	1990 Constant $		Current $	1990 Constant $	
		G-5 MUV c/	G-7 CPI d/		G-5 MUV c/	G-7 CPI d/
Actual						
1950	67	410	540	70	427	563
1951	72	385	527	81	428	586
1952	72	365	502	85	428	590
1953	68	355	471	77	400	531
1954	63	335	428	67	355	453
1955	62	323	419	65	339	440
1956	63	317	418	65	326	430
1957	63	313	411	63	311	409
1958	61	299	392	62	300	394
1959	58	287	372	64	316	409
1960	59	286	372	63	304	395
1961	60	283	365	64	304	392
1962	60	279	357	67	312	400
1963	59	281	342	67	318	387
1964	64	297	358	70	328	395
1965	58	269	317	66	305	360
1966	62	278	328	70	315	372
1967	62	273	318	69	307	357
1968	58	261	292	67	297	334
1969	56	238	270	64	272	308
1970	57	227	258	63	250	284
1971	62	235	263	64	242	271
1972	69	240	265	71	247	274
1973	137	410	460	147	441	495
1974	178	438	540	209	513	633
1975	138	306	374	181	401	490
1976	123	268	321	149	325	390
1977	96	190	226	116	230	274
1978	125	216	241	135	233	260
1979	156	238	285	172	263	314
1980	168	234	274	191	265	311
1981	155	214	250	196	272	318
1982	133	186	217	167	234	273
1983	137	197	221	170	244	273
1984	140	206	227	165	243	267
1985	129	188	204	173	253	275
1986	118	146	156	161	199	211
1987	112	126	130	134	150	155
1988	141	148	152	180	188	194
1989	161	170	175	201	213	218
1990	129	129	129	156	156	156
1991	126	123	120	143	140	136
Projected						
1992	144	135	129	172	161	154
1993	142	128	123	162	147	140
1994	146	130	123	164	146	139
1995	154	133	126	171	148	140
2000	195	142	133	218	159	149
2005	191	121	109	204	129	116

a/ For 1950-June, 1974, No. 2 Soft Red Winter; beginning July 1974, No. 1, f.o.b. Gulf ports.

b/ For years up to 1972, Manitoba (Canadian No. 1, Northern), basis in store, Thunder Bay; 1973-1984, No. 1 Canadian Western Red Spring (CWRS) export price; beginning April 1985, in store, St. Lawrence.

c/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.

d/ Deflated by G-7 Consumer Price Index (CPI).

Sources: US Department of Agriculture, Foreign Agricultural Service and Canadian Wheat Board (actual); World Bank, International Economics Department (projected).

Table A6: Rice - Production By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	24,437	25,479	25,486	25,186	25,819	25,763	24,876	24,663	28,596	31,419	0.2	0.1	1.6
OECD	21,206	22,445	23,195	22,895	23,528	23,472	22,585	22,372	26,305	29,128	0.3	0.4	1.7
United States	3,953	6,968	7,027	7,012	7,530	7,427	6,464	6,195	9,665	11,655	3.1	2.8	3.7
Australia	267	678	923	787	959	934	974	1,007	1,265	1,511	7.4	6.0	4.8
Japan	15,658	13,321	13,124	12,908	13,034	13,028	13,060	13,062	13,236	13,743	-0.9	-0.9	0.4
LMICs	275,611	365,392	486,955	482,355	494,251	504,881	514,869	525,415	578,705	635,074	3.2	3.0	2.0
Africa	4,627	5,672	7,413	7,246	7,411	7,573	7,736	7,900	8,764	9,560	3.3	2.4	2.0
Nigeria	425	739	930	993	1,019	1,043	1,068	1,091	1,200	1,300	4.2	4.3	1.9
Americas	10,150	15,475	14,123	16,609	19,021	20,216	20,722	21,184	24,026	26,365	2.9	2.9	3.4
Argentina	347	288	331	351	391	399	407	413	454	488	2.6	1.3	2.4
Brazil	6,145	8,623	7,200	9,300	10,738	11,747	12,088	12,391	14,247	15,775	2.1	2.7	3.8
Mexico	389	485	300	625	640	653	667	679	750	822	1.6	0.3	2.0
Asia & Pacific	254,687	336,704	456,901	450,498	459,279	449,478	477,647	487,399	536,108	588,557	3.2	3.0	1.9
India	62,925	74,679	112,511	106,860	106,321	108,490	110,658	112,929	124,604	136,718	2.7	3.0	1.8
China, People's Rep.	99,862	140,195	180,130	189,331	182,560	189,693	194,134	198,182	221,218	240,665	3.8	3.0	1.7
Pakistan	3,417	4,889	4,887	5,018	5,342	5,327	5,293	5,286	5,327	5,475	4.0	2.1	0.6
Indonesia	19,173	29,569	45,178	42,189	43,179	44,498	45,734	47,376	55,936	66,249	4.6	4.9	3.3
Thailand	12,473	16,865	20,177	17,300	20,552	21,128	21,318	21,494	22,812	23,854	2.7	2.5	2.3
Europe	1,836	3,145	3,256	2,585	3,050	3,039	3,142	3,253	3,862	4,270	5.5	3.1	3.6
Middle East & North Africa	4,312	4,395	5,262	5,437	5,490	5,565	5,622	5,679	5,945	6,232	1.7	0.7	1.0
Egypt	2,582	2,415	2,675	2,764	2,791	2,829	2,858	2,887	3,022	3,168	1.2	-0.2	1.0
World	300,048	390,871	512,441	507,541	520,070	530,644	539,745	550,078	607,301	666,493	3.0	2.8	2.0

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: USDA Foreign Agricultural Service (actual);
World Bank, International Economics Department (projected).

Table A7: Rice - Apparent Consumption By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	16,845	16,467	17,063	17,061	17,244	17,286	17,526	17,689	18,697	19,856	0.0	0.0	1.1
OECD	14,029	13,765	14,523	14,209	14,361	14,396	14,596	14,732	15,571	16,537	0.0	0.0	1.1
United States	1,279	2,052	2,990	2,633	2,686	2,786	2,885	3,001	3,523	4,019	3.9	4.3	3.1
Canada	54	96	160	137	141	145	148	151	165	176		5.3	1.8
Australia	66	62	172	168	162	166	171	176	193	209	3.8	3.3	1.6
France	148	190	213	-	-	-	-	-	-		1.9	1.7	
Japan	11,543	10,281	9,600	9,647	9,595	9,565	9,585	9,608	9,761	10,098	-0.8	-1.0	0.3
LMICs	186,160	249,866	326,287	329,693	334,920	340,208	347,471	355,601	393,152	431,918	3.2	3.0	1.9
Africa	3,678	6,053	7,530	7,450	7,690	7,925	8,176	8,395	9,621	11,002	4.3	4.0	2.8
Nigeria	285	974	808	838	910	985	1,027	1,056	1,206	1,371	6.6	6.2	3.6
South Africa	62	127	347	308	298	309	316	326	365	424	7.0	9.0	2.3
Americas	6,817	10,572	12,917	12,715	13,500	13,916	14,324	14,731	16,523	18,359	3.1	3.4	2.7
Argentina	138	107	156	155	156	159	158	158	165	171	0.9	-0.1	0.7
Brazil	4,170	6,048	7,400	7,450	8,031	8,318	8,589	8,871	10,036	11,246	2.5	3.3	3.0
Mexico	279	377	460	380	454	467	482	497	585	674	3.3	2.6	4.2
Asia & Pacific	171,314	225,762	297,190	301,155	304,986	309,431	315,802	323,038	356,183	390,291	3.1	2.9	1.9
India	42,121	51,098	72,975	72,278	71,443	72,452	73,888	75,383	82,663	90,596	2.6	2.8	1.6
China, People's Rep.	67,490	95,953	123,059	127,600	132,022	133,252	136,172	139,661	154,015	167,364	3.9	3.3	2.0
Indonesia	13,718	21,231	29,874	29,480	30,541	31,661	32,718	33,980	40,143	47,079	4.2	4.2	3.4
Pakistan	2,105	2,250	2,100	2,219	2,388	2,369	2,342	2,213	2,409	2,903	2.5	0.7	1.9
Thailand	6,935	8,065	8,600	8,300	8,785	8,761	8,723	8,680	8,600	8,506	1.9	0.6	0.2
Europe	1,722	3,107	2,868	2,743	2,948	2,957	2,988	3,037	3,323	3,595	4.5	3.2	2.0
FSU	1,027	2,246	1,914	1,810	1,973	1,980	2,000	2,035	2,245	2,441	6.8	3.9	2.2
Middle East & North Africa	2,627	4,373	5,782	5,630	5,796	5,979	6,181	6,400	7,502	8,671	4.4	4.0	3.1
Egypt	1,083	1,485	1,670	1,656	1,689	1,732	1,779	1,828	2,045	2,265	2.7	1.4	2.3
World	203,004	266,333	343,350	346,754	352,164	357,494	364,997	373,290	411,849	451,774	3.0	2.8	1.9

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: USDA Foreign Agricultural Service (actual);
World Bank, International Economics Department (projected).

Table A8: Rice - Gross Exports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	2,930	4,964	4,020	4,475	4,600	4,700	4,800	5,000	6,500	7,197	3.2	2.1	3.5
OECD	2,827	4,696	3,875	3,162	4,252	4,397	4,531	4,720	6,300	6,900	3.6	2.0	5.7
United States	1,684	2,805	2,351	2,300	2,580	3,021	3,174	3,302	4,086	5,600	2.7	2.0	6.6
Australia	129	396	461	470	496	515	535	557	691	846	8.6	6.9	4.3
LMICs	4,976	7,450	8,558	8,967	7,821	8,204	8,670	9,049	10,201	11,542	2.3	3.3	1.8
Asia & Pacific	3,797	6,560	7,765	7,050	7,560	8,006	8,670	9,049	10,201	11,542	2.7	4.0	3.6
Pakistan	157	1,030	1,200	1,250	1,297	1,421	1,447	1,598	1,704	1,800	9.7	6.1	2.6
Thailand	1,221	2,815	3,927	4,200	4,546	5,306	5,698	5,834	6,433	7,225	5.3	8.8	4.0
Viet Nam	14	13	1,500	1,200	1,200	1,300	1,400	1,500	1,750	2,000			3.7
World	7,906	12,414	12,549	13,442	12,421	12,904	13,470	14,049	16,701	19,739	2.6	2.9	2.8

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: USDA Foreign Agricultural Service (actual);
World Bank, International Economics Department (projected).

Table A9: Rice - Gross Imports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	1,428	2,174	2,637	2,410	2,482	2,557	2,633	2,712	3,234	3,755	1.8	3.3	3.2
OECD	732	1,322	1,597	1,610	1,658	1,678	1,695	1,742	1,958	2,274	2.4	4.3	2.5
United States	30	8	152	160	169	178	190	199	240	270			3.8
Canada	54	96	160	180	190	198	208	219	251	290		5.3	3.5
LMICs	5,968	9,982	9,912	9,759	9,939	10,347	10,837	11,337	13,467	15,984	3.1	2.7	3.6
Africa	755	2,336	2,822	2,756	2,885	3,013	3,163	3,277	3,943	4,749	7.3	7.9	4.0
Nigeria	3	441	250	186	234	291	319	334	409	507	31.9	29.6	7.4
South Africa	77	127	350	307	298	308	316	326	365	424	6.1	8.4	2.3
Americas	372	983	1,691	1,010	840	881	961	1,075	1,318	1,751	5.3	7.2	4.0
Brazil	0	326	405	600	387	363	373	425	641	812			2.2
Mexico	8	74	250	250	285	325	370	400	475	550			5.8
Asia & Pacific	3,821	3,817	2,073	2,300	2,369	2,440	2,513	2,587	2,794	3,000	-1.6	-3.9	1.9
China, People's Rep.	4	66	59	150	170	175	180	185	200	200			2.1
Indonesia	692	1,506	100	200	600	100	250	379	732	1,056	-6.5	-14.3	12.6
Europe	605	1,265	945	983	1,021	1,059	1,097	1,135	1,320	1,505	3.1	3.4	3.1
Middle East & North Africa	416	1,582	2,381	2,710	2,824	2,954	3,103	3,263	4,092	4,979	10.0	9.7	4.4
World	7,396	12,155	12,549	13,442	12,421	12,904	13,470	14,049	16,701	19,739	2.8	2.8	2.8

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: USDA Foreign Agricultural Service (actual);
World Bank, International Economics Department (projected).

Table A10: Rice - Prices, a/ 1950-91 (Actual) and 1992-2005 (Projected)

	($/ton)		
	Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/
Actual			
1950	137	837	1,102
1951	144	767	1,051
1952	156	792	1,091
1953	175	911	1,209
1954	158	842	1,076
1955	142	740	961
1956	137	691	910
1957	137	679	893
1958	142	692	909
1959	132	652	846
1960	125	602	783
1961	137	648	837
1962	153	712	912
1963	143	680	828
1964	138	642	776
1965	136	631	744
1966	163	730	862
1967	206	910	1,059
1968	202	900	1,010
1969	187	792	897
1970	144	574	651
1971	129	488	547
1972	147	510	565
1973	350	1,049	1,176
1974	542	1,333	1,644
1975	363	803	981
1976	255	555	665
1977	272	541	644
1978	368	634	709
1979	334	509	609
1980	434	603	708
1981	483	668	781
1982	293	412	480
1983	277	398	447
1984	252	370	408
1985	216	315	342
1986	211	260	276
1987	230	259	268
1988	301	316	325
1989	320	338	347
1990	287	287	287
1991	314	308	299
Projected			
1992	290	272	260
1993	288	261	249
1994	290	258	245
1995	300	260	246
2000	336	245	229
2005	374	237	213

a/ Thai, 5% broken, Board of Trade posted price, f.o.b. Bangkok.
b/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.
c/ Deflated by G-7 Consumer Price Index (CPI).

Sources: US Department of Agriculture, Rice Market News (actual); World Bank, International Economics Department (projected).

Table A11: Coarse Grains - Production By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	270,379	352,080	360,039	357,113	373,063	408,845	415,243	414,602	441,141	477,532	2.1	1.3	2.1
OECD	270,192	351,840	359,481	356,553	372,463	408,204	414,592	413,952	440,449	476,783	2.1	1.3	2.1
United States	165,774	227,789	230,586	218,205	263,200	258,085	260,186	256,328	268,321	289,527	2.0	1.4	2.0
Canada	20,495	22,340	26,061	22,701	20,800	26,593	27,946	28,863	32,483	35,852	2.5	1.0	3.3
Australia	4,694	5,949	6,897	7,497	7,600	8,208	8,384	8,480	9,265	10,481	4.2	2.7	2.4
LMICs	313,594	392,814	473,124	461,748	460,837	492,429	500,666	507,009	550,471	601,523	2.4	1.9	1.9
Africa	35,943	48,034	46,167	49,877	46,760	57,678	58,730	59,761	64,632	69,411	1.9	1.6	2.4
Nigeria	8,209	8,625	6,320	8,698	8,568	8,662	8,723	8,770	8,949	9,119	0.2	-0.3	0.3
South Africa	7,197	11,954	9,511	5,369	8,500	11,316	11,703	12,007	13,251	14,318	1.7	0.3	7.3
Americas	44,898	59,209	59,816	70,267	67,822	71,571	72,872	74,004	80,668	88,304	2.8	1.8	1.6
Argentina	13,727	16,028	8,124	12,388	12,900	14,891	15,168	15,314	16,498	18,291	1.7	-1.1	2.8
Brazil	13,811	20,062	22,450	29,328	25,642	25,927	26,279	26,614	28,560	30,704	3.6	3.1	0.3
Mexico	10,674	14,400	18,355	16,902	16,800	18,508	18,950	19,369	21,600	23,862	2.8	1.7	2.5
Asia & Pacific	97,010	128,519	171,343	165,567	164,476	167,618	170,082	172,129	182,875	193,530	2.6	2.4	1.1
India	27,426	29,116	34,969	29,028	33,800	29,518	29,411	29,213	28,798	28,680	0.9	0.7	-0.1
China, People's Rep.	56,726	81,415	113,455	112,320	108,900	113,184	115,335	117,263	126,266	135,212	3.2	2.9	1.3
Indonesia	2,575	4,035	5,300	5,985	5,300	6,373	6,480	6,494	6,891	7,596	2.7	4.0	1.7
Pakistan	1,431	1,541	1,781	1,833	1,600	1,862	1,877	1,874	1,909	1,992	1.1	1.0	0.6
Thailand	2,083	3,930	4,050	3,771	3,564	3,607	3,692	3,786	4,418	5,068	6.8	4.4	2.1
Europe	125,320	144,620	161,443	150,944	152,358	169,792	172,733	174,353	192,915	217,429	2.2	1.5	2.6
FSU	73,811	77,009	113,300	87,194	85,700	110,515	112,282	112,980	126,148	144,485	2.4	1.5	3.7
Middle East & North Africa	10,422	12,432	23,950	25,092	25,969	26,411	26,900	27,411	30,075	32,858	2.0	2.5	1.9
Egypt	3,308	3,670	5,387	5,435	5,518	5,603	5,688	5,774	6,210	6,659	2.2	2.4	1.5
World	583,972	744,893	833,163	818,861	833,900	901,274	915,909	921,611	991,612	1,079,055	2.3	1.7	2.0

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: USDA Foregin Agriculture Service Tape (actual);
World Bank, International Economics Department (projected).

Table A12: Coarse Grains - Apparent Consumption By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	274,335	312,816	333,294	345,829	349,223	354,122	357,555	361,089	380,346	397,102	1.5	0.9	1.0
OECD	272,256	306,854	326,942	339,238	342,567	347,373	350,741	354,207	373,097	389,534	1.4	0.8	1.0
United States	145,748	154,514	181,192	183,747	185,189	186,470	187,354	188,340	195,480	196,553	1.3	1.3	0.5
Canada	17,270	18,270	19,801	19,760	20,099	20,443	20,800	21,154	22,571	22,835	1.7	0.7	1.0
Australia	2,693	3,536	4,277	4,209	4,313	4,450	4,599	4,750	5,385	5,508	2.9	3.2	1.9
Japan	11,063	19,233	23,630	24,193	24,785	25,318	25,845	26,382	28,788	29,229	5.5	3.7	1.4
LMICs	305,615	429,731	508,742	502,526	484,677	522,055	532,972	543,803	606,328	678,141	2.9	2.4	2.2
Africa	33,600	44,045	46,256	51,429	49,001	53,662	55,545	56,962	63,108	69,470	2.2	2.1	2.2
Nigeria	8,214	8,879	6,584	8,615	8,561	8,655	8,729	8,797	9,070	9,301	0.2	-0.2	0.5
South Africa	5,455	7,427	7,653	7,778	8,006	8,380	8,734	9,117	10,740	12,512	2.6	1.6	3.5
Americas	37,940	58,265	67,505	72,466	71,444	73,285	75,494	77,420	89,166	102,043	3.7	2.9	2.5
Argentina	6,057	6,359	5,657	6,239	6,789	7,111	7,311	7,296	8,097	8,974	1.3	-0.8	2.6
Brazil	13,483	20,879	25,076	28,999	26,439	26,727	27,232	27,784	30,354	33,143	3.9	3.6	1.0
Mexico	10,728	18,973	22,391	22,093	22,875	23,652	24,592	25,582	31,588	37,905	4.4	3.1	3.9
Asia & Pacific	93,965	133,144	178,178	175,579	170,830	172,930	176,396	180,536	200,869	224,385	2.8	2.6	1.8
India	28,236	29,454	33,266	29,082	29,310	29,551	29,433	29,224	28,749	28,567	0.9	0.4	-0.1
China, People's Rep.	54,395	84,317	108,307	108,951	109,233	109,823	112,070	115,267	130,291	148,101	3.2	2.9	2.2
Indonesia	2,354	4,028	5,294	5,978	6,243	6,386	6,514	6,550	7,006	7,745	2.8	4.3	1.9
Pakistan	1,399	1,541	1,757	1,807	1,815	1,831	1,844	1,840	1,856	1,903	1.0	1.1	0.4
Thailand	236	1,160	2,012	2,164	2,331	2,515	2,724	2,919	3,676	4,441	20.2	13.2	5.3
Europe	129,144	175,321	183,709	169,196	156,467	179,474	181,418	183,348	201,249	223,843	2.8	1.8	2.0
FSU	74,683	99,142	129,102	108,454	98,336	120,419	121,362	122,292	134,885	151,436	3.2	2.1	2.4
Middle East & North Africa	10,966	18,956	33,004	33,850	41,480	42,704	44,119	45,537	51,936	58,400	4.8	6.2	4.0
Egypt	3,337	4,593	6,878	6,931	7,020	7,189	7,375	7,565	8,419	9,263	3.3	4.5	2.1
World	579,950	742,547	842,036	848,355	833,900	876,177	890,527	904,892	986,674	1,075,243	2.3	1.7	1.7

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: USDA Foregin Agriculture Service Tape (actual);
World Bank, International Economics Department (projected).

Table A13: Coarse Grains - Gross Exports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	36,829	90,967	80,961	75,981	77,305	74,748	79,642	82,616	102,606	122,445	5.7	3.3	3.5
OECD	36,752	90,432	80,861	75,881	77,205	74,565	79,632	82,516	102,506	122,345	5.6	3.3	3.5
United States	20,577	66,769	51,158	48,604	50,542	48,227	49,932	54,814	62,940	72,439	5.3	3.3	2.9
Canada	3,770	5,637	5,025	6,050	4,307	5,805	6,885	7,530	9,751	11,993	7.0	1.6	5.0
Australia	2,074	2,744	2,342	2,215	2,762	2,846	2,812	2,744	3,877	3,501	6.7	1.8	3.3
LMICs	16,288	19,417	14,163	15,764	14,582	14,890	15,032	15,836	17,746	20,375	1.6	0.3	1.8
South Africa	1,661	3,718	1,000	650	300	2,432	2,794	2,859	2,563	1,880	-1.8	-4.0	7.9
Argentina	7,493	9,811	4,250	5,655	5,409	7,766	7,854	8,012	8,396	9,308	2.1	-1.4	3.6
World	53,117	110,384	95,124	91,745	91,887	89,638	94,674	98,452	120,352	142,820	4.7	2.7	3.2

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: USDA Foregin Agriculture Service Tape (actual);
World Bank, International Economics Department (projected).

Table A14: Coarse Grains - Gross Imports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	40,162	57,032	46,100	41,351	40,851	41,394	42,018	42,473	46,510	48,648	2.1	0.1	1.2
OECD	38,136	50,634	38,795	34,166	34,378	34,835	35,360	35,743	39,460	41,415	1.5	-0.6	1.4
Japan	10,267	18,690	21,400	21,100	21,619	22,129	22,669	23,210	25,660	28,882	6.8	3.8	2.3
LMICs	9,431	55,347	46,270	49,716	51,036	48,244	52,656	56,434	73,842	94,172	10.7	8.0	4.7
Africa	602	1,799	1,026	1,256	3,518	915	1,294	1,886	2,638	3,461	7.3	5.6	7.5
Americas	1,570	9,933	8,872	9,009	9,013	9,546	10,543	11,517	16,971	23,127	11.8	8.5	7.0
Brazil	71	1,248	778	1,210	500	701	890	1,119	1,730	2,369	11.6	15.7	4.9
Mexico	380	5,029	4,630	4,855	5,109	5,260	5,718	6,282	10,064	14,117	17.2	13.4	7.9
Asia & Pacific	1,060	5,158	8,070	8,300	8,704	9,149	10,014	11,245	16,913	26,056	8.9	9.7	8.5
China, People's Rep.	138	1,402	1,000	800	800	800	800	1,056	4,548	12,735			21.9
Europe	5,492	31,394	15,662	18,421	16,057	14,103	13,325	13,379	14,187	14,703	10.0	4.9	-1.6
FSU	1,568	20,800	11,200	15,000	12,118	10,164	9,313	9,379	8,687	6,953	30.5	10.9	-5.3
Middle East & North Africa	706	7,062	12,640	12,730	15,744	16,531	17,480	18,407	23,133	26,825	15.5	18.2	5.5
Egypt	63	931	1,600	1,850	1,504	1,589	1,689	1,793	2,211	2,606	10.8	15.3	2.5
World	49,593	112,379	92,370	91,067	91,887	89,638	97,674	98,452	120,352	142,820	4.8	3.0	3.3

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: USDA Foregin Agriculture Service Tape (actual);
World Bank, International Economics Department (projected).

Table A15: Coarse Grains - Prices, 1950-91 (Actual) and 1992-2005 (Projected)

	($/ton)					
	Sorghum a/			Maize b/		
	Current $	1990 Constant $		Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/		G-5 MUV b/	G-7 CPI c/
Actual						
1950	53	326	430	68	417	549
1951	62	329	451	72	382	524
1952	65	331	456	63	317	437
1953	55	289	383	60	314	417
1954	55	294	376	58	311	397
1955	48	252	327	49	255	332
1956	52	263	346	52	261	343
1957	43	214	282	48	235	310
1958	43	211	277	48	232	304
1959	38	187	242	46	227	295
1960	38	182	237	43	209	272
1961	43	202	261	46	218	282
1962	46	212	272	51	239	307
1963	49	231	281	55	260	316
1964	48	225	272	56	260	314
1965	47	219	258	55	255	300
1966	52	231	273	59	266	314
1967	50	223	259	50	221	257
1968	47	208	233	49	219	246
1969	50	212	240	54	228	259
1970	52	207	234	58	233	264
1971	56	211	236	58	221	247
1972	56	194	215	56	194	215
1973	93	279	313	98	294	329
1974	121	298	367	132	325	400
1975	112	248	302	120	265	323
1976	105	230	275	112	245	294
1977	88	176	209	95	189	225
1978	94	162	181	101	174	194
1979	108	165	197	116	176	211
1980	129	179	210	125	174	204
1981	126	175	204	131	181	212
1982	109	152	178	109	154	179
1983	129	185	208	136	196	219
1984	119	175	192	136	200	220
1985	103	150	163	112	164	178
1986	83	102	108	88	108	115
1987	73	82	85	76	85	88
1988	99	103	106	107	112	115
1989	106	112	115	112	118	121
1990	104	104	104	109	109	109
1991	105	103	100	107	105	102
Projected						
1992	103	97	92	105	99	94
1993	102	92	88	104	94	90
1994	103	91	87	107	95	90
1995	105	91	86	110	95	90
2000	134	98	91	139	101	95
2005	125	79	71	130	82	74

a/ US No. 2, Yellow, f.o.b. Gulf ports.
b/ US No. 2, Yellow, f.o.b. Gulf ports.
c/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.
d/ Deflated by G-7 Consumer Price Index (CPI).

Sources: US Department of Agriculture, Foreign Agricultural Service (actual); World Bank, International Economics Department (projected).

Vegetable Oils

Summary

- Following the generally depressed prices of 1990, vegetable oils and meals posted small gains in 1991. These are expected to continue in 1992 and 1993. The market for groundnut oil, which experienced a price rally in 1990, will be the notable exception.

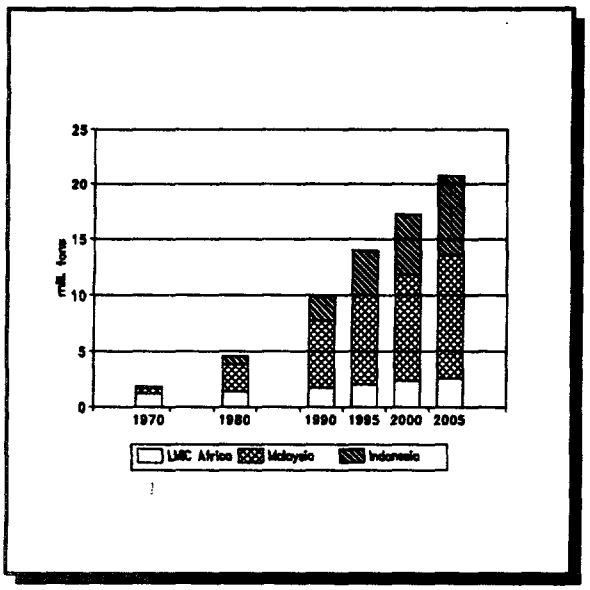
- A cyclical downturn in palm oil yields in Malaysia and Indonesia should be reversed in the second half of 1992 and 1993 so that by 1994 prices are expected to fall again; for coconut oils, drought conditions limited early 1992 supplies and caused significant price rises but prices are expected to fall through the second half of 1993. Finally, soybean prices, having fallen sharply in real terms since July 1988, are expected to remain stable through 1995.

- For the longer term, vegetable oil prices are expected to remain flat to downward trending in real terms despite vigorous growth in demand. The fast pace of production increases in several low-cost producing countries, especially Argentina, Brazil, Indonesia, and Malaysia, is expected to continue.

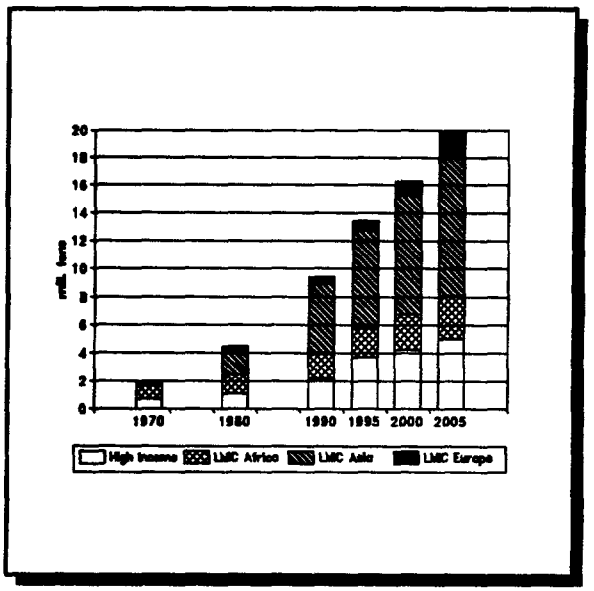
- In an environment of low prices and positive income growth, demand growth is expected to remain robust, especially in many populous countries in Asia.

- Vegetable oil and meal prices are expected to remain volatile, although the diversification of production has helped to ease the effects of weather on global production levels.

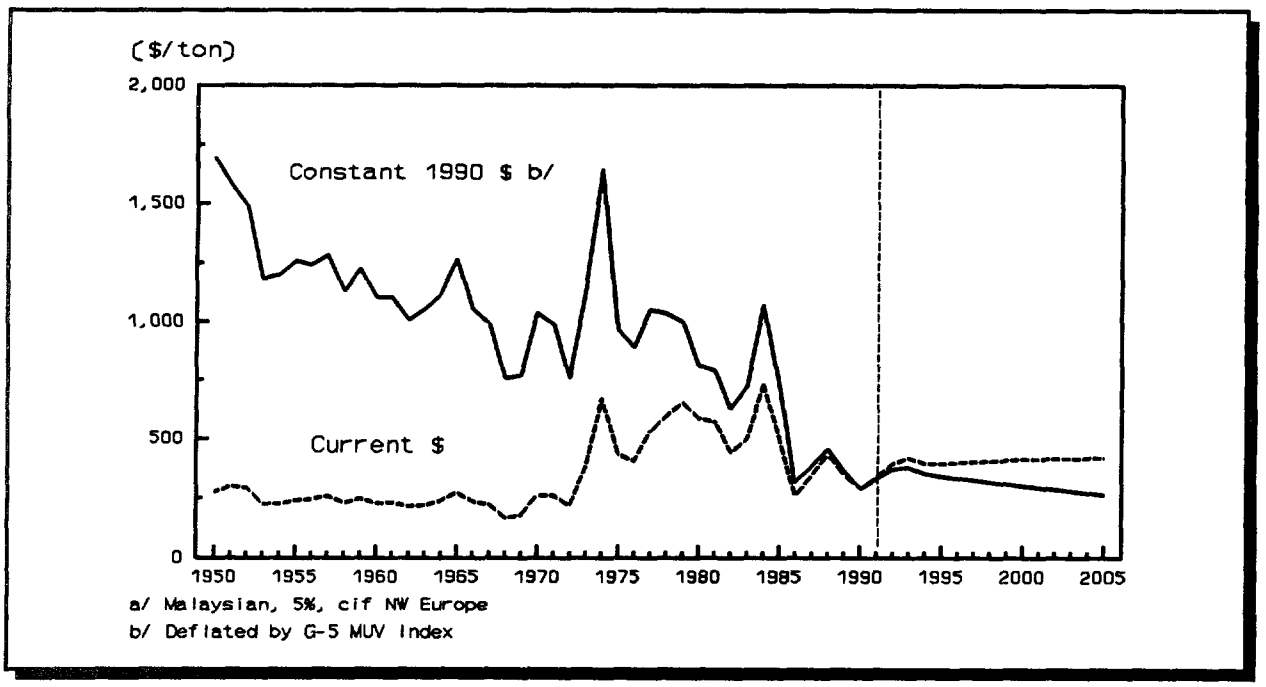
Projected Palm Oil Production, by Region



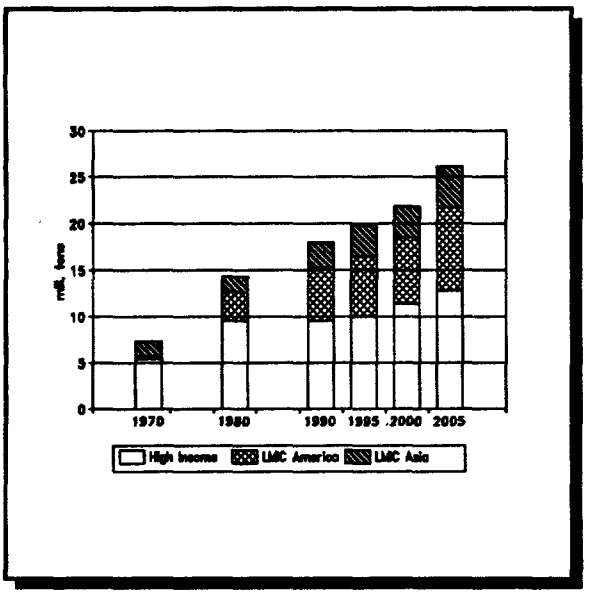
Projected Palm Oil Consumption, by Region



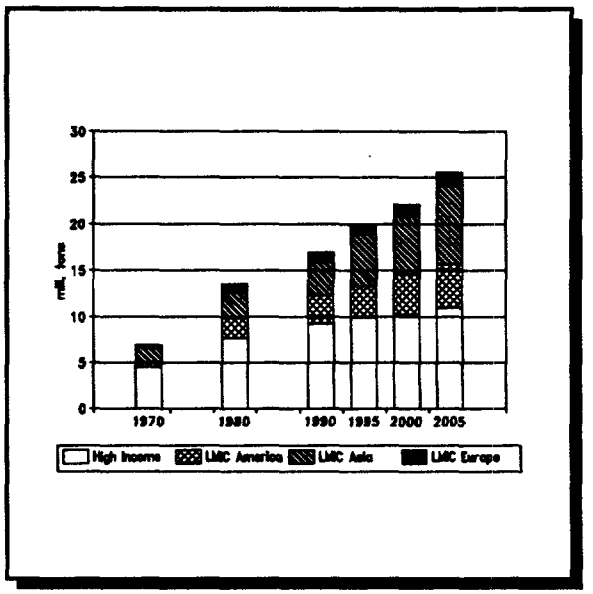
Palm Oil Prices a/, 1950-2005



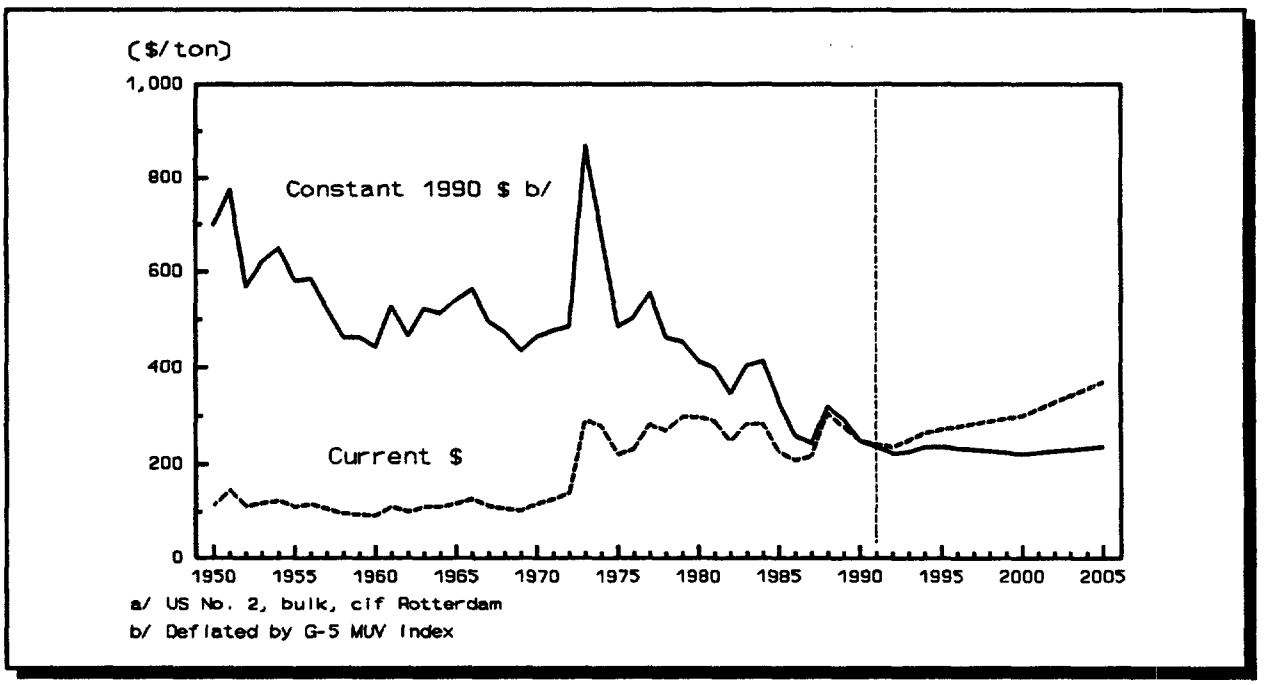
Projected Soybean Production (Oil Equivalent), by Region



Projected Soybean Oil Consumption, by Region



Soybean Prices a/, 1950-2005



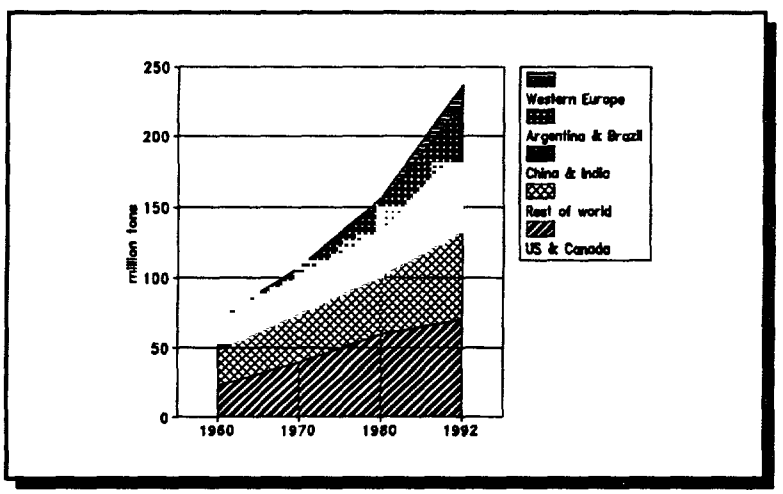
Market Characteristics and Recent Developments

Oilseeds and their products are traded in a world market, the workings of which are complicated by the physical nature of the production processes for both raw and finished products. Production includes both annual crops grown on land easily used for alternative crops and perennial tree crops whose productive lives span decades. Oilseeds are grown in both rich and poor countries and are produced to some extent in almost every country. Some production technologies are quite input-intensive, while other growing methods--especially for some tree crops--require no additional inputs other than land, rain, and harvesting labor. All countries consume oilseed products, in forms ranging from animal feed, to cooking oil, to industrial products such as detergents and paint products. Oilseeds contain multiple products, and all oilseeds contain both oils and meals in varying amounts. All meals can be used as feed, but each possesses a unique nutritional composition characterized especially by protein content.

Almost all of the vegetable oils can be used as cooking oil and, through various methods of processing, all oils can be broken down into their basic chemical components and recombined to form nearly homogeneous final products. Because of the multiple and varied nature of final oil products, vegetable oils compete in markets shared with animal products such as butter and tallow, and in markets shared with petroleum products such as detergents and wood finishes. The worldwide prevalence of oilseeds, the combination of annual and perennial crops, the jointly produced products, and the wide-ranging degree of technical substitution among oilseed products produces a unique and intricate market with a number of distinctive economic and physical characteristics.

Worldwide production is geographically diverse and the diversity will continue to increase. Figure 1 illustrates the changing country origins of oilseed production. During the early 1970s, the North American harvest dominated the oilseed market as US farmers expanded quickly into soybeans to meet the demands of rapidly growing feedlot and poultry industries. However, by the 1980s, lower production costs in other countries and a US farm policy designed to support farm incomes by stockpiling US supplies had fueled a rapid expansion of oilseed production, especially soybeans and sunflowerseeds, in South America. Moreover, during the mid-1970s, a dramatic move by the EC to

Figure 1: Oilseed production in selected regions 1960-92



Source: Oil World.

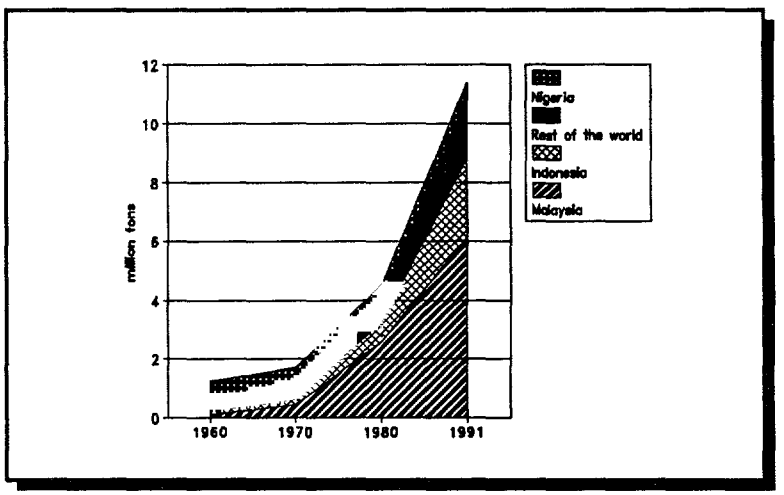
support domestic production of oilseeds spawned its significant entry into rapeseed and sunflowerseed production. During the same period, an easing of the controls on producer prices in China, together with a restrictive import policy, drove up domestic prices and production. In India, restrictions on imports have spurred production while the high domestic prices have kept consumption well below free-market levels.

While North and South America, the EC, China, and India were expanding their production of annual oilseed crops, the tree-crop planting programs begun in the late 1970s and early 1980s literally began to bear fruit (particularly in Asia). Figure 2 vividly illustrates the rapid growth of Malaysian and Indonesian palm oil output.

The production of vegetable oils and meals will continue to diversify globally throughout the next decade as an even greater share of oilseed production will move to the developing countries. (Detailed descriptions of the prospects for production are given in a later section, *Supply Prospects*, and in the Annex tables.) Production of palm oil will grow inexorably in Malaysia and Indonesia, as trees planted during the past decade reach maturity while low production costs will support further production gains in Latin America. However, a combination of EC budget constraints, GATT rulings, EC market unification, and Uruguay Round negotiations are changing the way in which oilseeds are supported in the EC and are likely to slow production growth there. Also, changes in US farm policy to increase farmer planting flexibility have favored soybeans production there, but soybean area in the United States (which declined during the 1980s) is not expected to increase and production gains will most likely be modest.

Worldwide demand for both oils and meals is growing rapidly and will grow most rapidly in the developing countries. Driven by population and income growth, the demand for both oils and meals is growing rapidly and will continue to do so throughout the current decade. The demand for both sets of products has grown most rapidly in the developing countries where income gains during the

Figure 2: Palm oil production in selected regions, 1960-92



Source: Oil World

past decade have led to better and more diversified diets. As incomes climb in poor countries, consumers quickly increase their consumption of cooking oil to add flavor, calories, and diversity to their diets. When incomes climb still further, poultry and other meat sources are added to the diet, contributing to the demand for oilseed meals. (A detailed description of demand prospects is given in later sections.) Figures 3a and 3b illustrate the growth in the consumption of oilseed products in developing countries. In 1970, Japan, Western Europe, Canada, and the United States consumed nearly one half the world's supply of fats and oils; those same countries currently consume slightly more than one third. A similar trend has begun among the oil meals. As late as 1980, Japan, Western Europe, Canada, and the United States consumed nearly two thirds of all oilseed meals (Figure 4). By 1990, that share had dropped to 55% of total supplies. Interestingly, the consumption of oilseed products has grown most rapidly outside of major producing areas, stimulating international trade in these products.

Figure 3a: Consumption of major fats and oils for selected regions, 1970

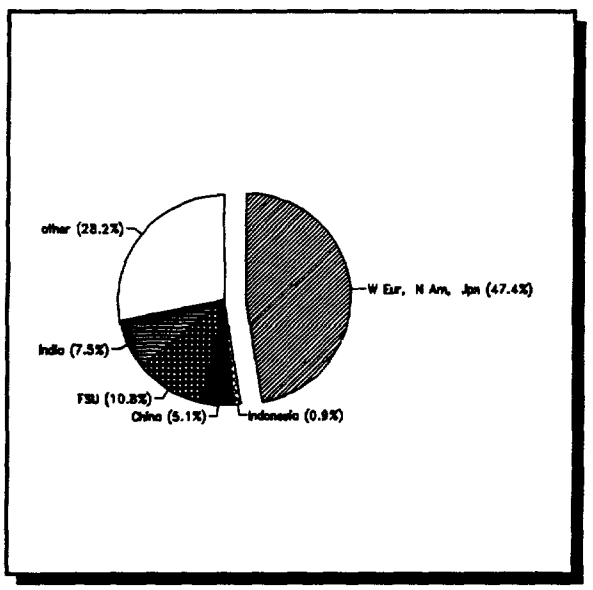
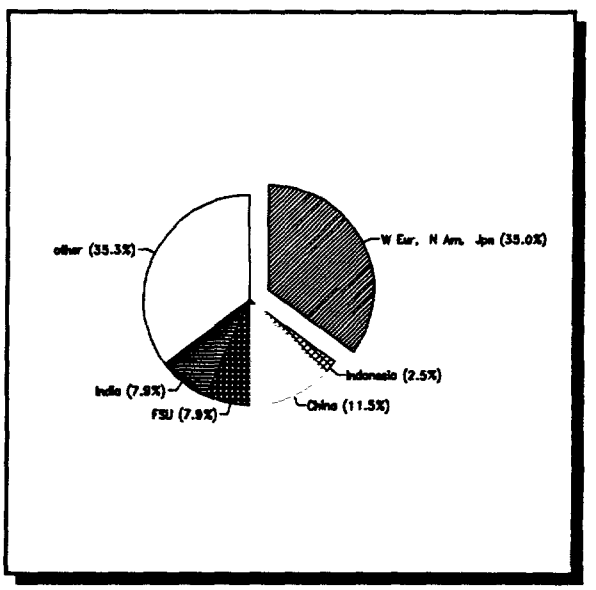


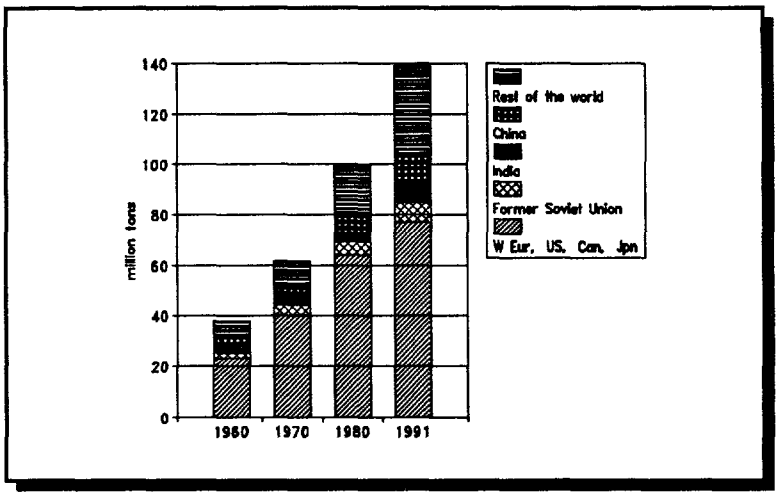
Figure 3b: Consumption of major fats and oils for selected regions, 1991



Source: Oil World.

Prices are, on average, highly correlated. While each vegetable oil and meal has unique characteristics that allow for quite specialized market niches, almost all vegetable meals can be used as a protein source for animal feed, and almost all vegetable oil can be used as a cooking oil. The demand for livestock feed is based on its nutritional basis, not its oilseed origin; and all vegetable oils can be chemically separated into more basic components and recombined to produce products that are practically indistinguishable to the final consumer. This does not mean that all oils and meals can be lumped together without regard to individual market characteristics; however, the large range of technical and economic substitutability does result in a high correlation among prices despite quite disparate supply characteristics. Tables 1 and 2 present the correlations calculated from 22 years of annual prices for vegetable oils and meals respectively. The extremely high correlation between soybean, rapeseed, and sunflowerseed oil prices demonstrates the degree to which substitutability on the demand side binds price

Figure 4: Consumption of major oilseed meals for selected regions, 1960-91



Source: Oil World.

movements across the three oils despite differences in supply conditions. Even the price of groundnut oil, which has special taste and cooking characteristics, remains highly correlated with other oil prices. The lauric oils (coconut and palm kernel oil), which have special industrial uses in detergents, are themselves highly correlated, although they are slightly less correlated with the nonlaurics. Interestingly, palm kernel oil prices are more highly correlated with coconut oil prices than with palm oil prices despite being derived from the same palm fruit, demonstrating once more the way in which demand substitutability links the various oil markets.

While vegetable oil and vegetable meal prices tend to be highly correlated on average, relative prices can change in rapid and extreme ways. For example, between May 1991 and May 1992 groundnut oil prices dropped by $287/ton (about 31%), while coconut oil prices jumped by $305/ton (91%). While such large changes in relative prices are rare, they are not unique. For example, in 1975 the 25% premium that coconut oil traditionally commanded over soybean oil fell to a 36% discount. And between 1986 and 1987, the 25% discount on palm oil against soybean oil swung to a 3% premium.

Table 1: Simple Correlation Among Selected Vegetable Oil Prices, 1970-91

Oil:	Soybean	Palm	Rapseed	Coconut	Groundnut	Palm kernel	Sunflower
Soybean	1.000	0.918	0.994	0.894	0.819	0.890	0.969
Palm		1.000	0.943	0.908	0.744	0.938	0.888
Rapeseed			1.000	0.858	0.833	0.899	0.961
Coconut				1.000	0.596	0.988	0.788
Groundnut					1.000	0.653	0.814
Palm kernel						1.000	0.847
Sunflower							1.000

Source: World Bank, International Economics Department.

Prices are extremely volatile, and volatility will diminish only slightly as production diversifies. A salient feature of the vegetable oil market is its remarkable price volatility, extraordinary even by the capricious standards of primary commodity markets. Groundnut oil sold for over $1,000/ton during 1974, 1978, 1981, 1984 and 1991, and for less than $600/ton in 1982, 1983, 1986, and 1987. Coconut oil averaged $464/ton in 1982, $1,115/ton in 1984, $590/ton in 1985, and $297/ton in 1986. Palm oil, soybean oil, and other vegetable oils have experienced similar swings, introducing considerable price risk for both producers and consumers. Table 3 provides two measures of price variation for a large number of primary commodities: a standard deviation from trend, and a more formal instability index. The commodities are listed in order of their instability index. Monthly average prices from January 1979 to February 1992 were used to calculate the measures. As indicated by the table, vegetable oil prices were particularly volatile, even when compared with coffee or petroleum.

In the past, a significant proportion of the price variability has come from the disproportionate share of production centered in the US corn belt. Weather and policy shocks radiate from changes in the US soybean crop and US government stockpiles into world markets. However, the emergence of significant production available for export from Argentina, Brazil, Indonesia, and Malaysia has reduced the dependence of world production on a single weather system and helped to reduce the seasonal component of production and price swings. At the same time, the joint-production nature of vegetable oils and meals, together with the growing share of palm oil, will ensure a continued high level of volatility for the following reasons. Farmers growing annual oilseed crops can respond at the beginning of each growing season. To the extent that the prices farmers receive reflect international prices, the two-hemisphere production of oilseeds allows the market to adjust roughly every six months. However, the price to which farmers respond is, effectively, a weighted average of meal and oil prices. Oilseeds are generally not consumed directly but are crushed to produce oil and meal. The crusher normally extracts a small portion of the value of the oil and meal and remits the remainder to the oilseed producers. Therefore, different combinations of meal and oil prices can result in the same product value for the underlying seed. Since the demand for feed is driven by the livestock population, while vegetable oil is mostly used as food, market conditions can be quite different in the two markets--leading to atypical market results. For example, as vegetable oil prices drop, oilseed crushing, and therefore the supply of vegetable oil, need not fall significantly *if* meal prices happen to rise slightly to compensate. For soybeans, a $22/ton increase in the price of meal will, on average, compensate for a $100/ton drop in the price of soybean oil, leaving the price of soybeans--the price to which the farmer responds--unchanged. An example of this occurred during 1983 and 1984 when international prices for soybean

Table 2: Simple Correlation Among Selected Vegetable Meal Prices, 1965-89

Meal:	Soybean	Rapeseed	Groundnut	Sunflower	Copra
Soybean	1.000	0.878	0.963	0.863	0.800
Rapeseed		1.000	0.910	0.935	0.931
Groundnut			1.000	0.917	0.816
Sunflowerseed				1.000	0.839
Copra					1.000

Source: World Bank, International Economics Department.

Table 3: Primary Commodity Price Instability, 1979-92[1]

Commodity	Instability index	standard % deviation from trend
Tobacco	0.45	4.93
Bauxite	0.68	6.83
Beef	0.78	7.70
Iron	0.85	9.31
Phosphate	1.08	11.68
Wheat	1.14	11.64
Soybean	1.18	11.28
Rubber	1.24	12.35
Sorghum	1.29	12.86
Cocoa	1.30	13.71
Maize	1.32	13.14
Soybean meal	1.34	12.20
Tin	1.35	12.81
Cotton	1.38	13.96
Oranges	1.49	14.77
Wool	1.50	15.27
Logs	1.50	14.41
Bananas	1.51	14.85
Soybean oil	1.69	16.66
Zinc	1.76	17.03
Coffee	1.80	16.96
Tea	1.87	15.44
Rice	1.90	19.70
Palm oil	2.01	19.20
Copper	2.01	20.99
Petroleum	2.06	20.61
Groundnut oil	2.11	23.13
Aluminum	2.12	20.40
Lead	2.64	27.08
Jute	2.65	19.50
Copra	2.72	27.91
Groundnut meal	2.72	41.54
Coconut oil	2.94	29.13
Nickel	3.17	31.48
Sugar	4.41	43.54

Source: World Bank, International Economics Department.

[1] The instability index is given by $\frac{100}{(n-2)} \left\{\sum\left[(x_t - x_t^*)/x_t^*\right]^2\right\}^{\frac{1}{2}}$, where n is the number of observations and x^* is the trend-forecasted value of x.

oil rose by nearly $200/ton (See Table 4). Nonetheless, the sharp price increase did not signal farmers to plant more soybeans because a simultaneous drop in meal prices offset oil-product gains.

While farmers can readily choose among annual crops at each growing season, oil palm and coconut trees are planted with long-term prices in mind. The trees take years to reach a fruit-bearing stage, may take a decade to fully mature, and may produce fruit for 50 years or more. In addition, for modern palm oil plantations, the majority of the costs of producing vegetable oil from tree crops are fixed and unavoidable. In addition to the fixed cost of clearing the land and planting the trees, expensive processing plants are built near the plantation, since the oil contained in the picked fruit quickly becomes rancid. Since most of the processing plants are fueled by waste products, the variable, or avoidable costs of palm oil production are quite low. In addition, only an insignificant amount of meal is recovered by crushing the small kernel of the modern oil palm fruit, so that the revenues of the oil palm plantation are almost exclusively determined by the prices of vegetable oils. Hence, while annual oilseed producers can respond relatively quickly to prices--but look to an average of oil and meal prices in making their planting decisions--tree-crop producers, while highly dependent upon vegetable oil prices, are unable to adjust production in response to those prices.

These combinations of physical characteristics--the joint production of meals and oils from annual oilseed crops and the fixed nature of perennial vegetable oils--are a key cause of the wild gyrations in vegetable oil prices. The price instability has a number of ramifications. Investment analysts must be aware of the potentially large revenue swings throughout the life of the project. In development projects involving mono-cropping, smallholders remain especially vulnerable, as farmers near subsistence levels are least likely to possess the resources needed to weather lean years. Likewise, countries that depend heavily on vegetable oils to generate export revenue, such as the Philippines and Senegal, face reat uncertainty in regard to income and debt management. Tools and strategies of risk management--sensitivity analysis, hedging, and diversification--are vitally important to the investment analyst and investor.

Characteristics of demand for fats and oils. The demand for fats and oils is determined by a variety of factors, including income, population, relative prices, cultural preferences; however, there is an archetypical pattern of demand development which is tied to economic development and which transcends national boundaries. This pattern is illustrated in Table 5. At very low levels of daily caloric intake, when per capita calorie supplies are around 2,000 calories per day, the share of the diet derived

Table 4: An Example of Off-setting Movements in Oil and Meal Prices

	Average Price	
Commodity	1983	1984
	(US$/ton)	
Soybeans	282	282
Soybean oil	527	724
Palm oil	451	729
Soybean meal	238	197

Table 5: Daily Per Capita Calories by Foodtype for Selected Countries, 1969-89

Country	Commodity	1969	1979	1989	1969	1979	1989
		(Total)			(%)		
Bangladesh	Total	1,984.00	1,962.00	2,021.00	1.000	1.000	1.000
	Cereals	1,550.00	1,615.00	1,711.00	0.781	0.823	0.847
	Roots & Tubers	47.93	38.14	26.31	0.024	0.019	0.013
	Pulses	45.59	69.38	39.83	0.023	0.035	0.020
	Meat	18.49	18.62	15.69	0.009	0.009	0.008
	Vegetable fats & oils	46.51	47.63	81.90	0.023	0.024	0.041
	Animal fats & oils	7.03	7.71	4.88	0.004	0.004	0.002
China	Total	1,930.00	2,275.00	2,639.00	1.000	1.000	1.000
	Cereals	1,287.00	1,606.00	1,854.00	0.667	0.706	0.703
	Roots & Tubers	303.90	259.10	148.90	0.157	0.114	0.056
	Pulses	51.16	46.78	23.25	0.027	0.021	0.009
	Meat	78.96	113.90	212.80	0.041	0.050	0.081
	Vegetable fats & oils	37.53	53.96	116.90	0.019	0.024	0.044
	Animal fats & oils	9.98	14.60	18.68	0.005	0.006	0.007
India	Total	1,988.00	2,111.00	2,229.00	1.000	1.000	1.000
	Cereals	1,308.00	1,381.00	1,416.00	0.658	0.654	0.635
	Roots & Tubers	38.15	44.66	38.98	0.019	0.021	0.017
	Pulses	149.30	131.80	134.10	0.075	0.062	0.060
	Meat	9.10	9.90	11.58	0.005	0.005	0.005
	Vegetable fats & oils	98.92	123.70	148.20	0.050	0.059	0.066
	Animal fats & oils	21.14	23.46	24.99	0.011	0.011	0.011
Indonesia	Total	1,909.00	2,323.00	2,750.00	1.000	1.000	1.000
	Cereals	1,264.00	1,574.00	1,958.00	0.662	0.678	0.712
	Roots & Tubers	261.60	191.80	178.90	0.137	0.083	0.065
	Pulses	18.86	23.39	18.79	0.010	0.010	0.007
	Meat	20.93	21.49	35.98	0.011	0.009	0.013
	Vegetable fats & oils	50.16	89.72	113.90	0.026	0.039	0.041
	Animal fats & oils	2.19	3.60	3.81	0.001	0.002	0.001
Pakistan	Total	1,859.00	2,222.00	2,219.00	1.000	1.000	1.000
	Cereals	1,133.00	1,398.00	1,339.00	0.609	0.629	0.603
	Roots & Tubers	5.86	7.15	8.42	0.003	0.003	0.004
	Pulses	75.46	62.40	52.97	0.041	0.028	0.024
	Meat	38.66	44.80	54.44	0.021	0.020	0.025
	Vegetable fats & oils	59.98	151.20	218.20	0.032	0.068	0.098
	Animal fats & oils	56.95	57.18	60.56	0.031	0.026	0.027
Thailand	Total	2,209.00	2,292.00	2,316.00	1.000	1.000	1.000
	Cereals	1,555.00	1,474.00	1,359.00	0.704	0.643	0.587
	Roots & Tubers	60.35	46.41	27.89	0.027	0.020	0.012
	Pulses	22.48	13.52	52.66	0.010	0.006	0.023
	Meat	94.12	107.90	116.70	0.043	0.047	0.050
	Vegetable fats & oils	33.56	41.21	110.60	0.015	0.018	0.048
	Animal fats & oils	14.76	12.24	13.36	0.007	0.005	0.006
United States	Total	3,379.00	3,498.00	3,671.00	1.000	1.000	1.000
	Cereals	629.20	641.30	729.70	0.186	0.183	0.199
	Roots & Tubers	95.30	93.59	95.86	0.028	0.027	0.026
	Pulses	34.98	29.37	22.47	0.010	0.008	0.006
	Meat	663.70	679.50	691.10	0.196	0.194	0.188
	Vegetable fats & oils	389.30	481.00	519.40	0.115	0.138	0.141
	Animal fats & oils	154.10	114.40	105.40	0.046	0.033	0.029

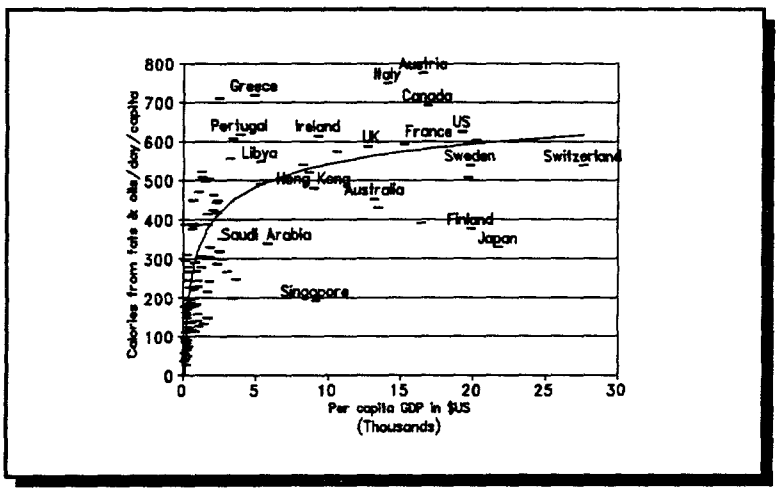
Source: FAO.

from cooking oils is extremely low. For example, in Bangladesh in 1979 over 87% of daily calories came from cereals, roots, tubers or pulses. Rice was boiled and fats and oils composed less than 3% of the diet. As food becomes more affordable through income growth or price declines, vegetable oils consumption grows rapidly. Though still a small part of its diet, the relative share can grow rapidly. Continuing the example of Bangladesh, between 1979 and 1989, while average per capita caloric supplies grew by only about 60 calories per day, calories derived from vegetable oils grew by about 34 calories. Over the range of 2,000 to 3,000 calories per day, vegetable oil demand grows rapidly and meat is added to the diet. As calorie levels grow further, total fat consumption stagnates, with changes coming in composition of fats rather than levels. For example, growth in vegetable fats and oils in the United States between 1969 and 1989 came primarily at the expense of animal fats.

When calories per capita derived from fats and oils are below 300/day, very small income increases can trigger very large increases in daily intake. This is illustrated in Figure 5a, which maps per capita fats and oils supplies against per capita income. The solid line in the graph represents a population-weighted regression line explaining average caloric intake levels as a function of income. Generally, in all countries clustered around the lower left corner of the graph (see Figure 5b for clearer comparison), a 1% increase in income will generate a greater than 1% increase in demand for fats and oils. The overwhelming majority of the world's population is found in these countries. Particularly interesting is the difference between Pakistan and India which have followed very different policies with regard to vegetable oil imports.

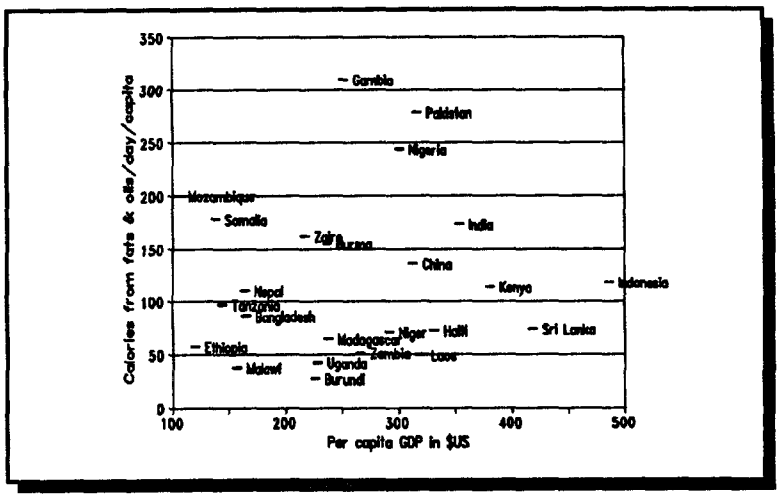
Table 6 gives the average per capita apparent consumption of 17 major fats and oils for selected countries and regions, and illustrates the potential for demand gains in the world's populous countries. China, India, Indonesia, Bangladesh, Nigeria, the Philippines, and Thailand all consume below-average levels of fats and oils for their per capita incomes. China, India, Indonesia, and Thailand have experienced rapid income growth in recent years, growth which is projected to continue over the next decade. The same is true for Pakistan. The potential for consumption growth in this region is quite

Figure 5a: Income and fats and oils consumption: Cross-country comparisons for 1989



Source: FAO.

Figure 5b: Income and fats and oils consumption: Detail from cross-country comparison



Source: FAO.

important in world terms. By way of example, a 1 kg/capita increase in vegetable oil consumption in China and India would increase world consumption of vegetable oils by an amount equal to current US exports of soybean oil plus current exports of palm oil from Indonesia. Thus, the combined concentration of population and income growth in Asia will shift the mainspring of vegetable oil consumption demand growth away from the EC and North America.

Table 6: Population and Per Capita Consumption of Major Fats and Oils in Selected Countries for 1985 and 1991

Country	1991 population	Per capita consumption 1985	1991
	millions	(kg)	
China	1,150.0	6.3	8.2
India	871.3	7.2	7.4
EC-12	343.3	35.7	39.7
United States	251.1	38.9	42.3
Indonesia	187.8	8.6	10.7
Brazil	153.3	16.6	19.3
Japan	123.9	18.3	20.9
Pakistan	126.7	13.1	15.7
Bangladesh	118.8	3.3	4.6
Nigeria	112.1	6.9	9.3
Mexico	90.5	15.9	18.3
Philippines	63.9	6.2	6.1
Thailand	56.5	3.6	7.8
World	5,399.8	13.9	15.2

Source: Oil World.

Demand Prospects for Vegetable Oils

Demographic and income growth prospects indicate that the most rapid demand growth for vegetable oils will come from developing countries, particularly in Asia. Clearly, China and India have the greatest potential for demand growth; however, there are good reasons to expect demand growth in these countries, while significant, to remain substantially below its potential. As stated earlier, both countries follow policies that raise the price and greatly limit the availability of vegetable oils toconsumers. Without these restrictive policies, consumption levels would likely increase by more than 50% immediately. Per capita income levels in China and India are roughly equivalent to incomes in Pakistan where per capita fats and oils consumption is roughly double. However, the restrictions on consumption have a long history in each country, and a rapid departure from past policies is not envisaged.

Brazil, Indonesia, and the Philippines, countries that are large and fast-growing producers of vegetable oils, are also expected to grow rapidly as consumers. Brazil and the Philippines have population growth rates in excess of 2% p.a. While income growth prospects are more optimistic for Brazil and Indonesia than for the Philippines, the Philippine consumption level is comparatively low and possesses a large potential for improvement, even at close to current income levels. Encouraged by income growth, demand is expected to grow rapidly in Thailand as well.

Changes in the countries of Eastern Europe and the FSU from command to market economies will eventually favor demand for vegetable oils. Historically, aggregate consumption levels of fats and oils in Eastern Europe and the FSU have been comparable to consumption levels in the rest of Europe. However, consumers and producers in Eastern Europe and the FSU faced relative prices and supplies very different from the rest of Europe. The results are well illustrated by comparing the composition of consumption of fats and oils between formerly divided East and West Germany (see Figures 6a and 6b). While total per capita consumption levels were comparable between the two countries in 1985, animal fats accounted for over 63% of total fats and oils in East Germany compared with less than 36% in West Germany. Rapeseed oil, which was produced in East Germany, and sunflowerseed oil, a major FSU crop, dominated vegetable oils in East Germany while West Germany consumed a variety of vegetable oils, both imported and locally produced. Generally speaking, the countries of Eastern Europe consumed more animal fats than other countries in Europe. This is illustrated in Figure 7.

As markets are liberalized, changes in relative prices should favor an adjustment away from animal fats such as butter and lard toward vegetable oils such as soybean oil and palm oil. Eventually, this should lead to an overall increase in demand for vegetable oils in these countries. However, the early stages of liberalization have been characterized by a precipitous drop in purchasing power and severe limitations on credit. As a result, total demand levels are likely to drop as imports become unaffordable. Figure 8 illustrates the experience of Poland where demand has fallen significantly since 1988.

The demand for vegetable oils will continue to grow more rapidly than the demand for animal fats. A consistent worldwide trend over the past three decades has been the declining share of the fats and oils market taken by animal fats. In 1960, equal amounts of butter and soybean oil were produced worldwide. In 1991 soybean production exceeded butter production by a factor of 5 (see Figures 9a and 9b). Part of the change in composition comes from the increase in consumption in Asia where animal fats are less traditional components of the diet. However, in industrial countries, health

Figure 6a: Composition of fats & oils consumption in former West Germany (1985)

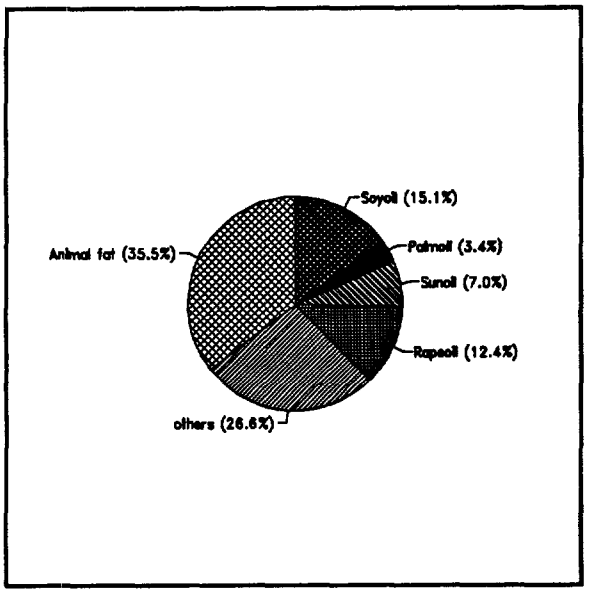


Figure 6b: Composition of fats & oils consumption in former East Germany (1985)

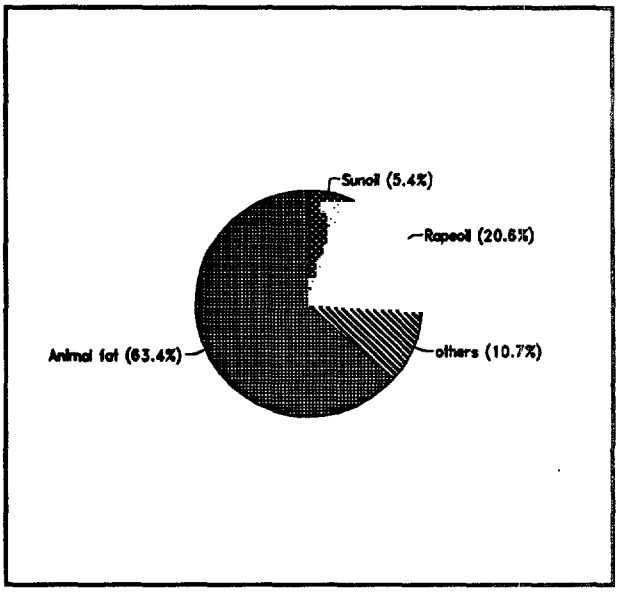


Figure 7: Per capita calories from fats and oils for selected European countries in 1985

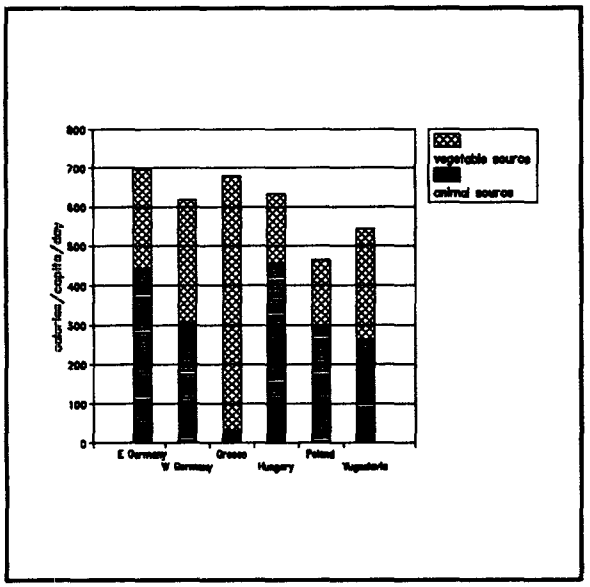
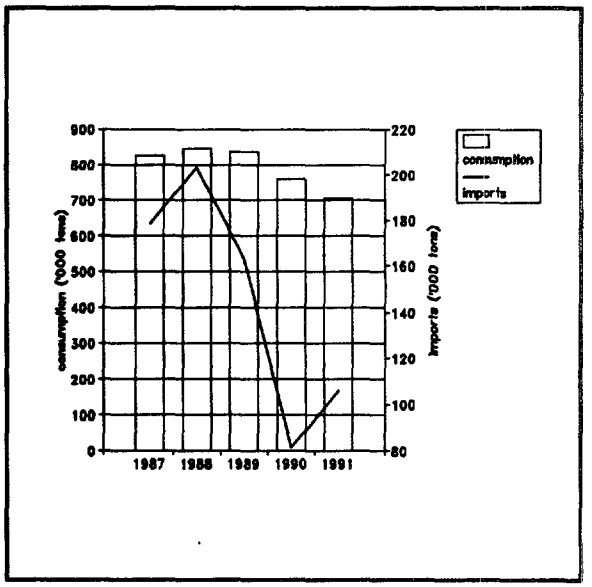


Figure 8: Vegetable oil consumption and imports for Poland, 1987-91



Source: Oil World.

concerns have reduced per capita consumption of butter, lard, and grease. Until recently, tallow, often used for frying in fast-food restaurants, had not experienced a similar decline. For example, from 1958 to 1991, lard consumption in the United States dropped from 850 tons to 362 tons despite a population increase of about 77 million consumers. During the same period tallow consumption roughly doubled from 958 tons to 1,990 tons. Even so, in the United States there is now anecdotal evidence in recent years to suggest that major fast-food chains are replacing tallow with vegetable oils--again in response

Figure 9a: Worldwide fats and oils production 1960 (million tons)

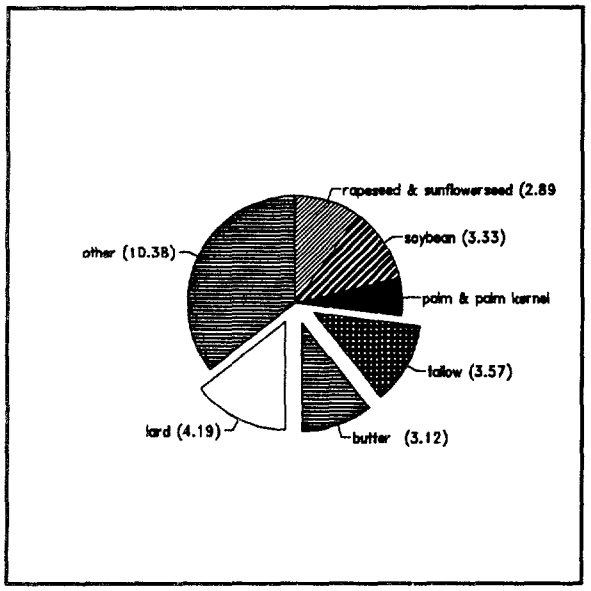
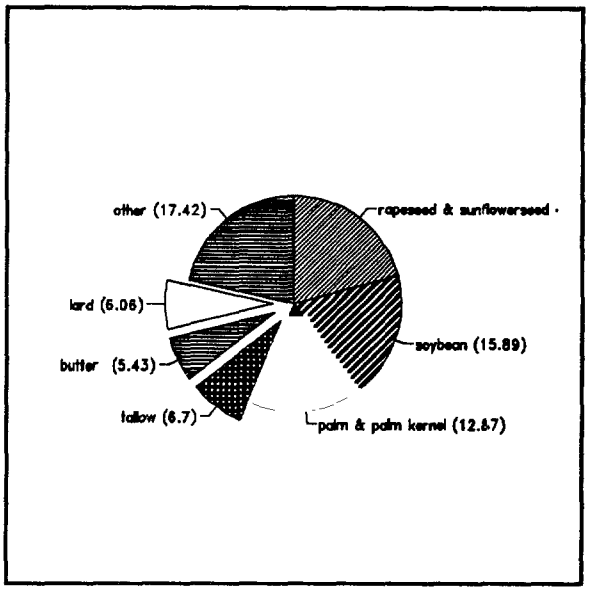


Figure 9b: Worldwide fats and oils production 1991 (million tons)



Source: Oil World.

to consumer health concerns. The changes in Eastern Europe and the FSU will eventually reinforce the on-going process of displacing animal fats with vegetable oils.

DEMAND FORECASTS FOR VEGETABLE OILS. After remaining stagnant from 1980 to 1986, worldwide soybean oil consumption grew rapidly up to the end of the decade. The slowing down of the world economy has reduced growth and consumption has lingered around 18-19 billion tons in recent years. While forecast to grow less rapidly than lower-cost palm oil, soybean oil consumption is projected to expand at 2.6% p.a. through 2005 to about 26.5 billion tons. Consumption is expected to grow quite slowly at 1% annually in Europe and North America. Only the high-income countries of Asia are expected to experience significant growth. Consumption elsewhere is expected to exceed population growth rates and in LMICs is expected to exceed high-income country consumption by the close of the century. Asia and Latin America are expected to experience growth rates in excess of 3% p.a. while demand in Asia is expected to grow at around 4% p.a. through 2005. After experiencing a downturn in consumption, Eastern Europe is expected to grow rapidly--albeit from a low base--expanding by about 4.5% p.a. from 1991 to 2005.

Competitively priced, with production centers well located geographically, palm oil is expected to experience the most rapid consumption growth of the major vegetable oils. Worldwide, consumption is expected grow at slightly better than 4% p.a. from 1991 to 2005. Demand growth should be vigorous in all parts of the world; however, nearly one half of all palm oil consumption is expected to take place in Asia.

Although industrial demand exists for most oils, it is particularly important in the case of the lauric oils--palm kernel oil and coconut oil. Historically, nonedible uses of coconut oil have accounted for about 50% of total lauric oil consumption in the United States and Western Europe. Most

of the lauric oil for industrial use finds its way into soap or detergent manufacturing, either directly or indirectly after the lauric oil has been converted into fatty acids and fatty alcohols. In the early 1960s, a portion of the industrial market was lost to petroleum-based synthetics, but market shares have since stabilized. Coconut oil has traditionally dominated this segment of the vegetable oil market and will continue to do so over the projection period. However, palm kernel oil will supply an expanding share of the market. For industrial countries, growth in this market will be steady but slow, expanding primarily with population gains. Worldwide, most gains will come from urbanization and population growth in the developing countries. Gains in food use will be limited because of health concerns in the United States and other high-income countries. Demand in China, India, and Indonesia is expected to grow with domestic production, most significantly in the case of Indonesia.

Demand Prospects for Vegetable Meals

The demand for vegetable meals will grow most rapidly in Asia. Growth in the demand for vegetable meals will come mainly through income growth and the attendant growth in the demand for poultry and red meat in Asia. Eventually, more efficient feeding practices should stimulate demand in the FSU and Eastern Europe as those economies begin to price domestic resources at world levels. In South America--and, to a lesser extent, parts of Africa--the availability of grazing land allows livestock numbers to grow without necessitating a corresponding growth in feed demand (see Table 7). However, in populous areas of Asia, particularly India, grazing land is limited, and feeding rates are higher than in Europe and North America. As incomes grow and the demand for poultry and other livestock products increases in these populous areas, the demand for meals will expand quite rapidly. Figure 10 illustrates the indirect effects of income growth on meal consumption for several countries in Asia.

Changes in pricing policies in Eastern Europe and the FSU are eventually expected to stimulate the demand for meals, for soybean and rapeseed meals in particular. In the past, inappropriate domestic pricing policies and limited supplies resulted in inefficient feed practices. With economic planners reluctant to import soybean meal, feed compounds in those countries have contained a less-than-optimal protein component. In recent years, foreign exchange and credit limitations have dampened the ability of these countries to import meals. Lines of credit extended by the United States and the EC to the FSU have softened the effects of adjustment on the feed industry. So far, the adjustment experience of the FSU has been less severe than in Poland (see Figure 11).

Pricing policies in China have also contributed to inefficient practices in which livestock are fed wheat and rice rather than protein meals. From 1958 to 1962, meal usage rates in China were substantially higher than subsequently, averaging 872 kg/ton of livestock compared to 362 kg/ton in 1992. A move to price resources at international market levels would result in large increases in feed demand. However, policy reforms in China appear more slowly paced than those in Eastern Europe, and only marginal increases in feed demand are expected over the projection period.

DEMAND FORECASTS FOR VEGETABLE MEALS. Demand for soybean meal is expected to grow slowly but consistently among the high-income countries. In the United States consumption is expected to reach almost 58 million tons by 2005, growing at slightly under 2% p.a. Demand is expected to grow more slowly in Western Europe and rapidly in Japan so that total consumption by high-income countries is expected to reach about 62.6 million tons by 2005. Demand is expected to grow rapidly in

Figure 10: Oilseed meal consumption in selected Asian countries for 1982 and 1992

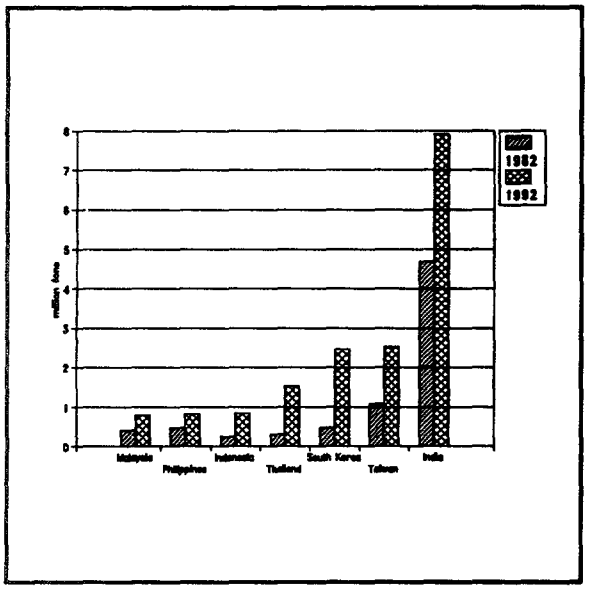
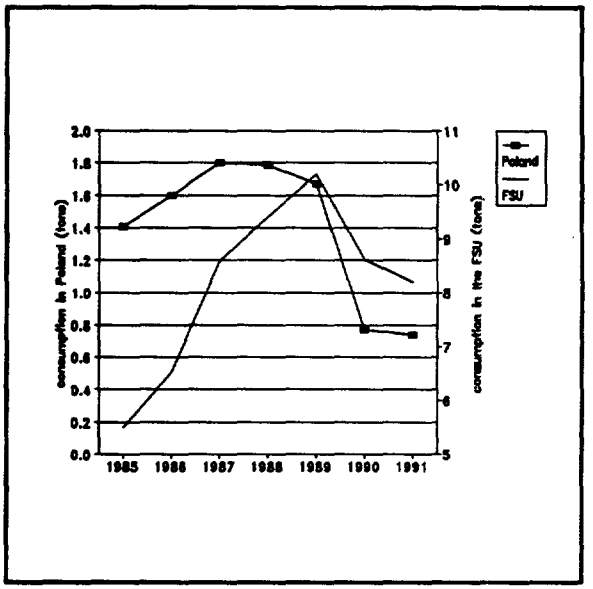


Figure 11: Oilseed meal consumption Poland and the FSI



Source: Oil World

the LMICs. In Latin America, feed consumption is expected to reach about 12.8 million tons by 2005. The most rapid increases in feed consumption are expected to occur in Asia, where soybean meal demand is expected to grow by more than 10 million tons between 1992 and 2005. Consumption growth rates are also expected to be high in Eastern Europe; however, the high rate of growth (around 5% p.a.) will be from levels reduced by structural adjustments currently under way.

Table 7: Average Meal Use, Kilograms of Soybean Meal Equivalents Per Ton of Livestock, 1973-77 to 1983-87

Country/Region	1973-77	1983-87
Argentina	87	100
Brazil	242	392
China	462	446
EC	458	639
India	1,047	1,102
Japan	880	905
United States	470	543
FSU	174	194
World	375	459

Source: Oil World.

Supply Prospects for Oilseeds

Production gains will come primarily from developing countries. Many developing countries, especially Argentina, Brazil, Indonesia, and Malaysia, appear to have a comparative advantage in producing vegetable oils and meals. Cost of production studies indicate that continued expansion is still profitable for efficient operations and several countries will continue to expand production, despite falling real prices. Yield improvements are likely for soybeans in Argentina and Brazil, and for oil palm in Indonesia and Malaysia. In addition, Argentina, Brazil, and Indonesia have land available for production expansion. Production gains through area expansion are likely in China as well, where current harvested area remains below levels in the late 1950s. Slow increases in production are projected for the United States in soybeans and for the EC in rapeseed and sunflowerseed. Limited land availability, along with income-support policies that also limit planted area, are likely to restrict production gains in both of these areas to improvements in yields.

Biotechnology provides a potential for continued gains in productivity beyond the projection period. In 1971, Cohen and Boyer developed the techniques for recombinant DNA technology which allows the transfer of genetic material from one organism to another. In 1976, the first biotechnology firm was established. By 1982, the first biologically engineered products reached markets in Europe and the United States. In 1985 the United States extended patent protection to genetically engineered plants and recent years have seen a number of patents awarded for biologically engineered plants and organisms or products. A recent paper published by the World Bank entitled *Agricultural Biotechnology, the Next Green Revolution*? reviews potential applications of biotechnology and makes an attempt to forecast the time horizon for applications of such technology to existing problems in agriculture. Oilseeds will eventually benefit from research already begun, but few meaningful applications are anticipated within the next five years. The applications which seem to have the shortest lead time involve the use of new techniques for diagnostics which use monoclonal antibodies or nucleic acid probes to test for pests or plant diseases. Such tests are anticipated for rapeseed within the next five years as is a diagnostic for viral diseases in coconuts; however, similar tests for palm oil are likely to occur much later, perhaps more then ten years into the future. Similarly, genetically engineered strains of palm oil which slow fruit spoilage or change the fatty-acid composition of the oil remain distant prospects. Clonal reproduction in palm oil has been attempted in recent years but has not proved successful. However, current research offers a potential solution through novel tissue culture methods.

The distant time between current research and future applications does not mean that technological gains will be suspended for the next ten years. Existing techniques have not been fully applied, or remain economically suboptimal because of relative prices. However, biotechnology provides a new set of tools for solving problems which are currently well understood and thus increases the potential of existing agricultural resources.

SUPPLY FORECASTS FOR OILSEEDS. ***Palm oil continues fast growth.*** A "baby-boom" is well underway in Southeast Asian palm oil production. Malaysian palm oil production doubled over the period 1962 to 1967. It doubled again by 1970, by 1973, by 1977, by 1982, and by 1989. It is expected to approach 11 millon tons by 2005. By that time, production from Indonesia is expected to exceed 7 million tons.

Because of already completed plantings, Indonesia and Malaysia are locked onto a path of rapid expansion through the close of the century. Figure 12 shows that this historically aggressive expansion of area into oil palm has not slowed in Malaysia, and is expanding more rapidly in Indonesia.

It should be emphasized that the impact of the most recent plantings will not be realized until the end of the decade. For a well-managed estate in Malaysia, the amount of oil that can be produced from a hectare of land climbs quickly from 1.4 tons four years after planting to 5.1 tons in the tenth year. Yields then decline very slowly over the life of the tree. Therefore trees planted in 1992 will not fully mature until early in the 21st century.

Slow down in soybean production. Soybean production in the United States is expected to grow slowly over the projection period--at about 1.9% p.a. Soybean area grew rapidly in the United States during the 1970s, peaked in 1983, and has declined slowly since. Area gains in Latin America have more than compensated, however; the soybean area in Brazil rose from 1.3 million ha in 1970 to nearly 15 million ha in 1989. Argentina harvested 360,000 ha in 1970 and nearly 9 million ha in 1990.

Planted area is expected to remain stagnant in North America, so that supplies will grow only from yield increases. Despite low to stagnant prices, low production costs will continue to make soybeans profitable in much of Latin America where production is expected to grow at slightly less than 4% p.a. during the projection period.

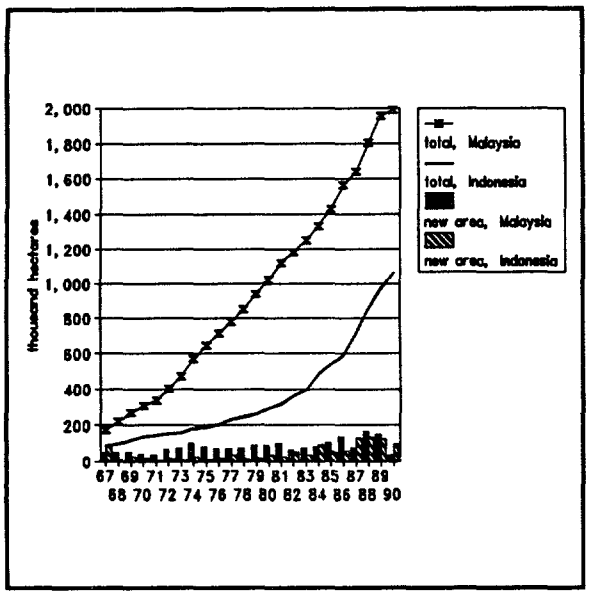
A great deal of uncertainty about government policies continues to make projections concerning China difficult. In 1958, about 10 million tons of soybeans were produced in China. During the Cultural Revolution, production dropped to a low of 6.2 million tons and remained below the 1958 level for nearly 30 years (see Figure 13). Yields remain low by international standards. For the projection period, production is expected to expand at about 3% p.a. in China. This rate is rapid by recent standards in China; however, the potential exists for even more rapid growth under alternative policies.

Coconut oil production stagnates. Over the past decade, palm kernel oil has gained an increased share of the lauric oil market at the expense of coconut oil. Supplies of copra have remained either stagnant or in decline in India, Malaysia, Papua New Guinea, the Philippines, and Sri Lanka. Area gains have come almost exclusively from smallholders in Indonesia. For the projection period, production in the Philippines, which historically has accounted for 40-50% of world output, is expected to decline from 1991 levels to less than 1.6 million tons in 2005. Production is expected to grow slightly in Indonesia so that world production will remain fairly close to 1991 levels.

Price Forecasts

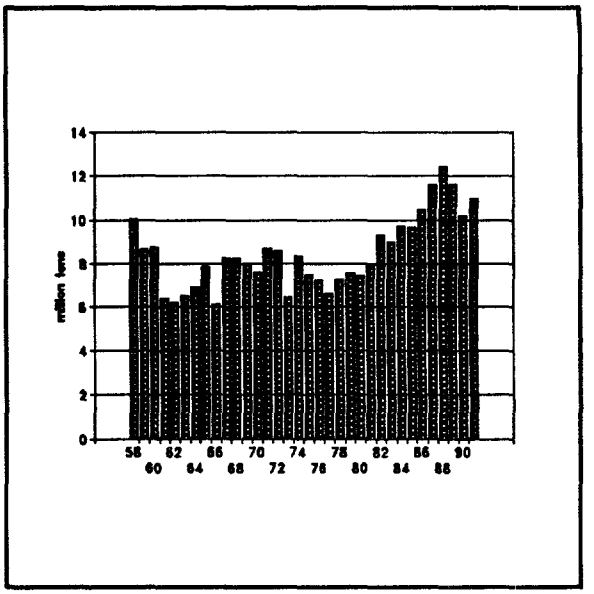
Oilseed prices should generally remain flat or trend downward following 1993. Following the generally depressed prices of 1990, vegetable oils and meals posted small gains in 1991 which are expected to continue in 1992 and 1993. The market for groundnut oil, which experienced a price rally in 1990, is the notable exception. A cyclical downturn in palm oil yields in Malaysia and Indonesia, which helped to deplete stocks and firm prices in 1991 and 1992 will reverse in the fourth quarter of 1992 and in 1993. Increasing yields, combined with new trees coming into production in Malaysia and Indonesia, should restore inventory levels and real prices are expected to average lower in 1994.

Figure 12: Area under oil palm, 1967-90



Source: Oil World, World Bank.

Figure 13: Soybean production in China 1958-91



Source: Oil World.

Drought conditions in major coconut-growing areas in 1991 which reduced early 1992 supplies will have a limited effect and coconut prices are expected to continue to fall through the second half of 1992 and in 1993 as yields recover. Despite the low investment in new coconut trees outside Indonesia, the effects of limited supplies from new areas are expected to be offset by increasing supplies of palm kernel oil due to the recovering fruit-bunch yield gains in Malaysia and Indonesia.

Table 8: Price Forecasts for Selected Oilseeds and Oilseed Products in Constant (1990) $/ton

	Palm Oil	Coconut Oil	Soybeans	Soybean Meal
		------(historic)------		
1980	811	937	411	364
1985	730	860	327	229
1990	290	337	247	209
1991	332	424	235	195
		------(projected)-------		
1992	371	554	221	195
1993	380	498	224	199
1994	353	509	233	204
1995	343	535	233	208
2000	303	564	219	185
2005	267	458	233	210

Source: World Bank, International Economics Department.

Following a severe drought in North America in 1988, soybean prices have declined steadily in real terms through 1992. During that period inventory levels have recovered, although the pace of the adjustment was slowed by a drop in Brazilian production in 1991. With normal production levels expected from Argentina, Brazil, and the United States in 1992, prices are expected to stabilized and remain so through 1995.

With recent substantial harvests in the United States and India, groundnut oil prices are expected to continue their retreat from 1990 highs. Down from the weather-induced peak levels, groundnut oil prices are expected to remain, in real terms, close to 1988 levels. Nonetheless, groundnut oil remains the least traded of the major vegetable oils and volatility in price should be expected.

For the longer term, vegetable oil prices are expected to remain flat to downward trending despite vigorous growth in demand. New investments in oilseed production have continued at a rapid pace, even with downward-trending real prices. Recent investment behavior and cost of production studies both indicate that production is expected to remain profitable in several countries, especially Argentina, Brazil, Indonesia, and Malaysia. Existing technology applications are expected to further increase yields, especially in palm oil, reducing costs even more. Palm oil is projected to remain the least expensive of the vegetable oils. Prices below $300/ton (constant 1990 US dollars) are forecast for the years beyond 2000. Coconut oil prices are expected to decline as well despite stagnant supplies because of abundant new supplies of palm kernel oil. Because little meal is produced by the oil palm fruit, the rapid expansion of oil palm will have a limited effect on the market for high protein meals such as soybean and groundnut meal. At the same time, projected demand growth is robust and meal prices are expected to remain fairly constant.

Policy and Trade

The 1990 US Farm Bill has had little effect on US oilseed production. Since 1965, US farm policy has operated under multi-year omnibus legislation known loosely as the Farm Bill. In 1990, the Food Security Act of 1985 was replaced with the Food, Agriculture, Conservation and Trade Act of 1990. The legislation was more of an amendment than a radical revision of earlier legislation. Designed to increase farmer planting flexibility, to lessen the government's ownership of commodity stocks, and to lower nominal support levels for a variety of agricultural products, the legislation has, to this point, had little effect on oilseed production in the United States--partly due to the level of oilseed prices.

The United States produces roughly 50% of the world's soybean output so that provisions of the bill affecting US soybean production are reflected in global prices for vegetable meals and, to a lesser extent, oils. With regard to soybeans, the primary tool of US policy is a program that guarantees participants an effective minimum price through a nonrecourse loan. Participating farmers can receive a loan in the form of a minimum price or "loan rate" for a fixed period of time, with all or a portion of their crop used as collateral. Under the provisions of the new bill, farmers may choose to repay the loan, together with accumulated interest, or forfeit the crop to the Commodity Credit Corporation, or retain their crop and receive a loan deficiency payment equal to the difference between the loan rate and an established market price. Loan rates are generally calculated on a five-year moving average, with the high and low years excluded. The legislation brought a number of other oilseeds into the loan program for the first time. Eligible oilseeds include sunflowerseed, rapeseed, safflowerseed, flaxseed, mustard seed, and other oilseeds at the discretion of the Secretary of Agriculture. The loan rates are subject to Gram-Rudman spending cuts; in recent years, deficit-reduction measures have lowered the actual loan

rate to levels below the legislated rate. However, to this point, the provisions have gone untested. After falling from $4.77/bu in 1988 to $4.50/bu in 1990, the soybean loan rate has risen slightly in recent years but has remained below market prices, making the government's program unattractive to farmers and therefore having little effect on international markets.

Oddly enough, a major impact of US farm legislation on the oilseed market comes not from provisions specifically addressing soybean production, but rather indirectly via the corn program. Much of the most productive soybean acreage in the United States lies in the US Midwest, which is also the country's corn belt. Farmers have traditionally switched production between corn and soybeans based on relative expected prices and yields for the two crops. Under current proposals, the minimum corn "target price"[1] is fixed at 1990 levels of $2.75/bu for the life of the five-year bill. Using expected yields, many US farmers would therefore find soybean production more profitable than remaining in the corn program should soybean prices rise above $6.50/bu. Under past legislation, farmers have been reluctant to make the switch because of the way in which the area qualifying for target payments was determined. Corn program payments were based on a five-year moving average of acreage enrolled in the corn program. In return for price guarantees, farmers agreed to idle a portion of their acreage base while planting the rest to corn. If a farmer wanted to switch land from corn to soybean production, the land would first have to be withdrawn from the corn program, thereby reducing the acreage base for the current harvest--as well as for the ensuing four crop years.

Under the proposed legislation, bases for all program crops, plus historical oilseed plantings, will be included in a "15% triple base." In order to fashion a $13.6 billion savings in the bill, 15% of the historic base was deemed ineligible for government target payments. In compensation, farmers are allowed to plant any crop (including additional soybeans) on this land (called the Normal Flex Acreage). In addition, under certain conditions farmers can plant another 10% (called the Optional Flex Acreage) of the acreage base in other crops. In doing so, they give up the right to receive any deficiency payments that they might otherwise be eligible to receive, but can respond to short-term price increases without suffering a reduction in subsequent acreage base calculations. The provisions should make US soybean farmers more supply responsive should soybean prices move into the $7/bu range. However, like changes to the loan provisions, the "flex" provisions remain untested as prices have remained high enough to avoid government loans, but too low to trigger a switch in plantings.

The United States will continue to subsidize exports of vegetable oils under several programs. Under the current Farm Bill, US farm exports, including vegetable oils and meals, will continue to receive subsidies. The Export Enhancement Program (EEP) was funded with a *minimum* expenditure level legislated at $500 million per year. In addition, a similar market promotion program, called Targeted Export Assistance (TEA) under the 1985 Act but renamed the Market Promotion Program (MPP), was continued with funding of at least $200 million per year for promotional efforts by agricultural trade associations, state departments of agriculture, and private companies. P.L. 480 food aid programs continue at current levels, with a provision allowing donations for Title 1 countries. Spending on the credit guarantee and credit subsidy programs, the three-year Short-Term Export Credit Guarantee Program (GSM-102) and the three-ten-year Intermediate-Term Export Credit Guarantee Program (GSM-103), was increased to $5 billion a year and $500 million a year, respectively. Under the proposals, an additional $1 billion annually was set aside for "emerging democracies." A $50

[1] If corn prices drop below the "target price," program participants receive payments compensating them for the difference.

million-a-year fund was also established for the sole purpose of subsidizing cottonseed and sunflowerseed oil exports under the Sunflower Oil Assistance Program (SOAP) and the Cottonseed Oil Assistance Program (COAP).

During 1991, the United States spent about $33 million directly subsidizing vegetable oil exports under the three programs. The subsidies backed the export of over 400,000 tons of vegetable oil (see Table 9). The export subsidy programs were originally intended to counter what the United States deemed unfair trading practices, primarily EC cereal exports subsidized under the EC's Common Agricultural Policy (CAP). The EC is a net importer of vegetable oil but traditional EC trading partners, primarily in North Africa, were targeted for vegetable oil subsides in the early years of the US program.

In recent years the programs have expanded to encompass other goals, most importantly, transitional subsidies to emerging democracies. Since 1990, the list of countries receiving subsidized vegetable oils under the three programs has expanded to include El Salvador, the FSU, Mexico, and Venezuela.

While EEP, SOAP, and COAP are perhaps the most visible subsidies for US vegetable oil exports, the bulk of the subsidies continue to come indirectly from the GSM and P.L. 480 programs. In 1991, the US backed credit on $139 million worth of vegetable oil exports, $89 million of vegetable meal exports, and $568 million in oilseed exports. $23.5 million in vegetable oil exports and $17 million in oilseed meal exports went to El Salvador and the Philippines in 1991 under PL 480.

EC policy, under both internal and external pressures, has been revamped. In the 1970s, the EC began a program to reach self-sufficiency in oilseeds and protein meals which, while economically very costly, proved wildly successful. From a 1970 production level of about 1 million tons, total EC production has grown more than tenfold (see Figure 14). During this period of rapid expansion the central policy tool was a subsidy based on the difference between the international and the EC price, which was paid to EC oilseed crushers buying domestic oilseeds. A portion was retained by the crusher with the remainder passed on to oilseed farmers. The amount of the subsidy and therefore the costs to the EC fluctuate with international prices, increasing in times of low prices and falling as

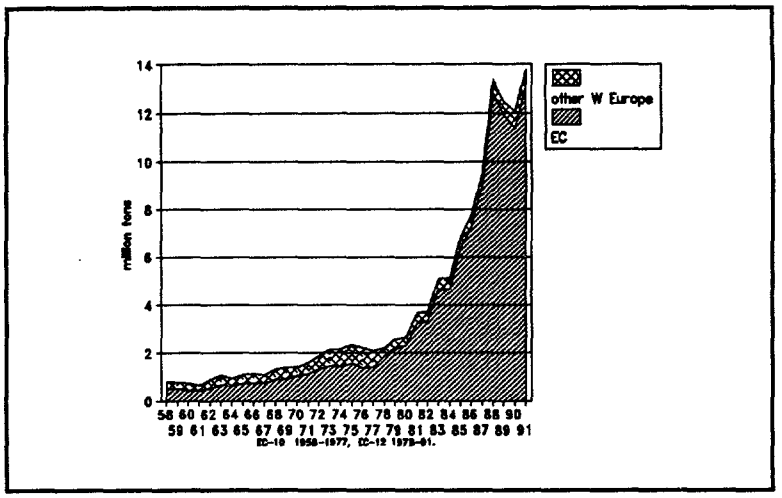
Table 9: Expenditures on US Export Subsidy Programs

	EEP	SOAP	COAP	EEP	SOAP	COAP	Total	Total
		----('000 tons)----			----('000 US$)----		'000 tons	'000 US$
1987	45	0	0	3,561	0	0	45	3,561
1988	355	34	0	50,205	3,282	0	389	53,488
1989	114	69	0	11,199	5,299	0	182	16,497
1990	18	36	14	2,161	3,323	2,251	68	7,735
1991	344	74	18	24,846	7,259	1,689	436	33,794
1992*	127	40	31	8,751	3,572	1,694	198	14,017

*Through May 7, 1992.

Source: US Department of Agriculture, Foreign Agricultural Service and World Bank calculations.

Figure 14: Oilseed production in Western Europe 1958-91



Source: Oil World.

prices rise; however, in recent years, EC farmers have consistently received more than double international prices. The EC offers support through other related programs, including subsidies on production, consumption, and trade in olive oil; subsidies encouraging the utilization of peas, beans, and other protein crops as substitutes for imported protein meals; subsidies to encourage the use of nonfat dry milk in poultry and livestock feed; and subsidies on butter and butter oil exports. As oilseed prices fell to the lows of 1986 and 1987, a crisis developed in the EC budget as the costs of various oil/meal programs rose from 2 billion ECUs in 1979 to 6 billion ECUs in 1987 while the EC budget deficit grew to over 4 billion ECUs.

In February 1988, the EC farm ministers announced Maximum Guaranteed Quantity levels (MGQs) for several grains and oilseeds. In addition, the Agricultural Commission revealed the details of a land set-aside program which would pay a premium of between 100 ECUs and 600 ECUs/ha to farmers who placed their land under conservation. Under the reforms, the EC intervention price for each commodity--the price at which the EC stands ready to buy--would be reduced by 0.5%[2] for every 1% of production in excess of the corresponding MGQ. After initially setting the MGQs at 3.5 million tons for rapeseed, 1.7 million tons for sunflowerseed, and 1.3 million tons for soybeans in 1988/89, the MGQs were raised for rapeseed and sunflowerseed to 4.5 million tons and 1.6 million tons, respectively,in 1989/90 and were held constant for 1990/91.[3] Current intervention prices for rapeseed, sunflowerseed, and soybeans remained unchanged in 1990/91 at 423, 556, and 508.9 ECUs/ton, respectively. EC producer prices still greatly exceeded international prices and the measures did little to curb production. In 1991, production again exceeded 12 million tons.

[2] The penalty rate for the 1988/89 crop year was 0.45%.

[3] Spain and Portugal are not included in the rapeseed and sunflowerseed MGQs, but face separately negotiated limits.

Pressure to reform oilseed policies grew, not only from a realization that the 1988 reforms had been unsuccessful, but also from a coincidental GATT panel ruling (see below) which declared the oilseed regime illegal under binding GATT agreements. In addition, more general discussions regarding changes in EC policy were ongoing as a way to both solve continued EC budget problems and to revitalize stalled discussions on the Uruguay Round GATT negotiations.

In December 1991, the EC established a new support system for soybeans, rapeseed and sunflowerseed for crops harvested after 1991. The agreement established an EC reference price. Regional payments would be made through a complicated formula based on average "regional" yields from 1986 to 1991 for individual oilseeds. A maximum "guaranteed area" was established. Producers would receive directly a payment based on regional yields and area. Once total area limits were exceeded the direct payments were to be reduced. The maximum area for soybeans was set at 509,000 ha, and 2.37 million ha for rapeseed. Sunflowerseed areas were set at 1.411 million ha for Spain, 0.122 million ha for Portugal, and 1.202 million ha for the rest of the EC.

A 1962 agreement and further CAP reform complicate oilseed policies in the EC. In 1962, as part of the Dillon Round of Multilateral Trade negotiations, the EC granted duty-free access to the EC market for soybeans and soybean meal along with low-tariff access to vegetable oils, in return for other trade concessions. At the time, the EC had a large crushing industry, but little oilseed production. Following global oilseed shortages and a US embargo in the 1970s, the EC looked to establish domestic oilseed production. Since previous concessions precluded the normal tariff protection, the strategy of subsidizing oilseed production indirectly through crushing subsidies was established. In 1987, the United States filed a petition drafted by the American Soybean Association charging that EC policies with regard to protein meals and oilseeds--particularly the crushing subsidies--violated the GATT agreement. In 1989 a three-member GATT panel agreed with the US that such an arrangement circumvented the 1962 zero-binding-duty agreement and recommended that the EC be given time to correct the problem before considering awarding damages. In 1990, the EC accepted the GATT ruling and worked to negotiate the new support system described above. The United States responded by asking the panel to reconvene in January 1992. In March 1992, the panel ruled the new system continued to impair US benefits from the 1962 agreement and recommended that "the Community should act expeditiously to eliminate the impairment of the tariff concessions--either by modifying its new support system for oilseeds or by renegotiating its tariff concessions... In the event that the dispute is not resolved expeditiously in either of these ways, the Contracting Parties should, if so requested by the United States, consider further action...." The EC responded to the panel by asking for time to reconsider its position as discussions on a more general CAP reform were under way.

In May 1992, the EC's Council of Ministers reached agreement on a CAP reform package. Under the agreement, starting in 1993/94, target market prices are to be cut by about 29%. Regional "base" areas are to be established based on average area in 1989-91. Farmers who agree to set aside 15% of their "base" will be eligible to receive direct payments based on average area yields. The full effect of the set-aside program will undoubtedly be less than a 15% reduction in output, however, as farmers with less than 20 ha are exempted from the set-aside. Additionally, European farmers will do what their American counterparts have done: dividing farms among family members to maximize the effects of the small farm exemption, setting aside less productive land, and using the set-aside period to replenish soil productivity. Oilseeds would come under the set-aside provisions, but the exact mechanics have yet to be announced. Generally, *relative* prices between oilseeds and cereals are expected to remain fairly constant and the shares of cultivated area are not expected to change.

Following the conclusion of the CAP negotiations, the EC's "113 Committee" on trade affairs recommended that the EC offer compensation to the United States rather than further modify its policy on oilseeds. The EC could compensate the United States by offering concessions on access to other parts of the EC market, but it is likely that the EC will attempt to bundle the oilseed compensation with Uruguay Round concessions. Linked to these discussions is the issue of corn gluten imports. The EC contends that the US subsidies which go into the gasohol program allow corn gluten, a gasohol by product, to compete with domestic EC grains at an unfair price. The EC may attempt to make concessions on the gluten issue, or may offer to accelerate the set-aside schedule announced in the May reforms. Compensation would also be offered to Argentina and Brazil.

Meanwhile the American Soybean Association, which originally pushed for the GATT panel ruling, is vigorously arguing that US soybean farmers should benefit directly from any EC compensation since soybean farmers suffered the consequences of the EC oilseed policies. The United States is not required under GATT rules to wait for EC action and is considering a set of punitive tariffs. The US Trade Representative announced a list of EC exports including wines, cheeses, beers, seafood, gin, vermouth, brandy, cut flowers and cooking oils which have been targeted for tariff increases. After the "hit" list is available for public comment for one month, it will be pared down to $1 billion worth of products. The tariffs could potentially triple the cost of those products in the United States.

CAP reform and the soybean "wars" have implications for the Uruguay Round. Generally, the proposed CAP reform has been viewed as a positive development for the successful conclusion of the Uruguay Round negotiations. Disputes between the United States and the EC over agriculture have threatened agreements reached in other areas and all sides view the reduction of EC price supports positively. At the same time, the CAP reforms did not resolve the oilseed issue which continues to generate animosity between the two trading partners. Additionally, the time spent on internal CAP-reform debate has stalled GATT negotiations to the point where the "GATT trigger" written into the US Farm Bill in 1989 has been activated. Under a provision of the Farm Bill, the US Department of Agriculture was obligated to spend an extra $1 billion on export refund programs for fiscal years 1994 and 1995 unless the Uruguay Round was concluded by June 30, 1992. In addition, the Secretary of Agriculture *may* waive any minimum set-aside program for any 1993-95 program crops. Another "trigger" set for June 30, 1993 would obligate the Secretary to consider further expanding the export programs and to provide increased price supports.

India's oilseed policies have made vegetable oil expensive to consumers while encouraging a diversion of land into oilseed production. Following a successful program to increase cereal production in India in the 1970s, India launched a program to gain greater self-sufficiency in oilseed in the 1980s. In order to accomplish this goal, exclusive control over trade in oilseed and oilseed products was granted to the Indian State Trading Corporation (STC) which, by limiting imports, has pushed domestic vegetable oil prices substantially above world price levels. Since 1981, the wholesale price of groundnut oil has ranged between 138% and 314% of the cost of imported oil; cottonseed oil has ranged between 130% and 320% of world prices; and for rapeseed oil the range has been 186% to 493%. Figure 15 shows monthly average domestic wholesale prices in India and in northern Europe for groundnut, rapeseed, and soybean oil for 1991. As can be seen, the imposition of quantitative restrictions distorts relative prices as well.

High domestic prices have substantially limited demand growth in India, despite strong income growth (recall Table 6). On the other hand, after a decade of sustained above-world prices, oilseed supplies in India have responded in recent years. There is little land in India which has not been cultivated so one of the effects of the pricing policy has been to divert land from other crops to oilseed production. Yields in recent years have been good, but remain highly dependent on weather patterns. When the monsoons are timely, as they were in 1988/89, yields and production climb; however, when rains are insufficient, as they were in 1987/88, production drops off, and imports climb (see Figure 16).

Government controls not only affect consumers directly through high prices but also make for inefficient uses of oils in the country's domestic vanaspati industry. Vanaspati, a lard substitute, can be made from a variety of vegetable oils without affecting its taste or consistency. When a sustained drought drastically reduced the groundnut crop in 1987, the STC allowed imports of less expensive palm oil and subsidized soybean and rapeseed oil to compensate. However, in the period 1989-91, as the Indian groundnut crop recovered while the international price of groundnut oil rose, India chose not to trade expensive groundnut oil for inexpensive palm oil, but rather forced the local industry to make its vanaspati from domestic oils. The opportunity costs in terms of resource use and export revenues were substantial. Groundnut oil prices in Rotterdam averaged $775, $964 and $895/ton respectively, over the 1989-91 period, while palm oil sold for $350, $290 and $339/ton.

In developing the price projection scenario, it was assumed that India would continue its pursuit of self-sufficiency in oilseeds. When shortfalls occur, India is likely to seek out less expensive vegetable oil sources again, as in 1988. Income gains will continue to push consumption levels beyond production gains, even when demand is rationed by high prices, so imports will continue to grow. However, imports and final consumption levels will remain below free-market levels.

Figure 15: Monthly wholesale prices for selected oils in India and Europe, 1991

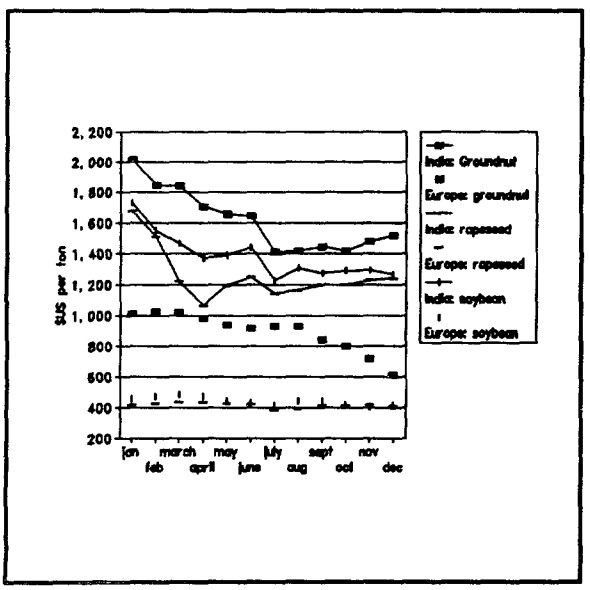
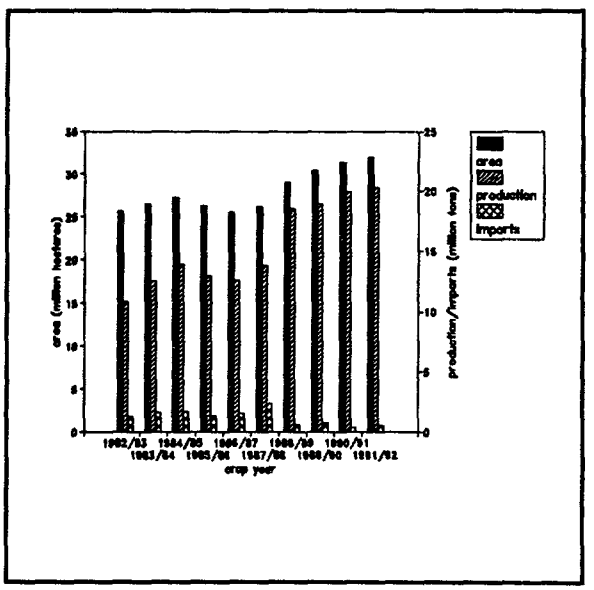


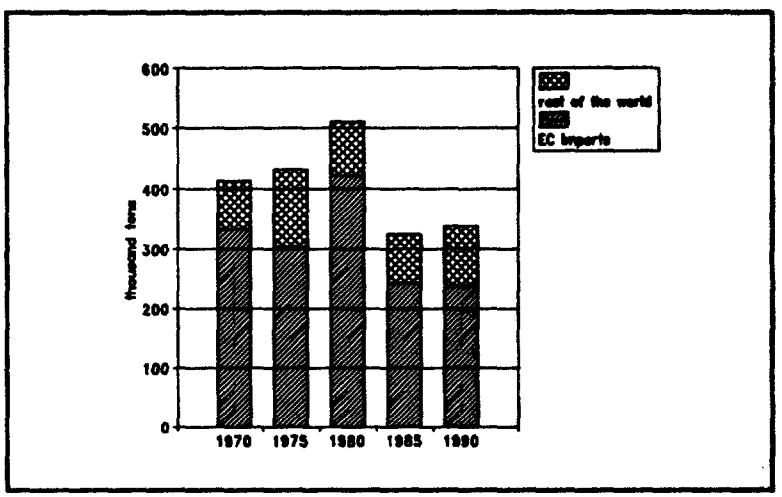
Figure 16: Oilseed production & vegetable oil trade for India



Source: Oil World.

The world market for groundnut oil will continue to dwindle. Groundnut oil remains an important source of export revenue for many African countries, and yet, unlike many agricultural goods, groundnut oil is becoming more thinly traded (Figure 17). Trade in groundnut oil peaked in 1972, when 537,000 tons were exported worldwide. In recent years, despite slow growth in production, trade has remained fairly stable, at around 300-400,000 tons, and prospects for gains are not good. Of the 289,000 tons traded in 1991, 235,000 tons entered Europe, where demand has remained extremely stable. Slow population growth rates, stable consumption rates, and increasing consumption of sunflowerseed oil in Europe will all contribute to low, if not negative, growth rates in EC groundnut oil imports over the projection period. China and India, the world's largest consumers of groundnut oil, consume domestic production only, as does the United States, which exports groundnut oil.

Figure 17: World trade in goundnut oil



Source: Oil World.

As the international market for groundnut oil grows thinner, the international price of groundnut oil becomes less representative of the underlying value of the oil because markets become less efficient. This has several implications. While most vegetable oils have a ready and efficient international market that producers can supply, groundnut oil does not. For project evaluation, consideration must be given not only to production costs and market prices, but to marketing, as well. For exporting countries attempting to manage export revenue risk, thinly traded markets reduce risk-hedging options, and long-term marketing arrangements become much more important.

Table A1: Soybeans (Oil Equiv.) - Production By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	5,380	9,492	9,531	9,904	10,196	9,969	10,069	10,069	11,369	12,769	4.1	2.7	1.8
OECD	5,369	9,489	9,530	9,903	10,195	9,968	10,068	10,068	11,368	12,768	4.1	2.7	1.8
United States	5,300	9,326	8,891	9,435	9,727	9,500	9,600	9,600	10,900	12,300	4.0	2.5	1.9
LMICs	2,049	5,116	8,826	8,724	8,924	9,231	9,431	10,031	10,831	13,683	7.4	7.5	3.2
Americas	342	3,146	5,764	5,290	5,849	5,665	6,028	6,490	7,150	9,020	19.0	12.6	3.8
Brazil	263	2,300	3,458	2,721	3,392	3,200	3,500	3,800	4,000	5,100	18.2	10.7	4.5
Argentina	7	612	1,827	2,088	1,926	1,950	1,980	2,100	2,500	3,100	35.2	30.7	2.8
Asia & Pacific	1,585	1,715	2,732	3,244	2,925	3,406	3,243	3,361	3,441	4,363	2.5	3.5	2.1
China, People's Rep.	1,414	1,401	1,870	1,980	1,764	1,850	1,990	2,000	2,400	3,010	1.8	2.5	3.0
Europe	110	187	238	190	150	160	160	180	240	300	5.3	5.0	3.3
World	7,429	14,608	18,357	18,628	19,120	19,200	19,500	20,100	22,200	26,452	5.3	4.5	2.5

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: USDA Foreign Agricultural Service (actual);
World Bank, International Economics Department (projected).

Table A2: Soybeans (Oil Equiv.) - Apparent Consumption By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	4,515	7,625	9,257	9,594	9,852	9,757	9,785	9,956	10,184	10,986	3.8	2.8	1.0
OECD	4,340	7,319	8,825	9,094	9,383	9,248	9,275	9,437	9,653	10,463	3.8	2.7	1.0
United States	2,631	4,459	5,999	5,591	5,800	5,700	5,700	5,800	5,900	6,400	3.6	3.1	1.0
Japan	531	776	779	775	780	780	800	820	880	980	4.2	2.3	1.7
LMICs	2,642	6,838	8,777	8,706	9,268	9,443	9,715	10,144	12,016	15,466	7.3	6.8	4.1
Americas	416	2,237	3,091	3,080	3,024	3,066	3,234	3,374	4,410	4,739	14.2	9.6	3.1
Brazil	216	1,402	1,878	2,000	1,980	1,990	2,100	2,200	2,900	3,200	16.3	10.0	3.4
Argentina	7	85	192	200	180	200	210	210	250	310	20.7	16.8	3.1
Asia & Pacific	1,754	2,875	3,712	4,826	5,444	5,527	5,581	5,670	6,406	8,500	4.5	4.9	4.0
China, People's Rep.	1,345	1,550	2,075	2,380	2,164	2,250	2,390	2,400	2,800	3,410	2.3	2.8	2.6
Europe	259	911	1,011	800	800	850	900	1,100	1,200	1,500	8.7	7.9	4.5
World	7,157	14,462	18,034	18,300	19,120	19,200	19,500	20,100	22,200	26,452	5.3	4.6	2.6

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: USDA Foreign Agricultural Service (actual);
World Bank, International Economics Department (projected).

Table A3: Soybeans (Oil Equiv.) - Gross Exports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	3,111	6,291	4,291	6,004	6,087	6,161	6,262	6,161	7,171	8,080	5.5	2.5	2.1
OECD	3,086	6,272	4,184	5,944	6,027	6,100	6,200	6,100	7,100	8,000	5.5	2.4	2.1
United States	2,668	4,867	2,909	3,844	3,927	3,800	3,900	3,800	5,000	5,900	4.5	1.6	3.1
LMICs	148	1,752	3,931	3,288	4,024	3,772	4,060	4,483	4,319	6,257	17.0	15.8	4.6
Americas	52	1,648	3,568	2,949	3,629	3,389	3,641	4,015	3,806	5,368	29.9	18.5	4.3
Brazil	50	1,035	1,604	793	1,553	1,331	1,540	1,760	1,210	2,090		13.4	6.9
Argentina	-	527	1,636	1,888	1,746	1,750	1,770	1,890	2,250	2,790			2.8
Europe	20	61	47	40	30	40	50	60	120	320	18.0	13.3	14.9
World	3,259	8,042	8,222	9,291	10,112	9,933	10,322	10,644	11,490	14,337	7.5	5.1	3.1

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: USDA Foreign Agricultural Service (actual);
World Bank, International Economics Department (projected).

Table A4: Soybeans (Oil Equiv.) - Gross Imports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	2,246	4,423	4,017	4,344	4,200	4,350	4,440	4,500	4,610	5,010	5.3	2.7	1.0
OECD	2,057	4,102	3,479	3,692	3,570	3,698	3,774	3,825	3,919	3,858	5.1	2.3	0.3
Japan	519	751	742	760	745	745	780	800	880	980	4.6	2.1	2.0
LNICs	741	3,473	3,882	3,645	4,135	3,978	4,189	4,442	5,020	6,572	11.6	9.6	4.2
Americas	126	739	896	890	880	980	1,010	1,200	1,340	1,450	12.4	10.8	3.5
Asia & Pacific	243	1,201	1,292	1,954	2,665	2,408	2,539	2,552	2,790	4,132	13.8	11.0	5.3
Europe	170	784	821	801	590	590	640	690	890	990	11.1	9.4	1.5
World	2,987	7,896	7,899	9,291	10,112	9,933	10,322	10,644	11,490	14,337	7.4	5.3	3.1

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: USDA Foreign Agricultural Service (actual);
World Bank, International Economics Department (projected).

Table A5: Soybeans (Meal Equiv.) - Production By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	25,463	44,949	45,134	44,018	45,316	44,307	44,751	44,751	50,529	56,751	4.1	2.7	1.8
OECD	25,411	44,935	45,127	44,014	45,311	44,302	44,747	44,747	50,524	56,747	4.1	2.7	1.8
United States	25,095	44,163	42,103	41,934	43,231	42,222	42,667	42,667	48,444	54,667	4.0	2.5	1.9
LMICs	9,754	24,226	41,794	38,774	39,664	41,027	41,916	44,582	48,138	60,813	7.4	7.5	3.2
Americas	1,613	14,898	27,292	23,510	25,997	25,178	26,791	28,844	31,778	40,089	19.1	12.7	3.8
Brazil	1,246	10,893	16,374	12,093	15,074	14,222	15,556	16,889	17,778	22,667	18.3	10.9	4.5
Argentina	32	2,898	8,654	9,280	8,560	8,667	8,800	9,333	11,111	13,778	35.2	30.7	2.8
Asia & Pacific	7,541	8,120	12,936	14,419	13,000	15,138	14,413	14,938	15,293	19,391	2.5	3.5	2.1
China, People's Rep.	6,695	6,635	8,855	8,800	7,840	8,222	8,844	8,889	10,667	13,378	1.8	2.5	3.0
Europe	521	887	1,125	844	667	711	711	800	1,067	1,333	5.3	4.9	3.3
World	35,217	69,175	86,928	82,792	84,979	85,333	86,667	89,333	98,667	117,564	5.3	4.5	2.5

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: USDA Foreign Agricultural Service (actual);
World Bank, International Economics Department (projected).

Table A6: Soybeans (Meal Equiv.) - Apparent Consumption By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	25,757	45,339	54,909	53,009	51,991	53,460	54,648	52,580	56,511	62,597	4.7	3.6	1.2
OECD	25,011	43,973	52,622	46,095	44,820	48,600	49,680	49,140	53,820	57,960	4.6	3.5	1.6
United States	12,972	19,159	25,179	21,096	21,100	23,000	23,500	23,000	25,100	27,100	2.8	2.9	1.8
Japan	2,576	3,822	4,377	3,820	3,800	4,000	4,100	4,300	4,800	5,100	4.4	2.8	2.1
LMICs	9,773	23,770	31,831	29,783	32,988	31,873	32,019	36,754	42,156	54,968	6.8	6.6	4.4
Americas	1,042	6,357	8,701	7,514	8,500	8,300	8,600	8,800	10,200	12,800	14.7	10.6	3.8
Brazil	454	3,508	3,983	3,084	3,400	3,800	4,000	4,200	4,600	5,300	14.8	10.7	3.9
Argentina	32	458	955	1,100	980	1,100	1,100	1,200	1,350	1,600	21.4	13.9	2.7
Asia & Pacific	7,256	9,428	11,843	15,169	17,688	16,473	15,219	17,854	19,556	27,968	2.8	3.2	4.4
China, People's Rep.	6,301	6,836	6,050	6,160	5,488	5,756	6,191	6,222	7,467	9,364	0.8	0.4	3.0
Europe	1,384	6,925	8,970	7,100	6,800	7,100	8,200	10,100	12,400	14,200	12.7	9.1	5.0
World	35,531	69,109	86,740	82,792	84,979	85,333	86,667	89,333	98,667	117,564	5.3	4.6	2.5

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: USDA Foreign Agricultural Service (actual);
World Bank, International Economics Department (projected).

Table A7: Soybeans (Meal Equiv.) - Gross Exports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	13,269	29,674	21,476	26,177	27,802	24,148	24,078	24,706	28,857	33,245	6.1	2.8	1.7
OECD	13,214	29,531	21,339	26,047	27,664	24,028	23,958	24,583	28,714	33,080	6.1	2.8	1.7
United States	12,123	25,004	16,986	20,838	22,131	19,222	19,167	19,667	23,344	27,567	5.6	2.1	2.0
LMICs	1,256	11,239	26,140	23,498	25,735	24,492	26,015	27,598	33,303	41,996	17.6	14.6	4.1
Americas	823	10,724	21,714	18,478	20,698	19,338	20,700	22,384	24,659	31,760	23.5	14.6	3.9
Brazil	792	7,831	12,391	9,009	11,674	10,422	11,556	12,689	13,178	17,367	21.3	11.3	4.7
Argentina	-	2,440	7,699	8,180	7,580	7,567	7,700	8,133	9,761	12,178			2.8
Asia & Pacific	407	441	4,270	4,769	4,785	4,896	5,050	4,954	8,211	9,724	8.9	17.6	5.1
World	14,525	40,914	47,615	49,675	53,537	48,640	50,093	52,305	62,160	75,241	8.6	6.0	3.0

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: USDA Foreign Agricultural Service (actual);
World Bank, International Economics Department (projected).

Table A8: Soybeans (Meal Equiv.) - Gross Imports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	13,563	30,064	31,251	32,786	33,728	32,102	33,062	33,475	32,945	36,116	7.0	4.3	0.7
OECD	12,814	28,569	28,834	29,613	30,464	28,996	29,862	30,235	29,757	32,621	6.9	4.1	0.7
Japan	2,473	3,670	4,202	4,400	4,400	4,500	4,500	4,600	4,800	5,520	4.9	2.6	1.6
LMICs	1,275	10,783	16,177	16,176	16,890	19,809	16,538	17,032	18,830	29,215	18.2	13.2	4.2
Americas	251	2,183	3,123	3,033	3,167	3,714	3,101	3,193	3,531	5,210	17.7	15.1	3.9
Asia & Pacific	122	1,749	3,176	4,044	4,222	4,952	4,134	4,258	4,707	7,304	21.1	18.6	4.2
Europe	879	6,051	7,991	7,077	6,334	7,428	6,202	6,387	7,061	10,956	17.1	10.4	3.1
World	14,838	40,847	47,427	49,675	53,537	48,640	50,093	52,305	62,160	75,241	8.7	6.1	3.0

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: USDA Foreign Agricultural Service (actual);
World Bank, International Economics Department (projected).

Table A9: Palm Oil - Production By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	0	0	0	0	0	0	0	0	0	0	-	-	-
LMICs	2,090	5,033	11,181	12,112	13,152	13,968	14,589	15,480	19,188	23,384	7.9	9.0	4.1
Africa	1,178	1,338	1,688	1,795	1,832	1,848	1,881	1,980	2,343	2,574	1.4	1.9	2.4
Nigeria	587	667	820	820	830	840	850	900	1,100	1,200	0.9	2.0	2.6
Cote d'Ivoire	46	158	214	268	280	280	290	300	320	360	11.3	5.1	1.8
Americas	107	191	629	630	650	680	720	900	1,200	1,700	7.7	10.4	6.9
Asia & Pacific	805	3,504	8,864	9,687	10,670	11,440	11,988	12,600	15,645	19,110	14.0	12.6	4.2
Malaysia	457	2,529	6,095	6,141	6,700	7,100	7,500	8,000	9,500	11,000	16.7	13.4	3.5
Indonesia	219	721	2,111	2,665	3,000	3,300	3,600	4,000	5,400	7,200	10.7	12.3	6.3
World	2,090	5,033	11,181	12,112	13,152	13,968	14,589	15,480	19,188	23,384	7.9	9.0	4.1

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: FAO, Trade Yearbook Tapes (actual);
World Bank, International Economics Department (projected).

Table A10: Palm Oil - Apparent Consumption By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	663	1,025	2,189	2,985	3,473	3,838	3,809	3,690	4,248	4,996	5.4	3.7	2.6
OECD	653	987	1,878	2,010	2,672	2,952	2,930	2,838	3,268	3,843	4.9	3.1	2.6
United States	80	128	182	120	150	170	180	200	240	300	10.8	0.4	5.0
LMICs	1,422	3,881	8,705	9,127	9,679	10,130	10,780	11,790	14,940	18,388	8.5	10.7	4.6
Africa	1,014	1,409	1,831	1,900	1,950	1,950	1,980	2,100	2,500	3,100	3.1	3.5	3.3
Nigeria	575	723	828	820	830	840	850	900	1,100	1,200	2.1	2.6	2.6
Cote d'Ivoire	33	88	79	91	110	120	140	160	280	360	8.1	6.4	8.5
Americas	108	197	717	720	800	850	910	1,200	1,900	2,500	7.6	10.1	8.1
Asia & Pacific	190	1,917	4,985	5,417	5,699	6,020	6,510	7,070	8,540	10,248	17.4	19.2	4.2
China, People's Rep.	113	206	1,274	1,207	1,340	1,350	1,420	1,610	2,100	2,100	10.2	9.4	3.2
Indonesia	36	375	1,041	1,220	1,330	1,380	1,440	1,590	1,800	2,300		25.5	3.9
Pakistan	1	215	597	875	880	870	890	900	1,100	1,200			2.2
India	0	525	668	309	380	700	900	950	1,100	1,720			10.8
Europe	26	160	478	380	510	560	600	620	1,100	1,580	14.7	18.3	8.1
Middle East & North Africa	84	198	694	710	720	750	780	800	900	960	11.3	11.9	2.1
Iraq	78	134	223	60	120	250	350	410	550	710	8.7	7.2	12.7
World	2,085	4,906	10,894	12,112	13,152	13,968	14,589	15,480	19,188	23,384	7.8	8.8	4.1

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: FAO, Trade Yearbook Tapes (actual);
World Bank, International Economics Department (projected).

Table A11: Palm Oil - Gross Exports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	184	618	867	1,186	1,351	1,493	1,481	1,435	1,652	2,027	11.7	8.2	2.9
OECD	37	110	200	250	285	315	312	303	348	385	9.7	6.6	2.1
Non-OECD	147	508	667	936	1,066	1,178	1,169	1,132	1,304	1,643	12.4	8.8	3.1
Singapore	147	508	625	908	1,034	1,143	1,134	1,098	1,265	1,593	12.2	8.5	3.1
LMICs	818	2,612	7,016	7,435	8,415	9,251	9,670	9,982	12,471	15,516	10.3	10.8	4.4
Africa	186	96	193	185	190	190	190	190	160	155	-3.9	-2.2	-1.5
Asia & Pacific	626	2,512	6,775	7,045	7,587	8,510	9,265	9,587	11,880	14,828	13.7	11.9	4.8
Malaysia	444	2,102	5,468	5,395	5,421	5,960	6,340	6,720	7,200	8,580	16.0	12.8	3.3
Indonesia	182	357	1,097	1,445	1,670	1,920	2,160	2,410	3,600	4,900	7.5	7.4	7.7
World	1,002	3,230	7,884	8,621	9,766	10,744	11,151	11,417	14,123	17,543	10.5	10.4	4.2

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: FAO, Trade Yearbook Tapes (actual);
World Bank, International Economics Department (projected).

Table A12: Palm Oil - Gross Imports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	846	1,643	3,057	4,179	4,862	5,373	5,333	5,166	5,947	6,994	6.8	5.0	2.6
OECD	690	1,096	2,078	2,786	3,241	3,582	3,555	3,444	3,965	4,663	5.2	3.4	2.6
United States	80	128	184	120	150	170	180	200	240	300	10.9	0.5	5.0
Japan	41	143	276	320	330	350	360	380	420	510	11.5	7.9	3.1
LMICs	150	1,460	4,540	4,441	4,904	5,371	5,819	6,251	8,176	10,549	16.9	20.0	5.5
Africa	23	167	336	252	284	245	238	288	377	1,262	16.3	16.7	10.6
Asia & Pacific	11	925	2,896	2,869	3,120	3,504	3,852	4,152	5,160	6,024	23.3	31.5	4.7
China, People's Rep.	-	40	1,133	1,207	1,340	1,350	1,420	1,610	2,100	2,100			3.2
Pakistan	1	215	597	875	880	870	890	900	1,100	1,200			2.2
India	0	525	669	309	380	700	900	950	1,100	1,720	24.6	46.9	10.8
Europe	27	160	478	399	546	616	672	713	1,350	1,800	14.6	18.2	8.5
Middle East & North Africa	84	198	694	710	720	750	780	800	900	960	11.3	11.9	2.1
Iraq	78	134	223	60	120	250	350	410	550	710	8.7	7.2	12.7
World	997	3,103	7,597	8,621	9,766	10,744	11,151	11,417	14,123	17,543	10.3	10.1	4.2

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: FAO, Trade Yearbook Tapes (actual);
World Bank, International Economics Department (projected).

Table A13: Copra - Production By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	24	0	0	0	0	0	0	0	0	0			
OECD	0	0	0	0	0	0	0	0	0	0			
LMICs	3,593	4,274	4,604	4,737	4,372	4,419	4,610	4,743	4,722	4,772	1.1	0.6	0.1
Africa	152	154	201	210	220	230	200	200	220	240	0.9	1.2	1.0
Americas	231	197	228	244	265	280	260	270	280	280	-1.6	-1.4	1.0
Asia & Pacific	3,211	3,924	4,175	4,283	3,887	3,909	4,150	4,273	4,222	4,252	1.3	0.7	-0.1
Philippines	1,334	1,921	1,967	1,950	1,700	1,600	1,890	1,880	1,680	1,590	1.6	0.7	-1.5
Indonesia	801	1,161	1,320	1,275	1,150	1,200	1,200	1,300	1,490	1,550	3.1	2.5	1.4
India	356	325	350	420	400	425	425	425	400	400	0.4	-0.5	-0.3
Malaysia	174	210	115	92	90	90	90	90	80	70	-0.7	-1.7	-2.0
Sri Lanka	204	131	128	87	100	99	100	120	120	120	-3.3	-1.9	2.3
World	3,617	4,274	4,604	4,737	4,372	4,419	4,610	4,743	4,722	4,772	1.0	0.6	0.1

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: FAO, Trade Yearbook Tapes (actual);
World Bank, International Economics Department (projected).

Table A14: Copra (Oil Equiv.) - Apparent Consumption By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	972	1,115	1,181	1,192	1,023	1,021	1,116	1,166	1,133	1,073	0.3	0.3	-0.8
OECD	974	1,104	1,155	1,122	1,003	1,001	1,093	1,142	1,111	1,052	0.3	0.3	-0.5
United States	386	429	425	400	394	380	400	400	410	430	1.0	0.5	0.5
LMICs	1,184	1,614	1,648	1,650	1,600	1,630	1,650	1,680	1,700	1,790	2.0	1.3	0.6
Americas	148	128	161	155	160	155	161	161	165	172	-1.9	-1.4	0.7
Asia & Pacific	932	1,317	1,285	1,435	1,375	1,405	1,418	1,447	1,445	1,518	2.6	1.6	0.4
Philippines	130	155	173	294	291	270	280	280	340	375		2.3	1.7
Indonesia	388	676	598	557	600	570	610	640	700	780	3.7	1.9	2.4
India	224	227	215	252	240	255	255	255	240	240	-0.2	-0.5	-0.3
Sri Lanka	50	60	60	55	53	50	55	58	62	65	0.5	0.3	1.2
Europe	42	89	71	60	65	70	71	72	90	100	2.1	0.2	3.6
World	2,156	2,729	2,829	2,842	2,623	2,651	2,766	2,846	2,833	2,863	1.3	0.9	0.1

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: FAO, Trade Yearbook Tapes (actual);
World Bank, International Economics Department (projected).

Table A15: Copra (Oil Equiv.) - Gross Exports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	129	125	171	157	145	139	132	129	112	107	1.3	-1.2	-2.7
OECD	75	58	118	110	98	95	90	90	90	85	1.9	-1.9	-1.8
Non-OECD	54	67	53	47	47	44	42	32	22	22	0.4	0.3	-5.4
Singapore	44	67	48	45	45	42	40	30	20	20	2.0	1.6	-5.8
LMICs	1,129	1,221	1,409	1,194	1,180	1,126	1,256	1,260	1,239	1,168	0.0	0.0	-0.2
Asia & Pacific	1,058	1,180	1,362	1,126	1,114	1,062	1,185	1,189	1,169	1,043	0.1	0.1	-0.5
Malaysia	54	87	84	61	59	59	59	59	53	46	1.0	2.4	-2.0
Sri Lanka	73	18	16	2	7	9	5	14	10	7	-6.8	-4.3	8.9
Philippines	671	998	1,007	876	729	690	854	848	668	579	1.1	0.3	-3.0
World	1,258	1,346	1,580	1,351	1,325	1,265	1,388	1,389	1,351	1,275	0.1	-0.1	-0.4

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: FAO, Trade Yearbook Tapes (actual);
World Bank, International Economics Department (projected).

Table A16: Copra (Oil Equiv.) - Gross Imports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	1,086	1,241	1,352	1,252	1,177	1,175	1,227	1,282	1,247	1,181	0.5	0.2	-0.4
OECD	1,048	1,163	1,273	1,234	1,103	1,101	1,203	1,257	1,222	1,157	0.4	0.1	-0.5
United States	392	437	450	400	394	380	400	400	410	430	1.1	0.7	0.5
LMICs	157	270	295	99	149	90	160	107	105	95	0.9	1.7	-0.3
Africa	22	13	29	12	12	14	14	15	18	22	-0.2	-1.5	4.3
Americas	18	17	26	18	17	16	17	19	21	25	-3.7	-2.2	2.3
Asia & Pacific	63	143	142	146	37	87	46	106	62	80	1.3	3.6	-4.3
China, People's Rep.	26	26	30	0	10	10	10	10	0	0	2.1	2.1	0.0
World	1,243	1,511	1,646	1,351	1,325	1,265	1,388	1,389	1,351	1,275	0.5	0.4	-0.4

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: FAO, Trade Yearbook Tapes (actual);
World Bank, International Economics Department (projected).

Table A17: Soybeans - Prices, a/ 1950-91 (Actual) and 1992-2005 (Projected)

	($/ton)		
	Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/
Actual			
1950	114	698	919
1951	146	775	1,063
1952	112	568	782
1953	119	620	824
1954	122	650	832
1955	111	581	754
1956	116	586	771
1957	106	524	690
1958	95	462	607
1959	94	464	601
1960	92	444	578
1961	111	527	681
1962	100	466	597
1963	110	522	636
1964	110	513	620
1965	117	542	639
1966	126	564	665
1967	112	495	576
1968	106	473	531
1969	103	436	494
1970	117	466	529
1971	126	477	534
1972	140	486	538
1973	290	869	974
1974	277	681	840
1975	220	486	594
1976	231	504	604
1977	280	556	662
1978	268	463	518
1979	298	454	543
1980	296	412	483
1981	288	399	467
1982	245	344	401
1983	282	405	454
1984	282	414	456
1985	224	327	355
1986	208	257	273
1987	216	243	251
1988	304	318	328
1989	275	291	298
1990	247	247	247
1991	240	235	228
Projected			
1992	235	221	210
1993	248	224	214
1994	263	234	222
1995	270	234	222
2000	300	219	204
2005	368	234	210

a/ US No. 2, bulk, c.i.f. Rotterdam.
b/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.
c/ Deflated by G-7 Consumer Price Index (CPI).

Sources: Oil World (actual); World Bank, International Economics Department (projected).

Table A18: Soybean Oil - Prices, a/ 1950-91 (Actual) and 1992-2005 (Projected)

	($/ton)		
	Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/
Actual			
1950	314	1,923	2,532
1951	375	1,992	2,729
1952	380	1,926	2,652
1953	410	2,138	2,837
1954	333	1,776	2,270
1955	294	1,538	1,997
1956	339	1,712	2,254
1957	306	1,514	1,991
1958	254	1,235	1,622
1959	235	1,159	1,504
1960	225	1,087	1,412
1961	287	1,363	1,761
1962	227	1,057	1,354
1963	223	1,059	1,289
1964	205	957	1,155
1965	270	1,251	1,474
1966	261	1,168	1,378
1967	216	956	1,112
1968	178	795	891
1969	228	966	1,094
1970	307	1,224	1,389
1971	323	1,222	1,369
1972	270	937	1,037
1973	465	1,393	1,563
1974	795	1,955	2,412
1975	619	1,369	1,672
1976	438	956	1,145
1977	576	1,144	1,362
1978	607	1,048	1,171
1979	662	1,009	1,207
1980	597	829	973
1981	507	701	820
1982	447	629	733
1983	527	758	850
1984	724	1,064	1,171
1985	572	834	906
1986	342	423	449
1987	334	376	388
1988	463	486	500
1989	432	456	468
1990	447	447	447
1991	454	445	432
Projected			
1992	430	404	385
1993	460	416	398
1994	499	443	422
1995	500	433	411
2000	562	409	383
2005	590	374	336

a/ For 1950-75, US, crude, bulk, c.i.f. Rotterdam; from 1976 onward, Dutch, crude, f.o.b. ex-mill.
b/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.
c/ Deflated by G-7 Consumer Price Index (CPI).

Sources: Oil World (actual); World Bank, International Economics Department (projected).

Table A19: Soybean Meal - Prices, a/ 1950-91 (Actual) and 1992-2005 (Projected)

	($/ton)		
	Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/
Actual			
1950	95	582	766
1951	125	664	910
1952	100	507	698
1953	108	563	747
1954	89	475	607
1955	77	403	523
1956	76	384	505
1957	78	386	507
1958	74	360	473
1959	73	360	467
1960	78	377	490
1961	81	385	497
1962	89	414	531
1963	91	432	526
1964	89	415	501
1965	94	435	513
1966	101	452	533
1967	98	434	504
1968	98	438	491
1969	95	403	456
1970	103	411	466
1971	102	386	432
1972	129	448	495
1973	302	905	1,015
1974	184	453	558
1975	155	343	419
1976	198	432	518
1977	230	457	544
1978	213	368	411
1979	243	370	443
1980	262	364	427
1981	253	349	408
1982	219	307	358
1983	238	342	383
1984	197	290	319
1985	157	229	249
1986	185	229	243
1987	203	228	236
1988	268	281	289
1989	246	260	267
1990	209	209	209
1991	199	195	189
Projected			
1992	208	195	186
1993	220	199	190
1994	230	204	194
1995	241	208	198
2000	254	185	173
2005	331	210	189

a/ US 44%, c.i.f. Rotterdam.
b/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.
c/ Deflated by G-7 Consumer Price Index (CPI).

Sources: Oil World (actual); World Bank, International Economics Department (projected).

Table A20: Palm Oil - Prices, a/ 1950-91 (Actual) and 1992-2005 (Projected)

	($/ton)		
	Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/
Actual			
1950	277	1,696	2,234
1951	298	1,581	2,166
1952	294	1,489	2,050
1953	227	1,181	1,567
1954	225	1,198	1,531
1955	240	1,257	1,632
1956	246	1,242	1,634
1957	259	1,281	1,685
1958	232	1,128	1,481
1959	248	1,223	1,587
1960	228	1,103	1,433
1961	232	1,102	1,423
1962	216	1,007	1,291
1963	222	1,056	1,286
1964	240	1,118	1,349
1965	273	1,262	1,487
1966	236	1,054	1,244
1967	224	989	1,151
1968	169	754	846
1969	181	768	869
1970	260	1,037	1,176
1971	261	988	1,106
1972	217	754	834
1973	378	1,131	1,268
1974	669	1,645	2,030
1975	434	961	1,173
1976	407	887	1,062
1977	530	1,053	1,253
1978	600	1,036	1,158
1979	654	997	1,193
1980	584	811	952
1981	571	790	923
1982	445	626	729
1983	501	721	809
1984	729	1,071	1,179
1985	501	730	794
1986	257	318	338
1987	343	386	399
1988	437	459	472
1989	350	370	380
1990	290	290	290
1991	339	332	323
Projected			
1992	395	371	354
1993	420	380	363
1994	397	353	335
1995	396	343	325
2000	416	303	283
2005	420	266	239

a/ Malaysian, 5%, c.i.f. N.W. Europe; quotations prior to 1955 refer to technical oil; thereafter that of edible oil.
b/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.
c/ Deflated by G-7 Consumer Price Index (CPI).

Sources: Oil World, IMF and FAO Trade Yearbook (actual); World Bank, International Economics Department (projected).

Table A21: Palm Kernels - Prices, a/ 1950-91 (Actual) and 1992-2005 (Projected)

	($/ton)		
	Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/
Actual			
1950	189	1,157	1,524
1951	220	1,169	1,601
1952	151	765	1,054
1953	176	918	1,218
1954	146	778	995
1955	143	748	971
1956	146	737	971
1957	141	697	917
1958	154	749	983
1959	194	957	1,241
1960	144	696	904
1961	137	651	840
1962	136	633	811
1963	153	726	884
1964	151	705	851
1965	179	829	977
1966	155	694	818
1967	162	717	834
1968	176	786	881
1969	153	648	734
1970	168	670	760
1971	145	549	614
1972	116	403	445
1973	259	776	870
1974	465	1,144	1,411
1975	207	457	558
1976	230	502	601
1977	326	648	771
1978	364	628	702
1979	500	762	912
1980	345	480	563
1981	317	439	513
1982	265	372	434
1983	365	525	589
1984	528	776	854
1985	291	424	461
1986	142	176	186
1987	181	204	210
1988	267	280	288
1989	251	265	272
1990	185	185	185
1991	220	216	209
Projected			
1992	230	216	206
1993	237	214	205
1994	246	219	208
1995	270	234	222
2000	334	243	228
2005	358	227	204

a/ Nigerian, c.i.f. European ports.
b/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.
c/ Deflated by G-7 Consumer Price Index (CPI).

Sources: Oil World (actual); World Bank, International Economics Department (projected).

Table A22: Copra - Prices, a/ 1950-91 (Actual) and 1992-2005 (Projected)

	($/ton)		
	Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/
Actual			
1950	226	1,385	1,824
1951	243	1,290	1,767
1952	163	828	1,140
1953	221	1,151	1,527
1954	196	1,044	1,334
1955	181	944	1,226
1956	177	894	1,176
1957	172	851	1,119
1958	203	989	1,299
1959	251	1,239	1,607
1960	202	974	1,266
1961	165	783	1,011
1962	164	764	979
1963	184	871	1,061
1964	194	907	1,095
1965	227	1,049	1,236
1966	185	827	976
1967	204	903	1,051
1968	232	1,037	1,163
1969	202	856	969
1970	225	897	1,017
1971	189	713	799
1972	141	489	541
1973	353	1,058	1,186
1974	662	1,628	2,008
1975	256	567	692
1976	275	600	719
1977	402	799	951
1978	470	812	908
1979	673	1,026	1,227
1980	453	629	738
1981	379	525	613
1982	314	442	515
1983	496	713	800
1984	710	1,044	1,148
1985	386	563	612
1986	197	244	259
1987	309	348	359
1988	398	417	429
1989	348	368	377
1990	231	231	231
1991	286	281	272
Projected			
1992	380	357	340
1993	360	326	311
1994	377	335	318
1995	404	350	332
2000	544	396	371
2005	508	322	289

a/ Philippines/Indonesian, bulk, c.i.f. N. W. Europe.
b/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.
c/ Deflated by G-7 Consumer Price Index (CPI).
Sources: Oil World (actual); World Bank, International Economics Department (projected).

Table A23: Coconut Oil - Prices, a/ 1950-91 (Actual) and 1992-2005 (Projected)

	($/ton)		
	Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/
Actual			
1950	292	1,789	2,356
1951	338	1,796	2,461
1952	263	1,332	1,835
1953	339	1,768	2,346
1954	306	1,633	2,087
1955	259	1,355	1,760
1956	265	1,338	1,761
1957	275	1,360	1,789
1958	312	1,517	1,992
1959	378	1,867	2,421
1960	312	1,507	1,959
1961	254	1,204	1,555
1962	251	1,170	1,499
1963	286	1,359	1,655
1964	297	1,383	1,670
1965	348	1,611	1,898
1966	324	1,449	1,710
1967	328	1,451	1,688
1968	399	1,783	1,999
1969	361	1,531	1,733
1970	397	1,584	1,797
1971	371	1,402	1,570
1972	234	812	899
1973	513	1,537	1,724
1974	998	2,454	3,028
1975	394	871	1,063
1976	418	912	1,093
1977	578	1,148	1,367
1978	683	1,179	1,319
1979	985	1,501	1,796
1980	674	936	1,099
1981	570	789	922
1982	464	653	761
1983	730	1,050	1,177
1984	1,155	1,697	1,867
1985	590	860	935
1986	297	367	390
1987	442	498	514
1988	565	593	610
1989	517	546	561
1990	337	337	337
1991	433	424	412
Projected			
1992	590	554	528
1993	550	498	476
1994	573	509	484
1995	618	535	507
2000	774	564	527
2005	721	457	411

a/ For 1950-72, Sri Lanka, white, 1%, ex-tank Rotterdam; from 1973 onward, Philippines/Indonesian, bulk, c.i.f. Rotterdam.

b/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.

c/ Deflated by G-7 Consumer Price Index (CPI).

Sources: Oil World (actual); World Bank, International Economics Department (projected).

Table A24: Groundnut Oil - Prices, a/ 1950-91 (Actual) and 1992-2005 (Projected)

	($/ton)		
	Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/
Actual			
1950	418	2,557	3,367
1951	476	2,529	3,466
1952	364	1,844	2,539
1953	386	2,012	2,670
1954	371	1,977	2,527
1955	288	1,507	1,957
1956	369	1,865	2,455
1957	360	1,779	2,340
1958	276	1,342	1,762
1959	300	1,478	1,917
1960	326	1,577	2,048
1961	331	1,571	2,029
1962	275	1,278	1,638
1963	268	1,274	1,551
1964	315	1,471	1,776
1965	324	1,500	1,767
1966	296	1,326	1,564
1967	283	1,253	1,458
1968	271	1,209	1,356
1969	332	1,405	1,591
1970	379	1,510	1,712
1971	441	1,667	1,867
1972	426	1,479	1,636
1973	546	1,636	1,835
1974	1,077	2,649	3,268
1975	858	1,898	2,317
1976	741	1,617	1,937
1977	852	1,692	2,015
1978	1,079	1,863	2,083
1979	888	1,353	1,619
1980	859	1,194	1,401
1981	1,043	1,443	1,687
1982	585	822	958
1983	711	1,023	1,146
1984	1,017	1,494	1,644
1985	905	1,319	1,434
1986	569	703	747
1987	500	563	581
1988	590	619	637
1989	775	819	841
1990	964	964	964
1991	894	876	850
Projected			
1992	605	568	542
1993	645	584	558
1994	656	583	554
1995	713	617	585
2000	760	554	518
2005	664	421	378

a/ Any origin, c.i.f. Rotterdam.
b/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.
c/ Deflated by G-7 Consumer Price Index (CPI).

Sources: Oil World (actual); World Bank, International Economics Department (projected).

Table A25: Groundnut Meal - Prices, a/ 1950-1991 (Actual) and 1992-2005 (Projected)

	($/ton)		
	Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/
Actual			
1950	95	582	766
1951	111	590	808
1952	98	497	684
1953	102	532	706
1954	98	523	668
1955	93	487	632
1956	92	465	612
1957	85	420	553
1958	74	360	473
1959	86	424	550
1960	84	406	527
1961	79	375	485
1962	87	405	519
1963	91	432	526
1964	93	434	524
1965	102	472	557
1966	95	425	502
1967	95	420	489
1968	90	402	451
1969	96	407	461
1970	102	407	461
1971	98	371	415
1972	122	423	469
1973	266	797	894
1974	174	428	528
1975	140	310	378
1976	176	384	460
1977	218	433	515
1978	205	354	396
1979	211	322	385
1980	240	334	392
1981	238	329	385
1982	189	266	310
1983	200	288	323
1984	187	275	302
1985	143	208	227
1986	165	204	217
1987	162	182	188
1988	210	220	226
1989	200	211	217
1990	185	185	185
1991	150	147	143
Projected			
1992	157	147	141
1993	165	149	143
1994	184	163	155
1995	199	172	163
2000	216	157	147
2005	276	175	157

a/ Any origin, 48-50%, c.i.f. N. W. Europe.
b/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.
c/ Deflated by G-7 Consumer Price Index (CPI).

Sources: Oil World (actual); World Bank, International Economics Department (projected).

Meats

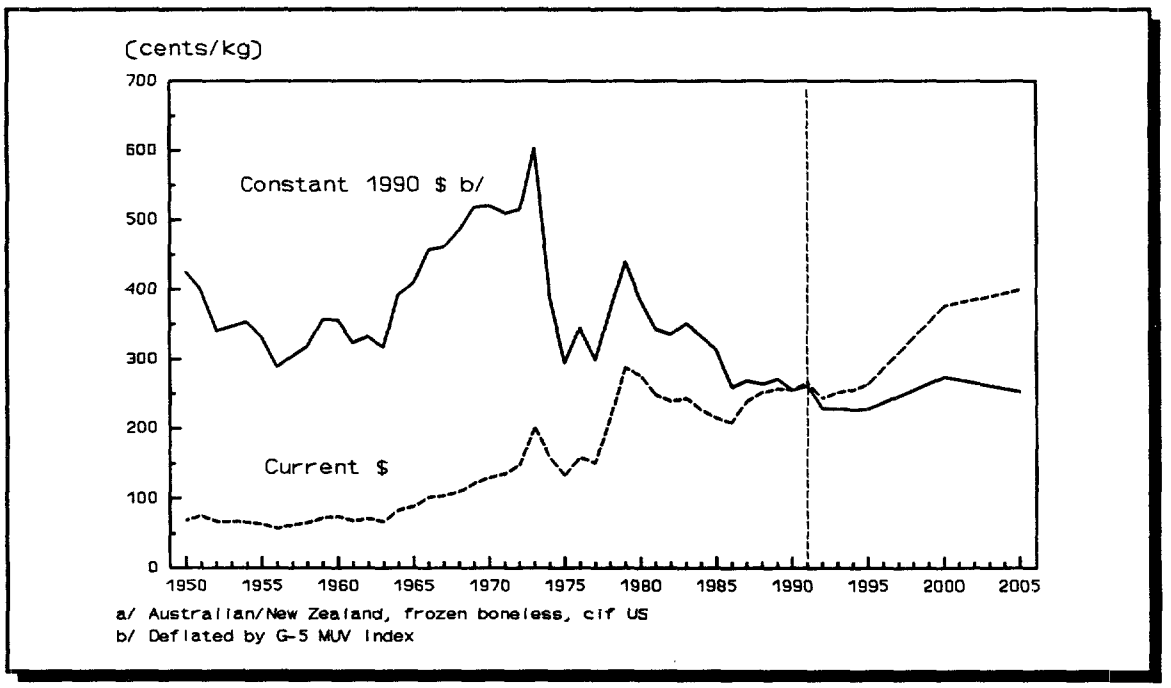
Summary

- The world meat market has changed in major ways since 1991. In April of that year, Japan ended its beef import quota system, replacing it with a non discriminatory tariff of 70%. In Eastern Europe and the FSU, beef and pork production dropped sharply in 1991 (-7.4%) as the political and economic changes resulted in the collapse of the communal farm system and state meat operations, as well as major disruptions in feed supplies. The collapse of the CMEA, the demise of bilateral trade agreements, and the shift of trade to convertible currency at world market prices resulted in a sharp decline in meat trade, a large drop in meat consumption, and a shift in demand between various types of meats, favoring poultry.

- In the United States, the uptrend in beef import prices since the mid-1980s continued through the second half of the decade and into 1990 and 1991 as beef supplies were relatively tight and Asian countries continued their strong beef import demand.

- US beef prices are expected to decline slightly in real terms over the next several years. Over the long term, the outlook for the US beef market will depend critically on how the major producing countries respond to the liberalization of the Japanese and Korean markets. Other countries in the East Asian region have high income elasticities of demand for meat and very low per capita meat consumption levels, so US beef prices in the long term should be supported by increases in exports to Asian markets.

Beef Prices a/, 1950-2005



- While the continuing improvements in technology and efficiency in meat production are likely to put downward pressure on real prices, this should be more evident in the poultry and pork sectors than in the beef sector where technical improvements are slower and support policies in several countries are likely to maintain prices above market-clearing levels.

- Ongoing trade liberalization in Japan and the gradual opening of the beef market in the Republic of Korea have led to a major shift in beef trade from the traditional markets in North America and Western Europe to the Pacific Rim Asian countries. The Asian region is expected to continue to be the major source of growth in world beef trade in the 1990s.

Production Trends

Growth slowdown during 1989-91 continues, with poultry the exception. The slow growth in world meat production (beef and veal, pork, and poultry) since 1989 continued in the early 1990s. World meat output grew by less than 1% p.a. during 1989-91, less than the rate of increase of above 2% p.a. during the 1980s. The slowdown in growth reflects the moderate increase in global output of beef and pork, which largely offsets the more rapid growth in poultry. In 1991, the sharp reduction in output in the FSU largely balanced the higher production in several countries (Table 1). While poultry meat experienced the most rapid growth in production, it still holds the smallest share (about 25%) in total meat output. Pork has the largest share with more than 40% of the total, followed by beef and veal with about 30%.

The United States, the EC, and the FSU account for nearly two thirds of beef and veal production. The United States continues to be the largest producer with a 21% share in 1991. The FSU ranked second until 1991 when its output sharply declined (-7.4%), reducing its share to 16%. The EC became the second largest producer with about 17%. Argentina and Brazil account for about 8% and 7%, respectively. Beef and veal production has grown more slowly than other meats, with a growth rate less than 1% p.a. since the mid-1980s. After declining in 1991, world production of beef and veal is estimated to fall again in 1992 to 49.9 million tons as gains in several other countries are largely offset by declines in Australia and the FSU.

The slow growth in beef output reflects the moderate herd expansion occurring in several countries since 1989. Drought conditions in Australia resulted in lower average slaughter weight and output in 1991, while in the FSU the collapse of the communal farm system and poor forage supplies resulted in sharp declines in output. In contrast, a cyclical upturn in EC production occurred in 1990 and 1991, reflecting the sharp increase in dairy cow cullings and an increase in heifer slaughter.

The United States produces about one third of the world's poultry meat, followed by the EC with about 18%. Other major producers include China, the FSU, Brazil, Japan, and Thailand. While production of poultry meat remains concentrated in a few countries and regions, world production continues to grow at a rapid rate. World production in 1991 increased by 5.7%, and about the same growth is forecast for 1992. Brazil and Thailand expanded output by over 10% in 1991. With a growth rate of 20% in 1991, Mexico became the most rapidly growing poultry meat producer. Other developing countries have also experienced rapid growth. Turkey increased its output of poultry meat by more than 150% between 1985 and 1990 while India's output grew by more than 100% during the same period. However, these countries remain relatively small producers.

Table 1: World Meat Production

	1979-81	1985	1989	1990	Percentage Change 1989-90	1991	Percentage Change 1990-91
	('000 tons)				%	('000 tons)	%
A. Beef and Veal							
United States	10,092	10,996	10,633	10,464	-1.59	10,530	0.63
FSU	6,720	7,370	8,800	8,814	0.16	8,160	-7.42
EC-12*	7,509	7,845	7,851	8,302	5.74	8,627	3.91
Argentina	2,933	2,760	2,600	2,650	1.92	2,640	-0.38
Brazil	2,104	2,223	3,800	3,600	-5.26	3,700	2.78
Australia	1,683	1,310	1,565	1,718	9.78	1,675	-2.50
Japan	430	555	548	549	0.18	573	4.37
Others	12,639	13,751	14,745	15,053	2.10	14,463	-3.93
World	44,110	46,810	50,542	51,152	1.21	50,368	-1.53
B. Poultry Meat							
United States	6,713	7,911	10,105	10,878	7.65	11,476	5.50
EC-12*	5,115	5,359	6,123	6,326	3.32	6,500	2.75
FSU	2,143	2,816	3,300	3,284	-0.48	3,200	-2.56
Brazil	1,345	1,549	2,139	2,416	12.95	2,663	10.22
Eastern Europe	1,806	1,836	1,989	1,939	-2.51	1,985	2.37
Japan	1,115	1,362	1,482	1,451	-2.09	1,417	-2.34
Thailand	373	470	553	595	7.59	655	10.08
Others	7,829	10,091	12,592	12,973	3.00	14,229	9.68
World	26,439	31,394	38,283	39,862	4.12	42,125	5.68
C. Pork							
China	11,704	17,337	21,228	22,811	7.46	23,009	0.87
EC-12*	12,511	13,315	13,979	14,084	0.75	13,703	-2.71
Eastern Europe	5,422	5,478	6,740	6,555	-2.74	7,187	9.64
United States	7,248	6,716	7,173	6,964	-2.91	7,258	4.22
FSU	5,223	5,853	6,700	6,646	-0.81	6,150	-7.46
Japan	1,434	1,532	1,594	1,555	-2.45	1,490	-4.18
Others	8,432	8,892	10,259	10,843	5.69	10,078	-7.06
World	51,974	59,123	67,673	69,458	2.64	68,875	-0.84

* Includes former East Germany.

Sources: FAO and US Department of Agriculture.

Over 80% of the world's pork is produced in five countries (China, the United States, the EC, Eastern Europe, and the FSU). China is the largest producer, with about one third of world production. The United States holds a 12% share of world production, followed by the EC with 10%. After increasing at about 3% p.a. during 1985-90, world pork production declined slightly in 1991 (-0.84%). The sharp declines in the FSU, Japan, the EC, and other countries largely offset growth in China, the United States, and Eastern Europe. Herd restructuring following the collapse of the FSU's farm system led to sharp declines in animal numbers and output. The pork sector in Japan is declining as environmental concerns and high feed costs force out small- and medium-sized producers. EC pork production also declined in 1991 due to significant reductions in the former East Germany. However, the continued rise in carcass weights compensated to some degree for the substantial decline in slaughter numbers. US pork output increased in 1991 as slaughter increased following herd expansion from the beginning of the year. Herd expansion continued in 1992, but at a slower rate due to low returns.

Table 2 shows annual growth rates of meat production by income and geographical groupings. A comparison of production trends between decades shows that except in China, India, the low-income countries in East Asia and the Pacific, South Asia, and North Africa, the average annual growth rate of meat output slowed from the 1960s to the 1980s. Poultry experienced double digit growth rates in most middle- and high-income countries. This rapid growth in poultry output has been largely due to the industrialization of production in most countries. Modern, large-scale production and processing enterprises have been established in many developing countries following the pattern begun in North America in the late 1940s. In the high-income countries, the long-run trend towards fewer, larger, and more vertically-integrated firms has allowed large efficiency gains. Use of modern technology in production, such as automated feeding, and use of high-energy rations and hybrid birds have improved the conversion of grain into poultry meat.

Supply Prospects

Modest growth in beef production expected. The recent high beef prices and strong export demand in the foot and mouth disease (FMD)-free areas will continue to stimulate herd rebuilding in major producing countries. However, the trend towards modest growth in the cattle inventory in several countries is likely to continue over the medium term and the growth in beef production will depend more on genetic developments and feeding technology than on increased cattle numbers. In North America and Oceania, continued improvements in breeding and finishing technology are projected to result in further growth in carcass weights which should compensate to some degree for the slow growth in animal numbers. Beef output in North America and Oceania is projected to continue its upward trend through the mid-1990s, before contracting slightly over the remainder of the decade. Likewise, pork production is projected to rise in major producing countries as the trend towards slaughtering heavier animals is likely to continue. In poultry, productivity improvements in feed conversion in an increasing number of countries are forecast to result in continued growth in world supplies during the 1990s.

In developing countries, the outlook for meat production will be determined by a broad set of factors including available technology, patterns of land tenure, farm structure, feed availability, and socioeconomic conditions. The type of meat that will be produced will be determined by land resources as well as supply and costs of feeds. In countries with rapid economic growth and industrialization, the most rapid expansion of meat production has occurred in the poultry sector. With the emergence of

Table 2: Annual Growth Rates of Meat Production, 1961-90 a/

Regions	All Meat			1961-90	
	1961-70	1970-80	1980-90	Beef	Poultry
Low-Income, Total	5.2	4.0	6.5	3.1	3.7
Large	7.1	5.2	7.9	9.3	3.5
China	3.2	2.7	5.1	3.7	1.9
India					
Small					
East & Southern Africa	1.9	2.4	1.3	2.5	5.1
West Africa	2.4	2.8	1.7	3.3	4.3
East Asia & Pacific	4.1	2.1	7.4	2.3	1.3
South Asia	3.5	3.1	5.0	2.7	5.2
Middle East	1.7	3.4	-1.7	6.3	6.3
North Africa	4.0	1.3	7.7	3.1	1.3
Latin America & Caribbean	3.0	3.5	2.0	5.0	9.1
Middle-Income, Total	3.0	3.4	2.5	4.6	7.0
Lower	2.6	3.8	1.8	2.9	8.8
East & Southern Africa	2.5	1.5	2.0	4.7	4.2
West Africa	3.3	3.0	3.2	6.9	6.2
East Asia & Pacific	4.0	4.0	3.8	2.6	9.0
Eastern Europe & FSU	2.9	5.1	0.9	4.6	8.1
Rest of Europe	2.3	2.6	2.0	2.7	4.7
Middle East	4.7	6.2	1.8	-0.6	9.8
North Africa	3.7	3.5	3.6	4.7	4.7
Latin America & Caribbean	1.9	3.1	1.5	2.5	11.4
Upper	3.2	3.2	2.8	5.7	6.0
East & Southern Africa	3.2	3.9	2.3	-0.9	13.7
East Asia & Pacific	7.9	10.6	5.7	3.6	12.5
Eastern Europe & FSU	2.8	2.3	2.8	7.4	3.5
Rest of Europe	4.1	5.3	0.7	9.5	15.4
Middle East	6.8	5.9	8.6	1.4	15.8
Latin America	4.0	4.8	2.8	3.5	9.1
High-Income, Total	2.4	2.4	1.6	3.3	5.9
OECD	2.3	2.3	1.5	3.2	5.8
East Asia & Pacific					
Australia	2.1	3.3	1.3	2.8	11.8
Japan	5.8	6.1	2.0	4.7	11.8
Europe				2.5	7.4
North America	2.6	2.8	1.3		
Canada	2.3	1.7	1.4	3.4	6.4
United States	1.7	1.4	1.7	3.8	4.2
Non-OECD	6.0	5.9	5.0	4.7	7.8
East Asia & Pacific	3.8	4.3	2.0	3.5	13.3
Middle East	5.3	6.1	2.9	3.0	6.1
Latin America & Caribbean	5.8	3.1	1.1	6.8	19.0

a/ Least squares trend growth rates for the period 1961-90.

Sources: FAO Production database. Calculations done by World Bank, International Economics Department.

large-scale integrated operations, production in this sector has become less tied to the land base. Animal feeds are either produced domestically or supplied through imports. Given the faster improvements in technical efficiency in the poultry and pork sectors, the cost disadvantages in these sectors are less than those incurred in cattle production. In some cases, beef can be supplied at a lower cost through imports from the industrial countries than through domestic production. The outlook for meat production in developing countries, therefore, is for faster growth in poultry and pork production relative to bovine meat (beef and veal, buffalo meat). In middle-income developing countries, where land and/or labor costs are increasing, the trend is likely to be towards larger-scale and integrated poultry production.

In the United States, the current herd expansion is slow and modest compared to the last cattle cycle. 1992 marked the third year of expansion, but the inventory expanded by only 2 million head from the cyclical low in 1990. During the last cattle cycle, the third year (1982) was the last year of expansion, and saw the herd growing 4.6 million head from the cyclical low in 1979. US beef and veal production is estimated to increase only 2% in 1992, following a 1% increase in 1991. Herd rebuilding is projected to continue through the mid-1990s, but with modest rates of growth of 1-2%, before entering a contraction phase for the remainder of the decade. Hence, the outlook for US beef production is one of modest increases during the next few years, with the cyclical peak projected in the mid-1990s. In the pork sector, low returns in 1991-92 prompted producers to increase culling and reduce retention of productive stock. US pork production is projected to continue its upward swing through early 1993 and then enter a contraction phase through the mid-1990s. Lower net returns in 1991 also resulted in slower growth in poultry output. Chicken meat supplies increased 4% over 1991, compared with 6% growth in previous years. However, further improvements in feed conversion and processing technology combined with strong domestic and export demand will boost US poultry production during the 1990s.

Strong export demand is expected to encourage continued herd rebuilding in Oceania. In Australia, cattle numbers are projected to expand slowly in the next two years, with slaughtering and output declining from current levels. After 1993, beef and veal production is projected to increase in line with the growth in cattle numbers. Expansion in Australian beef output is projected to continue until the mid-1990s. In New Zealand, beef production recovered significantly in 1991 from the 1988/89 drought. Beef output has continued its upward trend in 1992 following the increase in cattle numbers due to increased retention of dairy calves because of the high domestic beef prices and low milk prices. Also, improved seasonal conditions resulted in plentiful feed supplies supportive of longer feeding periods and higher slaughter weights. The outlook is for continued moderate herd rebuilding and increases in beef output over the medium term.

The continuing upswing in the Japanese Wagyu beef production cycle and the slight increase in the Holstein sector resulted in a modest rise in output in 1991 and 1992. Japanese beef production is expected to continue its slight upward trend in the next few years, with the bulk of the increase in Wagyu beef because of strong consumer demand. However, production of lower-quality beef is projected to level off over the next several years due to reduced prices as a result of import liberalization. In the Republic of Korea, prices for domestic beef have continued their upward trend, despite the rapid increase in imports. Korean calf production increased in 1991 as producers tried to expand herds to take advantage of the high prices. However, increases in the beef import quota may put some downward pressure on domestic prices in the near term.

The prospects for meat production in the FMD areas will depend largely on developments in the EC, Eastern Europe, and the FSU. In the EC, the medium- and long-run outlook for the beef sector will be influenced by a number of factors including the continuation of the dairy quota system, the provision of direct payments to extensive producers and the development of feedlot operations. The

political and economic reforms in Eastern Europe and the FSU have led to restructuring of livestock production. Livestock productivity is low in these countries due to outdated technology, inefficient resource use, and poor farm management practices. In the FSU, the combination of greater market orientation and lower feed grain supplies will result in a decline in meat output during most of the 1990s. Meanwhile, stability in production is beginning to be seen in parts of Central and Eastern Europe. However, farm profits continue to be squeezed as market forces begin to be felt through changes in input and output prices.

In the EC, a cyclical upturn in beef and veal output took place in 1990 and 1991 due to a number of factors: (i) the increases in beef cow numbers more than offset the fall in dairy cow numbers as a result of a tightening of the dairy quota system; (ii) the increasing importance of feedlot operations and the consequent increase in the share of fed cattle in total slaughter, leading to higher weight per animal; (iii) the German reunification resulting in an increase in the cattle herd and in slaughter numbers. The cumulative effect of these factors combined with stagnant demand resulted in the acceptance of massive quantities of beef into intervention stocks. The EC is proposing an extension of the milk quota system for a further eight years. The continuation of the dairy quota system and developments in feedlot operations are projected to result in a general rise in EC beef production over the medium term and through the second half of the decade.

Beef output is expected to decline in Central and Eastern Europe due to falling cattle numbers. In the FSU, the livestock sector is one of many in agriculture suffering from the sharp fall in economic activity and the changeover from centralized government control. Cattle inventories have declined for several years due to intensive culling, and growing death rates. The industry's productivity continues to be constrained by poor roughage and mixed-feed supplies and poor genetic material. The outlook is for a further fall in inventories, with the magnitude of the decline heavily dependent on the availability of inputs and the development of marketing channels. The breakdown of the grain procurement and distribution system, acute shortages of hard currency and limited foreign credits have resulted in very uncertain and limited supplies of feed grains and protein meals. As a primary user of imported feed grains, poultry production in the FSU is expected to decline over the next several years. The lag in genetic improvement notwithstanding, insufficient supplies of appropriate feeds will prevent any significant advances in FSU meat output in the 1990s. In fact, production is likely to continue to decline over the decade.

Brazilian beef production rose 6% in 1991, due to good pasture conditions and favorable producer returns which increased the average dressed carcass weight by nearly 2% over 1990. The cattle inventory in Brazil reached its peak in 1991 and is expected to begin a contraction phase in 1992. Government policies of price controls, subsidized imports, and export bans have been major deterrents to beef production. Investments to improve pasture conditions, management practices, and animal nutrition have been made only by the large ranchers which represent a minority among cattle producers. Production of beef has also been adversely affected by record poultry production as well as steady production of pork. Beef production is very sensitive to poultry prices which have been more attractive to consumers during a period of recession.

Technology improvements boost pork and poultry production. As in the beef sector, changing patterns of production and developments in feeding technology and animal genetics will largely influence the outlook for pork and poultry. Likewise, the demand for low-fat products will influence the type of meat produced in the industrial countries. The adoption of Western animal genetics and other technology has led to a rapid growth in output, improvements in feed efficiency and meat quality. While

small-scale operations still exist in developing countries, there is an increasing trend towards commercialization and vertical integration in poultry production in several countries in Asia, Latin America, the Middle East, and North Africa. In countries where central planning is no longer used to determine production targets, market pressures will force out inefficient producers.

The steady growth in China's hog inventory since 1986 was halted in 1991 due to floods, reduction in prices, and government policies to stabilize hog numbers. While China's hog sector is dominated by small-scale producers, large-scale hog operations will have more impact on future production growth. Also, as market forces play an increasing role in production and marketing decisions, more efficient operations will dominate. These factors are expected to result in continued production growth.

In other developing countries, the adoption of US swine genetics and other technology improvements have led to rapid growth in pork production, improvements in meat quality, and integration of operations. In Brazil, the demand for low-fat products has increased significantly in recent years.

More large-scale poultry operations mean higher growth in output. In Thailand, chicken meat production has been growing at rates of 7-8% p.a. since the mid-1980s. The strong growth is likely to continue due to expansion of broiler operations (both contract and independent farms) and the emergence of integrated poultry operations. Poultry production technology is similar to that of the industrial countries. Feeding technology is developed by the integrated poultry companies which produce poultry feed. Thai producers meet quality requirements of major import markets including Japan, the EC, and Asia. Since about 90% of Thai chicken meat is exported in the form of fancy cuts and deboned products, all processing plants employ labor-intensive processing technology. A similar trend is occurring in other countries including the Philippines and the Republic of Korea.

In the Republic of Korea, the growing domestic meat demand, and increasing labor costs are contributing towards increased mechanization and continued growth of large-scale operations in the poultry sector. The recent liberalization of imports of several feed ingredients, including soybean meal, is expected to put downward pressure on feed prices, at least in the near term, and will help boost poultry production. The process of integrating operations (production, processing, and marketing) in the Republic of Korea's broiler industry has recently begun and is expected to mitigate the limiting factors such as land scarcity and pollution controls. Productivity indicators such as daily gains, feeding days, and death rates show continued improvements.

Consumption Trends and Demand Prospects

Meat consumption slows in high-income countries, grows elsewhere. Total consumption of meats has grown at a much faster rate in developing countries than in industrial countries during the past two decades. In the 1970s and 1980s, the Asian region experienced the fastest increase in meat consumption among the developing regions, with most of the growth occurring in pork and poultry. In contrast, the growth in meat consumption has slowed in the industrial countries since the mid-1970s.

The trends in total and per capita meat consumption by income group[1] and type of meat are shown in Table 3 and Figure 1. In high-income countries, the decline in per capita beef consumption since the mid-1970s has been accompanied by a steady increase in poultry consumption. Pork consumption showed a slight upward trend while mutton and lamb consumption remained constant. In the United States, per capita beef consumption has declined 28% since the mid-1970s, from 40.28 kg/person in 1976 to 28.71 kg/person (boneless equivalent basis) in 1991 (Table 4). In contrast, US per capita consumption of poultry meat increased over 80% during the same period (from 16.55 kg/person to 30.25 kg/person). Similar trends are occurring in other high income countries, particularly in Oceania, traditionally a beef and sheep meat consumption region.

In middle-income countries, beef and veal still occupies the largest share in meat consumption, but poultry consumption has grown more rapidly than beef and veal during the last two decades. Following the decline from the mid-1970s to early 1980s, beef and veal consumption has resumed its upward trend since the mid-1980s. Pork remains the most popular meat consumed in low-income countries, but the total consumption of beef and poultry has grown steadily since the mid-1980s. However, total and per capita meat consumption in these countries remains very low relative to the middle- and high-income countries.

Consumption patterns change with income growth, demographic factors, and health concerns. The changes in consumption patterns for meat products have been determined by several factors. First, the sharp gain in poultry productivity due to vertical integration and developments in processing and distribution--which has led to lower prices relative to other meats--can partly explain the shift towards poultry products in many countries. In the United States, retail prices for whole chicken in 1960 were about one half those of the weighted average of all Choice cuts of beef. Whole chicken prices in 1991 were about 31% of the average composite Choice beef price (Table 5). In LMICs, increases in per capita income, urbanization, and changes in relative prices have been the main determinants of increased per capita demand for meat. In high-income countries, other factors aside from income have become important determinants of consumption patterns. These factors include diet and health concerns, increasing demand for convenience foods, and changes in demographic characteristics.

Income remains the most important factor influencing demand for meat. Demand generally increases with higher incomes. However, the relationship is nonlinear--at a certain income level, consumption tends to stabilize and then declines at the highest incomes. Rising incomes also affect the types of meat demanded, with more expensive cuts of meat demanded at higher income levels. Countries in East Asia provide examples of rapidly increased meat consumption accompanying fast economic growth. Lower incomes, on the other hand, reduce meat consumption or result in substituton towards lower priced meats. For instance, in Latin America, total meat consumption declined as real incomes fell during the 1980s and there was a shift from beef and pork to lower-priced poultry.

Changes in demographic characteristics of the population affect lifestyles and eating habits. For instance, the long-run trend towards smaller households, more two-income households, more single-person households, and increasing proportions of ethnic minorities and elderly have been fueling demand for convenience cuts and leaner meat and away-from-home consumption. Health consciousness in North America has also affected the types of meat demanded, with consumers demanding less fat, fewer calories, and better nutrition.

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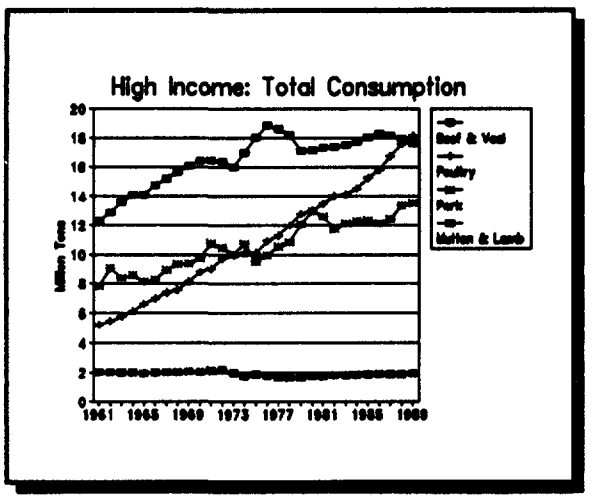
[1] The 185 countries are divided into four income groups using the World Bank's Global Economic Prospects classification. Using GNP per capita in 1990 US dollars: low-income, $610 or less; lower middle-income, $611-2,465; upper middle-income, $2,466-7,619; and high-income, $7,620 or more.

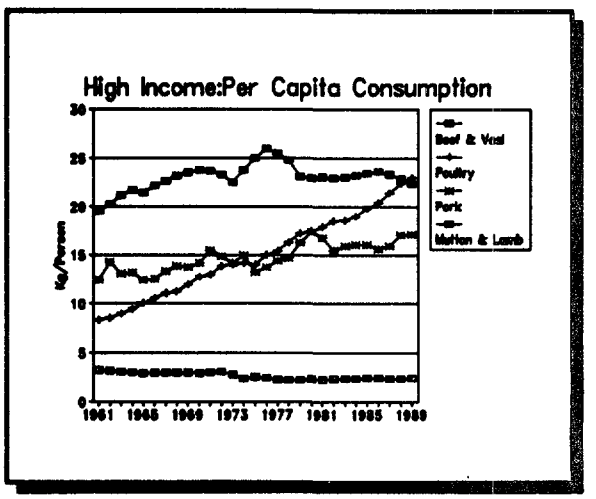
Table 3: Average Per Capita Meat Consumption by Income Group, 1961-89

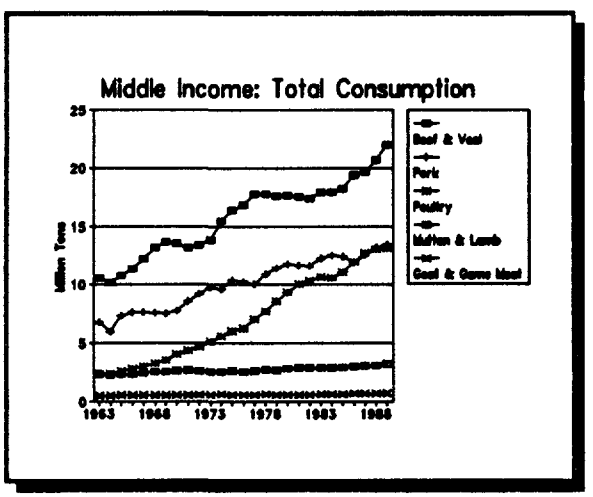
Income Group/Food Commodity	1961-63	1964-66	1969-71	1972-74	1974-76	1976-78	1979-81	1982-84	1984-86	1987-89
	(kg/person)									
High-Income Countries										
Bovine meat	24.64	26.67	29.16	28.96	30.91	31.74	28.48	28.50	28.84	28.29
Sheep meat	3.24	3.04	3.00	2.80	2.49	2.34	2.32	2.41	2.45	2.45
Pig meat	22.15	22.33	25.39	26.52	26.15	27.04	30.92	30.38	30.81	31.82
Poultry meat	8.80	10.21	12.77	14.25	14.65	15.87	17.87	19.04	20.09	22.76
Other meat	1.68	1.72	1.79	1.83	1.85	1.90	1.90	1.74	1.71	1.63
Milk & products	186.48	188.57	191.16	193.17	192.75	195.40	201.02	203.73	208.09	212.55
Fish & seafood	20.91	21.60	23.52	25.00	24.71	24.41	24.46	25.81	27.21	29.11
Upper Middle-Income Countries										
Bovine meat	13.40	14.70	17.29	18.20	19.61	20.16	19.21	19.16	19.38	21.50
Sheep meat	3.29	3.07	3.03	2.84	2.70	2.58	2.63	2.50	2.48	2.59
Pig meat	14.01	13.37	13.81	15.90	16.22	16.08	16.76	17.13	16.67	16.64
Poultry meat	3.20	3.21	4.64	5.63	6.20	7.07	9.14	10.22	10.59	11.89
Other meat	0.90	0.70	0.82	0.90	0.91	0.82	0.75	0.70	0.71	0.72
Milk & products	115.88	113.87	130.27	127.36	135.06	132.53	129.69	124.67	127.93	127.45
Fish & seafood	11.45	13.57	15.83	18.00	18.96	17.99	17.56	18.36	19.14	19.33
Lower Middle-Income Countries										
Bovine meat	12.29	11.17	11.80	10.67	12.12	12.86	12.37	11.07	11.15	10.92
Sheep meat	3.34	3.18	3.32	3.10	3.08	3.09	2.95	2.98	2.94	2.83
Pig meat	6.90	7.13	7.27	8.23	8.34	7.97	8.49	7.86	7.81	8.18
Poultry meat	2.22	2.67	3.57	4.36	5.00	5.53	6.70	6.68	6.78	7.22
Other meat	0.96	0.85	0.78	0.76	0.75	0.72	0.71	0.71	0.69	0.63
Milk & products	70.14	71.71	74.84	76.03	77.13	78.80	79.56	74.85	74.40	72.79
Fish & seafood	8.31	9.46	11.51	12.22	12.40	12.68	13.38	13.76	13.89	14.05
Low-Income Countries										
Bovine meat	1.39	1.40	1.43	1.37	1.38	1.39	1.45	1.53	1.62	1.80
Sheep meat	0.79	0.81	0.79	0.76	0.78	0.82	0.89	0.93	0.94	1.02
Pig meat	1.67	3.23	3.33	3.71	3.61	3.58	4.83	5.51	6.38	7.30
Poultry meat	0.77	0.80	0.84	0.89	0.93	0.99	1.16	1.36	1.47	1.69
Milk & products	19.30	18.23	18.27	18.14	18.54	19.58	20.83	23.25	24.67	25.81
Fish & seafood	4.30	5.00	4.88	5.07	5.18	5.28	5.20	5.59	6.04	7.11

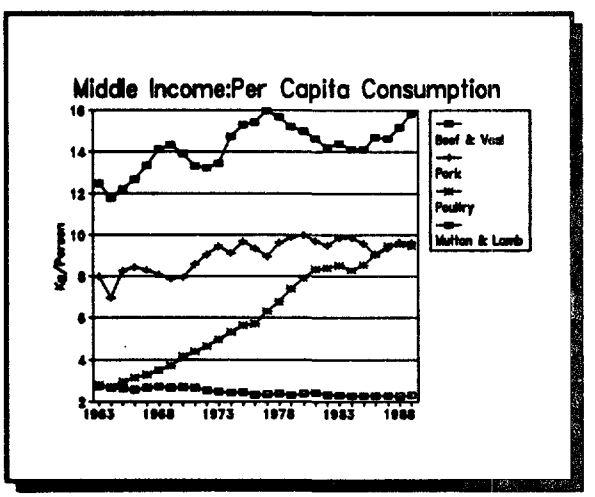
Source: FAO Supply and Utilization databases. Calculations done by World Bank, International Economics Department.

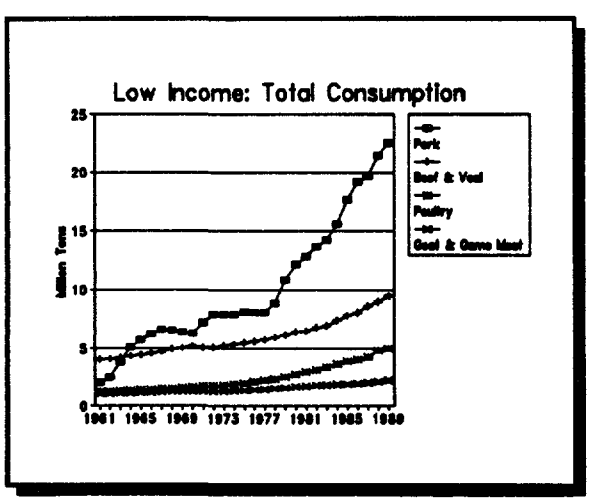
Figure 1: Meat Consumption By Income Groups











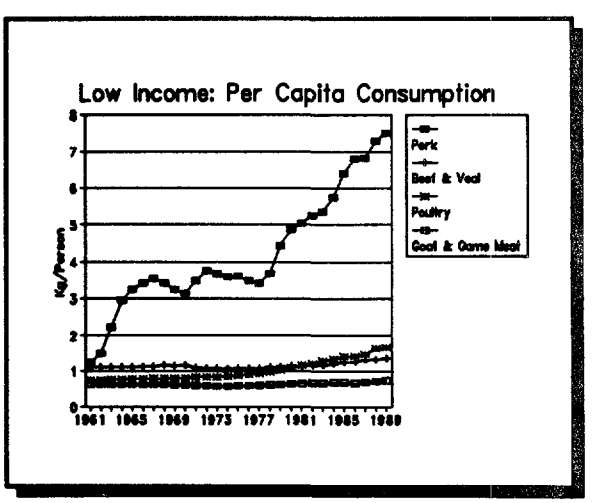


Table 4: US Per Capita Consumption of Red Meat, Poultry, and Fish

Year	Poultry		Beef	Pork	Veal & Lamb	Fish & Shellfish	Total
	Chicken	Turkey					
	(kg/person,boneless)						
1966	11.11	2.86	33.43	19.37	2.63	4.94	74.34
1970	12.56	2.90	36.20	21.91	1.86	5.31	80.69
1976	13.29	3.26	40.28	18.28	1.77	5.85	82.74
1980	15.56	3.76	32.70	23.63	1.04	5.62	82.33
1987	19.69	5.49	31.52	20.68	1.04	7.30	85.73
1989	21.45	6.17	29.66	21.95	0.95	7.08	87.27
1990	22.41	6.58	28.98	21.05	0.91	6.98	86.91
1991	23.45	6.80	28.71	21.27	0.86	6.98	88.09

Source: US Livestock and Poultry Situation and Outlook Report, ERS-US Department of Agriculture.

The poultry marketing and processing sector has been able to meet the demand for convenience faster than the red meat sector, although leaner meat cuts of beef and pork have recently been introduced, particularly in North America. Rapid expansion has occurred in cut-up poultry products rather than in whole birds. Consumers can choose from an array of products, including leg packs, skinless breast fillets, ground turkey, turkey hams, etc. One of the biggest boosts to poultry consumption is the proliferation of chicken meat in fast-food menus. The beef industry in the United States responded to the increasing demand for leaner meat by introducing fat-reduced beef products in fast-food and retail sectors. However, the sales of lean beef hamburgers in the fast-food sector was limited by consumers' perceptions about the technology for reducing the fat content. In general, the substitutes used to replace the fat and maintain flavor were perceived as "not natural". Further, reducing the fat in beef products is effectively a means of value-adding and product differentiation (characterized by fat and calorie content, and flavor), so that the product can be sold at a premium. Future developments in the technology to reduce fat content at a lower cost while maintaining flavor will affect the demand for low-fat beef products.

In Japan, the decline in the average number of persons per household (from 4.9 in 1955 to 3.2 in 1991) and the increase in the female labor force participation rate (from 45% in 1970 to 50% in 1989) have increased the demand for convenience foods and led to less frequent purchasing of food for in-home consumption. The demand for "value-added" meat products, and easy-to-prepare cuts of meat and processed products has increased. The import liberalization has also increased the availability of lower-priced beef and contributed to recent gains in beef consumption.

Increased urbanization and changes in demographic characteristics in developing countries have also increased the consumption of food away from the home and led to growth in demand for fast-food products such as hamburgers and fried chicken. Poultry meat is becoming more popular in developing countries because it is a relatively low-cost protein source and it is being used in a large variety of foods, from traditional in-home consumption to the increasingly popular away-from-home

Table 5: US Average Retail Prices of Red Meat and Poultry a/

Year	Poultry		Choice Beef	Pork
	Chicken	Turkey		
	(US$/kg)			
1960	0.92	1.23	1.78	1.21
1970	0.92	1.26	2.20	1.70
1980	1.58	1.96	5.16	3.06
1989	2.05	2.18	5.86	4.03
1990	1.98	2.18	6.19	4.70
1991	1.94	2.20	6.35	4.67

a/ Prices are unweighted annual averages. Prices include some bone and exterior fat for beef and pork, and bone and interior parts for chickens and turkeys.

Source: US Livestock and Poultry Situation and Outlook Report, ERS-US Department of Agriculture.

consumption. In addition, the expansion of fast-food franchises (Kentucky Fried Chicken, McDonald's, Burger King, Pizza Hut, etc.) in developing countries is leading to increasing availability and variety of chicken-based processed meat. In Thailand, some integrated processors are diversifying their operations to include chicken meat products such as sausage, grilled chicken, etc. In developing countries where religion prohibits eating pork, chicken meat consumption is also increasing rapidly.

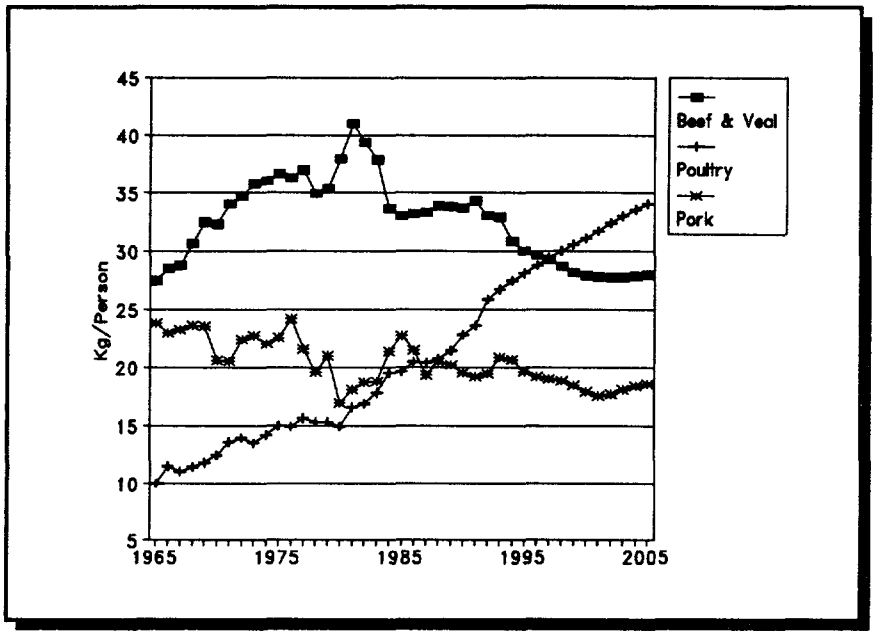
Several studies of meat demand in the United States have reported changes in demand elasticities. Although the results of these studies are not always comparable due to differences in methodology and data, most indicate that since the mid- to late 1970s, US beef demand has become less elastic with respect to own-price and income,[2] while demand for chicken has become a stronger substitute for beef or more responsive to income.[3] Evidence of change in pork demand is much weaker, but it might have become less responsive to its own-price. Overall, this evidence suggests a saturated but stable market for red meat and an increased preference for poultry.

The downtrend in the demand for red meat relative to white meat in North America is likely to continue, slowing in the 1990s, but not ending (Figure 2). US per capita consumption of beef is projected to continue to decline in the near to medium term, while the upward trend in demand for poultry is projected to continue. Per capita consumption of poultry meat in the United States and in the high-income countries in aggregate is projected to continue to exceed beef and veal consumption throughout the 1990s. Chicken meat is likely to continue to have the largest share in total poultry meat

[2] See Chavas, J.P. "Structural Change in the Demand for Meat," American Journal of Agricultural Economics 65(1983):pp.148-153.

[3] See Braschler, C. "The Changing Demand Structure for Pork and Beef in the 1970s: Implications for the 1980s," Southern Journal of Agricultural Economics 15(1983), pp. 105-110; Moschini, M.A. and K.D. Mielke, "The US Demand for Beef," Western Journal of Agricultural Economics 9(1984), pp. 271-282.

Figure 2: US Per Capita Meat Consumption



Source: World Bank, International Economics Department.

consumption. In the longer run, the shift towards poultry meat may slow due to increased marketing efforts by the beef industry, combined with the production of leaner meat and/or the sale of heavily-trimmed meat.

In developing countries, high income elasticities and the currently low average consumption levels indicate a large potential for growth in meat demand. Income growth will be the major factor determining future levels of consumption and imports. Middle-income countries in Asia, Latin America, and the Middle East are likely to continue to experience the fastest growth in meat consumption among the developing regions, with East Asia being the main growth area. Pork is likely to continue to hold the largest share, but the proportion of poultry should increase. Falling trade barriers and continued growth in incomes in East Asian meat markets should result in high growth in meat consumption in East Asia during the 1990s.

In the FSU and Eastern Europe, the demand for meat is expected to weaken due to recent declines in real incomes and projected slow economic growth. This will lead to lower meat consumption and imports during most of the 1990s. Considerable efficiency gains are believed to be possible in production, but the timing of such gains is very uncertain.

Trade Prospects

Liberalization of barriers to beef trade encourages growth in Asia. The volume of meat traded remains a very small proportion of world production, in part due to trade restrictions. In 1991, only about 10% of beef output, 3% of pork, and 7.6% of poultry was exported (excluding intra-EC

trade). However, recent changes in supply and demand in various countries have increased the total quantity traded and changed the mix of meat exported. Meat exports increased 25% from 1985 to 1991, led by a 70% gain in poultry meat. Beef exports rose more than 20%, while pork exports increased 20%.

The international trade in meat remains highly segmented and continues to be limited by trade barriers in many countries. The outlook is promising in the FMD-free areas, as liberalization policies in several countries are facilitating growth in imports. Most of the future growth in trade is projected to occur in the Pacific Rim countries whose market share in world beef trade has increased significantly since the mid-1980s. Recent changes in market access policies in Asia, coupled with continued income growth, will fuel further increases in meat demand and imports. In contrast, the prospects for meat trade in the FMD areas is less promising. Import demand is dependent on less predictable factors. On the supply side, the accumulation of beef stocks in the EC will have a major impact on trade. Likewise, supplies and trade are clouded by future policy developments in the EC. Imports into the FSU over the medium term are projected to decline--limited by reduced incomes and scarce foreign exchange and credit.

Recent trends in beef and veal trade in major countries are shown in Tables 6 and 7. The United States remains the world's largest beef importer. However, the importance of Asian countries has increased significantly since the mid-1980s. Japan's share in world beef imports increased from 11% in 1987 to 14.6% in 1991 (excluding intra-EC trade). In contrast, the shares of the United States and the EC declined from 37% to 31% and from 14.5% to 11.5%, respectively, during the same period. The EC is the largest beef exporter, accounting for about 26% of world exports in 1991, followed by Australia with about 21%. US beef exports have increased significantly since the mid-1980s and accounted for about 11% in 1991, compared with only 7% in 1987. Beef exports by some developing countries have also increased since the mid-1980s, with major gains reported in Argentina and China.

China's beef production and exports expanded rapidly in recent years, driven by domestic and export demand. Exports of chilled, frozen, and canned beef have increased. China has become a major exporter of frozen and canned beef to the FSU. As in other developing countries in Asia, the fast-food revolution has also reached China with the opening of the first McDonald's in Shenzhen and a planned opening in Beijing.

Japan and the Republic of Korea are the two fastest growing markets for beef in Asia. Both countries are experiencing rapid growth in meat demand, and the majority of the increase, particularly of beef, is being met by increased imports. In Japan, beef imports have grown significantly since the mid-1980s (Figure 3). Japanese beef imports now account for almost one half of total beef consumption, a 28% increase since 1985. Australia and the United States are the two major suppliers of beef to Japan, accounting for over 95% of total imports. Japanese beef imports rose strongly in 1992 as beef stocks were drawn down and the tariff lowered from 70% to 60%. The tariff will be further reduced to 50% in 1993. There are many uncertain factors in the Japanese market, however; while future tariff reductions, combined with forecast strong demand for beef, are projected to lead to rapid growth in imports during the 1990s these further reductions will depend on the outcome of the GATT Uruguay Round. Forecast levels of Japanese beef consumption and production imply that Japan must increase beef imports to about 500,000 tons (boneless basis) over the next few years.

Growth in beef imports in the Republic of Korea has spiralled since the implementation of bilateral agreements with the United States and Australia (Figure 4). Beef consumption has increased by 55% since 1988--from 142,000 tons to 220,000 tons in 1991. With the growth in demand, imports have been consistently above the base quota level which was increased from 14,500 tons to 115,000 tons

Table 6: Beef and Veal Imports, Selected Countries, 1987-92 (carcass-weight equivalent)

Country	1987	1988	1989	1990	1991	1992 b/
	('000 tons)					
North America						
Canada	135	153	158	185	210	210
United States	1,040	1,092	988	1,069	1,091	1,048
Latin America						
Argentina	0	0	0	0	2	15
Brazil	167	26	218	250	150	70
Peru	25	5	4	5	6	10
Venezuela	21	8	3	2	10	10
Mexico	4	15	40	60	100	140
EC-12 a/	410	467	449	401	405	410
Eastern Europe	64	125	185	169	69	96
FSU	142	117	150	250	400	430
Middle East						
Saudi Arabia	55	26	15	18	20	22
Africa						
Egypt	170	150	181	120	115	135
South Africa	48	68	58	33	23	25
Asia						
Japan	315	380	498	537	515	580
Korea, Rep. of	0	20	83	117	172	210
Philippines	6	7	13	11	12	15
World						
Incl. intra-EC trade	4,244	4,336	4,738	4,932	5,211	5,246
Excl. intra-EC trade	2,830	2,909	3,260	3,432	3,531	3,653

a/ Excluding intra-EC trade.
b/ Estimate.

Source: US Department of Agriculture.

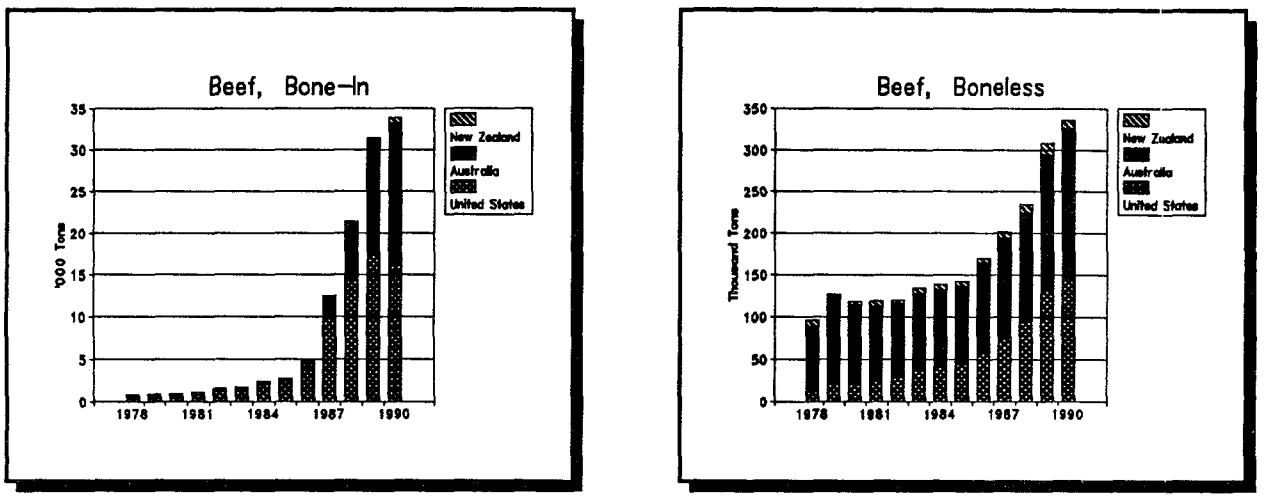
Table 7: Beef and Veal Exports, Selected Countries, 1987-92 (carcass-weight equivalent)

Country	1987	1988	1989	1990	1991	1992 b/
	('000 tons)					
North America						
Canada	93	86	108	110	106	110
United States	277	313	464	456	539	612
Oceania						
Australia	908	890	872	1,064	1,031	1,032
New Zealand	432	435	435	359	435	448
Latin America						
Costa Rica	27	23	21	19	23	20
Guatemala	12	10	16	18	13	13
Honduras	6	6	9	11	13	13
Argentina	287	320	360	451	372	280
Brazil	302	550	323	230	300	380
Uruguay	93	132	177	192	110	110
EC-12 a/	910	886	1,180	1,060	1,284	1,133
Eastern Europe	294	296	281	173	129	147
Asia						
India	134	132	126	126	140	132
China	34	54	57	155	219	250
World						
Incl. intra-EC trade	5,361	5,675	6,040	6,040	6,530	6,381
Excl. intra-EC trade	3,947	4,248	4,537	4,537	4,857	4,793

a/ Excluding intra-EC trade.
b/ Estimate.

Source: US Department of Agriculture.

Figure 3: Japanese Beef Imports, 1978-90



Source: World Bank, International Economics Department.

(boneless basis) between July 1988 and 1991. Korean beef production is estimated to increase in 1992 as producers expand herds in anticipation of higher beef prices. Despite this anticipated rise, the minimum beef quota for 1992 was raised to about 185,000 tons (carcass weight).

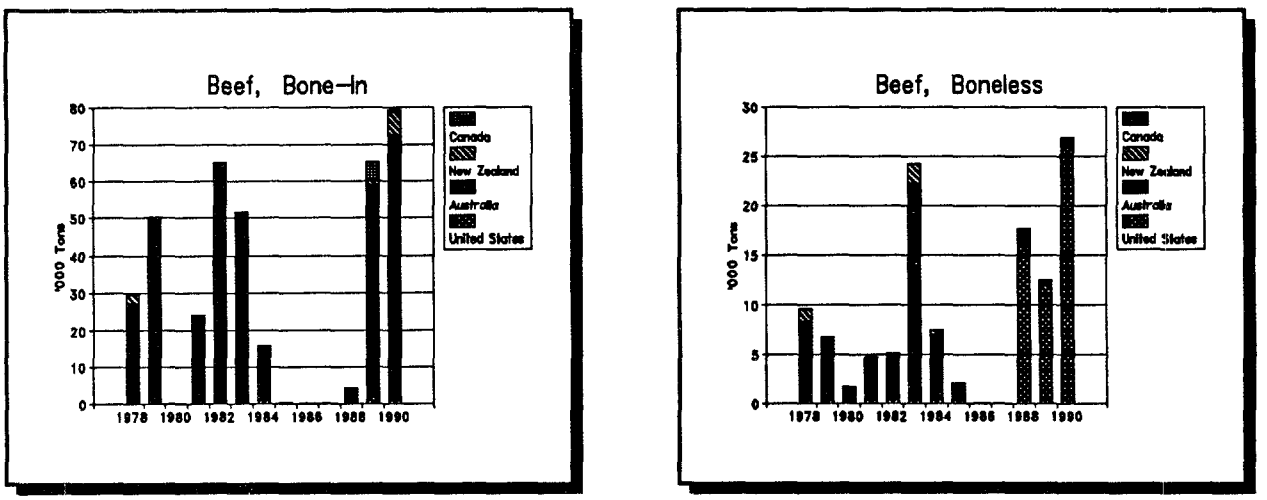
Australia is the Republic of Korea's main supplier of beef. However, imports from the United States rose from 21,500 tons (product weight) in 1989 to 49,000 tons in 1991, resulting in an increase in the US share from 19% to 30%. In the US-Korean Beef Agreement of April 1990, the Republic of Korea agreed to eliminate beef import restrictions before July 1997.

The Asian region is potentially a huge market for beef trade in the 1990s due to high income elasticities of demand for meat and the current very low per capita consumption levels. The combination of population and income growth with trade liberalization policies should result in beef trade diversion from the United States to Asian markets, and contribute to upward pressures on US beef prices.

USDA reports indicate an increase in Japanese investment in the beef industry in the United States, Australia, and New Zealand through purchases of ranches, feedlots, and processing plants to supply beef to the Japanese market. The US Department of Agriculture estimated that Japanese firms in the United States accounted for about 15% of total US beef exports to Japan in 1991; while in Australia, Japanese firms accounted for almost 50% of beef exported in 1991.

US beef exports likely to exceed imports by mid-1990s. US beef and veal imports rose 2% in 1991. Supplies from Australia were drawn into the United States due to tight US supplies and relatively high prices of US cow beef, along with favorable exchange rate movements. Also, demand was down in Japan due to the large stock of frozen beef accumulated prior to the April 1991 relaxation of import restraints.

Figure 4: Republic of Korea's Beef Imports, 1978-90



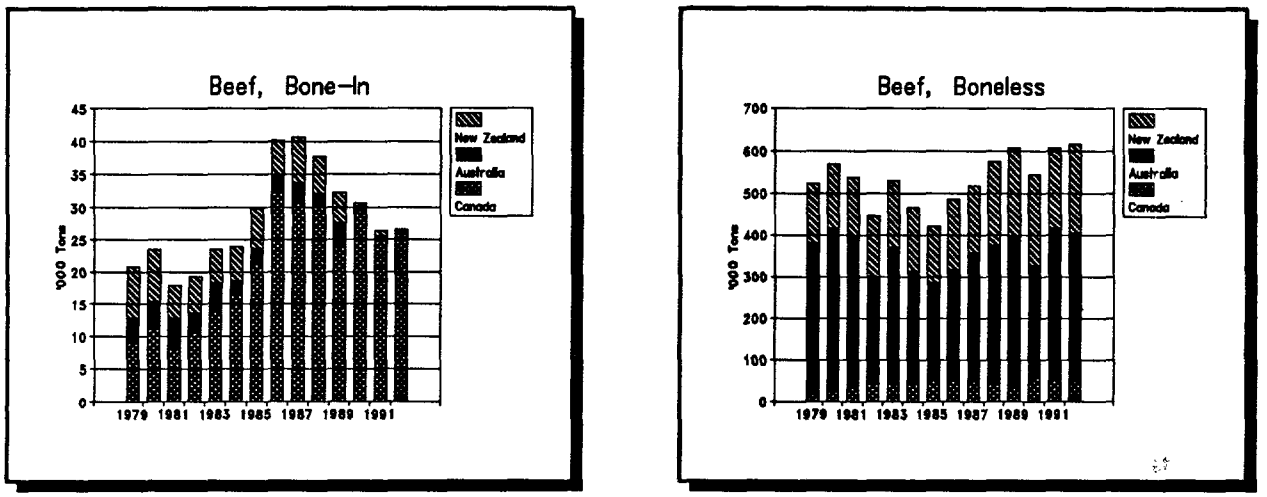
US meat imports from Australia and New Zealand have been governed by the US Meat Import Law since 1964. The law was revised to include a countercyclical formula to set the level of imports inversely with US cow beef production to offset production variations in each cycle. The US Meat Import Law provides for a minimum level of meat imports (including beef and veal, buffalo, mutton and goat meat) at 567,000 tons. If the expected quantity of imports is likely to exceed the "trigger level,"[4] quotas are required. These quota requirements can be superseded by the US government negotiating voluntary restraints with supplying countries. In 1992, the trigger level was set by the US Department of Agriculture at 594,750 tons, only slightly below the 1991 trigger level of 598,062 tons. Voluntary restraint agreements (VRAs) were negotiated in 1991 between the United States and Australia and New Zealand of 337,000 and 202,000 tons, respectively. US beef imports from countries not included under the law (Argentina and Brazil) increased in 1991.

US exports of meat have grown significantly in recent years because of increased beef and veal exports to Canada, Japan, Mexico, and the Republic of Korea. With likely declines in domestic per capita consumption and continued liberalization in major export markets, US meat exports are likely to exceed imports by the second half of the decade. Japan continues to be the single most important market, accounting for 75% of US exports of beef, and 60% of pork and variety meat exports. US beef and veal exports to the Republic of Korea in 1991 were up more than 50% from 1990.

EC beef exports (excluding intra-EC trade) rose 20% in 1991 to about 1.3 million tons despite the disruption of traditional export markets. Concerns over Bovine Spongiform Encephalopathy (BSE) continued to adversely affect EC exports to traditional markets in the Middle East (Iran, Algeria, and Libya). However, this was more than offset by larger exports to Brazil and the newly independent states of the FSU.

[4] Equivalent to the base quota for the year times 10%.

Figure 5: United States Beef Imports, 1979-91



Growth in poultry markets elsewhere compensates for FSU decline. In the poultry market, the leading exporters are the EC, the United States, Brazil, Hungary, and Thailand. The world market for poultry meat has continued to expand in recent years, with world exports increasing to 2.7 million tons in 1991 (Table 8). In 1991, the Netherlands and Thailand experienced the most rapid growth in poultry meat exports, with growth rates of 17% and 14%, respectively. The United States remains the world's largest exporter of poultry meat, with 588,000 tons exported in 1991. Exports to the FSU declined in 1991, but exports to Asian markets continued to be robust. With a decline in FSU's poultry meat imports in 1991 of 50%, the total import market for chicken meat was estimated to shrink by 3% compared with 1990. However, import markets in Japan, Hong Kong, and Mexico showed continued rapid growth in 1991, with growth rates of 13%, 12%, and 41%, respectively. At least in the near term, the availability of foreign credit will determine future imports level by the FSU.

Thailand is the largest poultry exporter in Asia and the fourth largest in the world. Fueled by strong demand in Japan and other Asian countries as well as success in European markets, exports increased to 138,000 tons in 1990, following a 12.5% growth in 1989. Japan imports thigh meat and deboned breast. Exports to the European market are mostly skinless, boneless breast, while exports to the Middle East are mainly whole frozen broilers and bone-in-leg parts. Exporters foresee continued growth in demand from both Japan and the EC. Steady growth in Thai frozen chicken production will boost exports to Japan in the 1990s.

Although the Republic of Korea has begun to liberalize agricultural imports, the poultry sector is still highly protected. Currently, imports of fresh, chilled or frozen chicken meat are prohibited. However, under an agreement with the United States, fresh and chilled chicken meat imports are scheduled to be liberalized in 1994.

Table 8: Poultry Meat Trade, Selected Countries, 1989-92 (Ready-to-Cook Equivalent)

Countries	1989	1990	1991	1992 a/
	('000 tons)			
Exports				
United States	398	554	588	579
Brazil	248	305	295	325
France	474	497	530	550
Netherlands	340	376	440	460
Thailand	111	144	165	185
Others	786	762	719	779
Imports				
Japan	281	301	341	387
Hong Kong	198	239	255	260
Saudi Arabia	194	209	203	209
FSU	210	277	130	150
Netherlands	76	113	150	175
France	71	67	80	80
Mexico	51	46	80	89
Canada	42	53	48	48
Others	799	952	997	1,062

a/ Projection.

Source: US Department of Agriculture.

Chicken parts represented more than 90% of 1991 US chicken exports, about the same as in 1990. While US chicken meat exports to the FSU were down about 5%, due mostly to credit limitations, exports were strong to most other markets–up over 20% from 1990 (Table 9). Japan and Hong Kong were the largest markets, with increases of nearly 40% and 26%, respectively. US exports to Mexico increased about 55% as consumption of relatively low-priced chicken meat continues to rise rapidly. US exports to the Middle East also rose substantially, where over 60% are whole birds, in contrast to only 7-8% whole birds among all exports. The growth of US chicken meat exports to Pacific Rim countries is likely to continue in the 1990s. Poultry meat consumption in these countries is steadily growing. Other markets include Canada, the Caribbean, Mexico, and the Middle East. In the past, exports to the Middle East have consisted mainly of whole birds under the Export Enhancement Program (EEP).

In the EC, the policies on poultry meat exports to non-member countries were changed to reflect world market conditions and export refunds were reduced, although they still vary according to destination. In 1991, the concession to reduce levies by 50% granted by the EC under the generalized system of preferences to ACP countries, as well as Hungary and Poland, was extended to Czechoslovakia and Bulgaria.

Table 9: US Exports of Poultry Meat, 1989-91

Destination	Quantity			Unit Value		
	1989	1990	1991	1989	1990	1991
	(tons)			(f.o.b.US$/kg)		
Chicken Parts						
Japan	101,285	87,903	122,430	1.26	1.21	1.19
Hong Kong	74,553	80,463	101,964	1.07	0.96	0.96
Canada	27,201	30,437	29,043	1.43	1.92	2.39
FSU	11,703	136,458	83,039	0.77	0.71	0.79
Mexico	38,023	34,628	53,816	0.95	0.97	0.95
EC-12	10,391	17,777	21,904	0.97	0.92	0.99
Saudi Arabia	2,156	5,326	5,788	1.14	1.29	1.38
United Arab Emirates	1,308	2,299	2,285	1.26	1.28	1.61
Bermuda	1,128	1,460	1,570	2.27	2.30	1.98
Republic of Korea	67	1,386	934	1.96	1.65	2.27
Bahrain	279	299	824	1.22	1.55	1.60
Western Samoa	516	1,065	1,073	0.64	0.69	0.74
Colombia	862	422	829	0.98	0.99	0.88
Whole Broilers						
Jordan	0	3,386	6,511	0	1.10	1.37
United Arab Emirates	0	1,271	5,129	0	1.23	1.25
Saudi Arabia	176	1,517	5,459	1.34	1.27	1.16
Mexico	2,852	3,872	5,761	1.14	1.03	1.10
Canada	2,885	4,371	3,471	1.34	1.33	1.30
Oman	0	1,318	2,972	0.00	1.23	1.31
Japan	155	5,533	3,041	1.02	1.02	1.08
Hong Kong	56	216	3,340	2.93	1.01	0.91
Singapore	105	547	729	1.28	1.01	0.98
Micronesia	648	1,244	1,394	1.43	0.97	0.96
Guatemala	34	19	814	1.21	0.74	1.24
Bermuda	522	517	558	1.49	1.41	1.34
Bahrain	0	331	552	0	1.25	1.30
Nicaragua	0	0	475	0	0	1.10
Angola	79	129	329	1.41	1.44	1.40
EC-12	34	318	173	1.91	1.39	1.21

Source: US Department of Agriculture.

Developments in Eastern Europe and the FSU

Lower incomes mean decreases in meat imports. Political and economic reforms in Eastern Europe since 1990 and the collapse of the FSU in 1991 continue to present major uncertainties in the outlook for meat trade. As with the rest of the FSU's agriculture, meat production has sharply declined (-7%) from 1989 and 1990 levels. Projections for 1992 show another 6% drop to 7.7 million tons. In recent years, major reforms to the meat industry include price liberalization, elimination of subsidies, and adoption of market-oriented marketing and distribution systems; further changes are expected during the decade. In most of these countries, meat production is adversely affected by inefficient production systems, poor farm management and genetic material, feed shortages, and distribution difficulties.

The FSU has been a significant net importer of agricultural products. Meat imports by the FSU rose markedly in the 1970s and remained high during the 1980s. Beef imports, mostly in the form of food aid, increased in 1991 and 1992. Until 1991, the FSU imported significant amounts of meat and grain from Eastern Europe, largely on a barter basis using a nonconvertible accounting unit called the transferable rouble. Since 1990, countries in Eastern Europe have reduced their trade ties with the FSU and begun to develop closer relations with Western countries, particularly the EC. With the collapse of the CMEA and the changes in the FSU, trade between Eastern Europe and the FSU virtually disappeared in 1991. With greater independence of the republics and adoption of market systems, imports will depend on many factors including: (i) effects of the price liberalization on production and consumption; (ii) ability to earn foreign exchange; and (iii) policy developments in the EC.

The changes in the FSU seem likely to result in further reductions in the region's meat production, consumption, and imports. In addition to current inefficiencies in production, meat output will be adversely affected by further reductions in feedgrain imports due to shortages of foreign exchange, while these reductions in grain production and imports are likely to lead to some diversion in utilization of grains from livestock to direct human consumption. The combination of greater market orientation, reduced incomes, limited foreign exchange, and much lower grain crops could result in a decline in livestock and meat production at least through the mid-1990s. Lower meat output, however, is unlikely to result in higher meat imports unless incomes recover and foreign exchange earnings increase or more aid and credit assistance are extended. In the long run, imports of meat products could rise as incomes and foreign exchange earnings increase. Policies of Western countries will also influence the FSU's meat trade. The continuation of policies to support production and subsidize exports in the industrial countries will result in greater FSU imports than if these policies were eliminated. In the near to medium term, most imports are likely to be in the form of food aid from North America and Western Europe.

Price Prospects

Beef prices to rise in long term. The uptrend in US prices of imported beef since 1986 continued through the second half of the decade and the early 1990s (Figure 6). Prices of US imported frozen boneless beef (85% lean) averaged US¢266.3/kg in 1991--3.9% above the previous year and 27.4% above the 1986 level. The recent upturn in prices was due to relatively tight US supplies and lower production in Australia and New Zealand. Also, concerns about the US quota trigger levels during the second and third quarters caused a sharp price increase going into the fall of 1991 (Figure 7). Prices declined in 1992, however, as record total meat supplies and a weakening economy weighed on prices.

Figure 6: US Beef Import Prices, 1961-91 (85% Lean Frozen Boneless, c.i.f. US port)

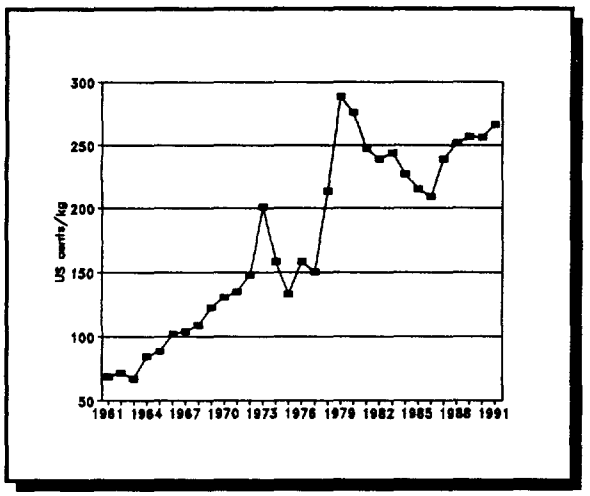
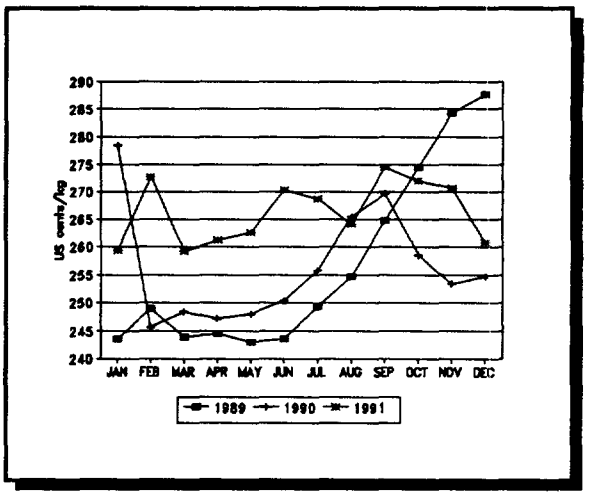


Figure 7: US Beef Import Prices, 1989-91(monthly) (85% Lean Frozen Boneless, c.i.f. US port)



The outlook for beef markets in the FMD-free areas will depend critically on how the major producing countries respond to the liberalization of the Japanese and Korean markets. The beef trade liberalization policies implemented in Japan since 1988 and the gradual opening of the beef market in the Republic of Korea have shifted trade from the traditional markets in North America towards the Pacific Rim Asian countries. Excluding intra-EC trade, Japan became the world's largest net importer of meat and meat products in 1989, with total imports reaching nearly 1.5 million tons (carcass-weight basis)--twice the level of the early 1980s. Other factors that will influence the outlook for the beef markets in FMD-free areas are: (i) negotiations on further reductions of the tariff on Japanese beef imports; (ii) quota increases by the Republic of Korea; and (iii) supply and demand conditions in the major producing and consuming countries. It is likely that the continued growth in demand for beef in the Pacific Rim countries will be met by increases in imports as domestic consumption continues to outpace production.

Continued improvements in market access in Japan and other rapidly growing Asian countries will contribute to upward price pressures in the medium and long term. However, in the next several years, the abundant supplies of competing meats and slow economic growth will hold down the price gains. US beef import prices (in nominal terms) are projected to rise only modestly to average around US¢264/kg by 1995 or US¢228/kg in constant 1990 dollars. Real prices are projected to rise during the second half of decade due to several factors including declines in US output as the beef cycle enters its contraction phase in the mid-1990s, expected increase in exports of US beef to Asian markets, and lower beef exports from Australia to the United States--also as a result of increased shipments of Australian beef to Asia. However, the price increases will be tempered by abundant supplies of competing meats, particularly poultry.

Table 10: US Poultry Average Export Prices, 1989-91

Commodity	1989	1990	1991
		(f.o.b. US$/kg)	
Whole Broilers			
Chicken Parts	1.22	1.14	1.19
Whole Turkeys	1.12	1.01	1.09
Turkey Parts	1.67	1.79	1.43
	1.26	1.26	1.49

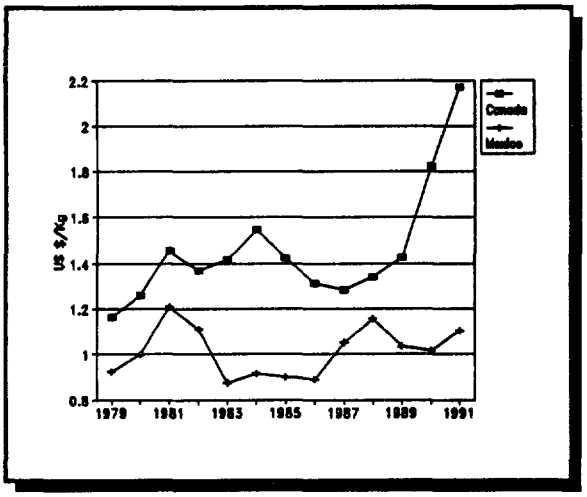
Source: US Department of Agriculture.

Pork prices to move cyclically with output. In the pork sector, aggressive expansion of the North American hog inventory in 1991, combined with a slowing economy, and abundant supplies of competing meats, were the major factors behind the large pork price declines that occurred during the second half of 1991 (Figure 11). These same factors are also expected to hold pork prices down in 1992, before prices begin to increase again with cyclical output declines. Expansion in 1992-93 is expected to be followed by contraction in 1994-95, expansion in 1996-97, and contraction once again in 1998-99.

Pork and poultry's real long-run prices to fall with cost decreases. Continued strong demand for poultry meat contributed to chicken price increases in recent years (Table 8 and Figure 8). Average US export prices of chicken meat are projected to decline slightly in real terms through the mid-1990s. Large supplies of reasonably priced legs and leg quarters helped the United States compete for market share in world trade. US chicken exports in the near term are expected to continue growing strongly, but volume is likely to be down slightly from 1991. Demand for poultry in the Pacific Rim countries is rapidly expanding from a low base, and this is likely to remain a large growth market in the 1990s, taking over 50% of total US chicken exports.

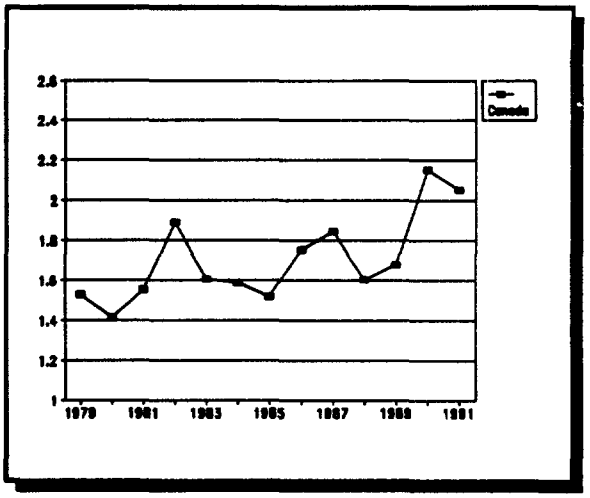
Although rising demand will bid up prices, continuing improvements in technology and efficiency in production should result in further declines in production costs and, thus, in real meat prices in the long term. As in the past decade, this is likely to be more pronounced in the poultry and pork sector than in the beef sector, where technical developments are slower and where support policies in several countries are likely to maintain prices above market-clearing levels. In developing countries, pork and poultry production is rising much faster than beef, sheep, and goat meat production. Investments in poultry and hog industries in middle-income developing countries are likely to lead to similar levels of feed conversion efficiency as in the industrial countries, causing real prices of poultry and pork meat to decline.

Figure 8: US Poultry Export Prices, 1979-91 (f.o.b.)



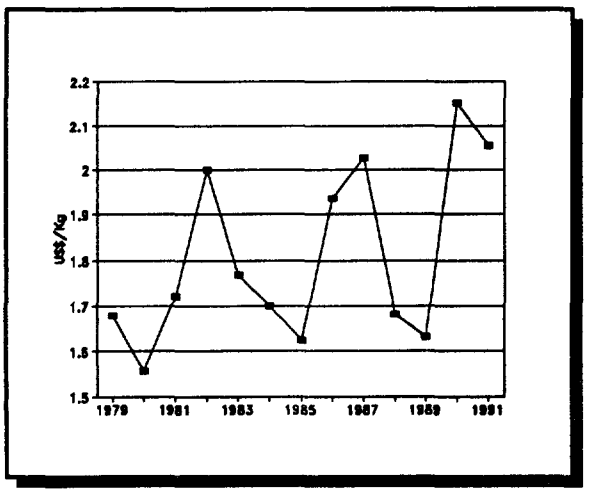
Source: US Department of Agriculture.

Figure 9: US Pork Import Prices, 1979-91 (c.i.f.)



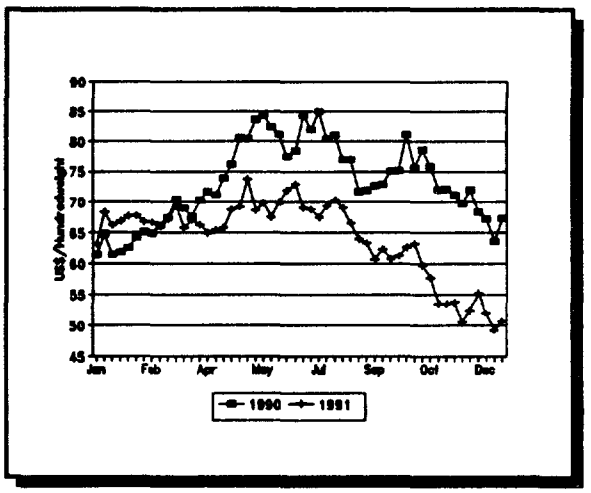
Source: US Department of Agriculture.

Figure 10: Canadian Pork Export Prices, 1979-91 (f.o.b.)



Source: Agriculture Canada and Statistics Canada.

Figure 11: US Pork Carcass Prices, 1990, 1991 (f.o.b. midwest river)



Source: The National Provisioner.

Table A1: Beef - Prices, a/ 1950-91 (Actual) and 1992-2005 (Projected)

	(¢/kg)		
	Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/
Actual			
1950	69	425	560
1951	75	398	546
1952	67	340	468
1953	67	347	460
1954	66	353	451
1955	63	331	429
1956	57	289	380
1957	62	304	400
1958	65	318	417
1959	72	356	462
1960	74	356	463
1961	68	324	418
1962	71	332	426
1963	67	317	386
1964	84	392	474
1965	88	409	481
1966	102	457	540
1967	104	461	536
1968	109	485	543
1969	122	518	587
1970	130	520	590
1971	135	509	570
1972	148	514	568
1973	201	603	676
1974	158	389	480
1975	133	294	358
1976	158	345	413
1977	151	299	356
1978	214	369	413
1979	288	440	526
1980	276	384	450
1981	248	343	400
1982	239	336	392
1983	244	351	393
1984	227	334	368
1985	215	314	341
1986	209	259	275
1987	239	269	277
1988	252	264	272
1989	257	271	279
1990	256	256	256
1991	266	261	253
Projected			
1992	244	229	219
1993	252	228	218
1994	256	227	216
1995	264	228	217
2000	376	274	256
2005	399	253	227

a/ Australian/New Zealand, cow forequarters, frozen boneless, c.i.f. US ports. For 1950-75, 90% visible lean; from 1976, 85% chemical lean.

b/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.

c/ Deflated by G-7 Consumer Price Index (CPI).

Sources: US Department of Agriculture; The National Provisioner Daily Market Service, The National Provisioner (actual); World Bank, International Economics Department (projected).

Dairy Products

Summary

- Around 70% of international trade in dairy products is supplied by the highly regulated markets of the EC and the United States. Price movements are largely determined by the dairy policies of these exporters.

- New Zealand exports around 80% of its total production and is the second largest supplier to the international market after the EC. The FSU had become a major market for New Zealand, but with reduced consumer demand there and more food aid and subsidized exports from elsewhere, New Zealand will have to maintain its drive to expand in other export destinations.

- Production in the FSU and Eastern Europe is expected to recover only slowly, and probably not fully, from the much reduced levels of the past three years.

- The outlook for the butter/butteroil market in the short term is one of demand well below desired exports, and large stocks, especially in the United States. So the downward pressure on prices is likely to continue. In the second half of the 1990s, some recovery is possible.

- For milk powders, prices are strongly influenced by production levels and domestic disposals in the EC. Production levels in 1992 have been reduced by quota cuts and drought conditions in some countries, and intervention stocks are low. At the same time, demand is quite strong. So milk powder prices are expected to stay around the US$1,800-1,900/ton range. For the 1993-94 period, supply for export is likely to increase while demand prospects are mixed, so prices are expected to decrease, possibly to US$1,400/ton. In the second half of the 1990s, import liberalization in some markets, growing consumer demand in others, and the probability of lower levels of subsidized production as an outcome of the Uruguay Round, suggest that prices may be higher, probably in the range of US$1,600-2,000/ton.

Introduction

Internationally traded dairy products (excluding intra EC and FSU trade) represent a relatively small residual market, accounting for around 5% of total world milk production. Approximately 70% of this trade is supplied by countries with protectionist policies which largely isolate production from prices on the international market. In this environment, price movements and expectations are generally dominated by dairy policy management in a few key countries.

During the 1980s, on average, about one half of all product entering the market was supplied by the EC. With its domestic market four times the size of the international market, highly regulated, and supported by large export subsidies, EC policy management and pricing is the single most important determinant of international prices.

The United States is generally the most important of the other institutionally driven exporters. Over the past two decades, its influence on the international market has fluctuated in line with

the wide variation in its export volumes. However, it is important as (i) it has been the third or fourth largest supplier over the last decade its exports are typically well above the next largest of the protectionist exporters (Canada and the Nordic countries); and (ii) of the institutional exporters, its internal pricing is the closest to the international market. Because of the large size of the US market relative to the international market, these prices place a cap on international prices, i.e., if international prices reach the level of the US market, its exports enter the market on a commercial basis, considerably expanding the effective supply base.

While New Zealand is the second largest supplier to the international market, it is relatively unimportant to the formation of prices. With a small domestic market, relatively price inelastic supply (at least in the short term), and little support or protection for the dairy industry, it is predominantly a price taker with relatively fixed supply.

Like exports, dairy product imports are also strongly affected by policy considerations. Most markets are subject to some form of trade restriction, with nontariff barriers (e.g., quotas and state trading) being widely used. Overall, however, fluctuations in effective demand have not been as important to international market prices as supply-side considerations. A major exception is the impact on international butter demand of the recent changes in the FSU. This has major short- and long-term implications for the market.

From a longer-term perspective, demand-side considerations become more important. Population and income growth and taste changes (associated with income growth and globalization) are the major factors in demand growth. In many growing markets, pressures for contraction in domestic support and trade liberalization are likely to limit expansion of domestic supply, causing import demand to increase.

Recent Developments

(i) MAJOR EXPORTERS

EC. ***May '92 reform package weakens commitment to further quota cuts.*** EC production (excluding former East Germany) declined in 1991 and is expected to decline by a similar degree in 1992. In the main, these declines reflect production quota cuts. Production quotas were reduced by 2.15% in June 1991. Further cuts were proposed by the European Commission as part of its CAP reform proposals, but the reform package agreed in May 1992 substantially weakened commitments to quota cuts, with none being imposed for 1992/93, and the 1% cuts for each of the following years, subject to market review by the Commission.

Production quotas for Spain and Greece were increased substantially (900,000 tons). The impact of this on actual supply is not clear, although the countries themselves argue that the increased quotas will be more strongly enforced and over-quota production reduced since their initial quotas did not reflect actual production. Italy has also requested quota increases using this argument. (It is reporting higher production in 1992 but this is said not to reflect an actual increase in production.)

Political obstacles remain despite economic rationality of quota reductions. What is clear is the permanency of the quota regime. Introduced in 1986, it is now the principle medium-term management tool for the Commission and a significant asset for current quota holders. While these forces

ensure its continued existence, the regime's future in terms of quota allocations and management is less sure. Factors suggesting a continuing decline in quota allocations include:

- The persistent structural surplus. Commercial disposals account for only about 80% of current production.

- EC budgetary pressure. While government spending on the CAP is not large on a national basis, it is a substantial part of the EC budget. Proposals to move assistance from price to direct income assistance would increase national budget pressures (while reducing consumer transfers). Reducing dairy production would provide significant savings for the EC budget.

- Developments in the FSU. This region has been the principle market/aid outlet for EC butter. Price reforms and falling real incomes have seen dairy demand and butter imports fall substantially.

- Uruguay Round outcome. It appears likely that one outcome of the GATT Uruguay Round would be to require the EC to reduce subsidized exports. With subsidized internal disposals already high (see below) such an outcome is likely to mean further cuts in production.

While these factors are working towards a continuation quota cuts during the 1990s, their extent, timing and impact on actual production will depend on a range of political factors including:

- The desire of some member countries to increase production. Currently quotas are not transferable between countries and hence the only mechanism for an increase in production (or a slower rate of decline) is via changes in total quota.

- Funding the retirement of quotas, in particular, the level of compensation provided and the proportion provided by the EC. Unless market prices are reduced by lowering support prices and reducing the level of subsidized disposals, future quota cuts are likely to increase quota values, increasing the cost of quota retirement.

- Quota performance. Quota production is related to a national rather than farm level. This has meant that farmers were only penalized for over-quota production if the nation as a whole exceeded its quota. Under this regime there is a farm-level incentive for over-quota production and the current scheme has experienced persistent over-quota production.

With internal EC prices above intervention levels and sharply lower government stocks, it is far from certain that the 1% quota cut will be implemented in April 1993. Completion of the Uruguay Round is likely to be important to the debate. In the longer term, the balance of probabilities seems to favor modest quota reduction in the mid-1990s.

Changes in EC market management. While total EC production is important, we turn now to the world market where the balance between internal and external subsidized disposals has a direct and major impact. The recovery in international prices in the second half of 1991 derived substantially from this source. The EC significantly increased its subsidized internal disposals of butter and skimmed milk powder (SMP) in 1991. This, together with the quota cut, was sufficient to eliminate intervention purchases and allow internal wholesale prices to increase. EC export prices rose correspondingly. With

the exception of butter/butter oil, international market prices followed the EC prices. (These developments are further discussed in the product reviews.)

One aspect of EC market management which appears to be changing is the ability of the Commission to more rapidly vary the supply-demand balance. EC production has been significantly reduced from the levels of the mid-1980s. This has meant an even larger decline in the level of structural surpluses (i.e., subsidized disposals). Current levels are such that relatively small changes in production and/or subsidized disposal regimes can alter the market balance between accumulation or decline in intervention stocks. This is likely to change significantly the pattern of international prices. Price fluctuations are likely to be shorter in duration (i.e., the period from significant price decline to recovery is likely to be shorter). The difference between peaks and troughs may also be reduced.

Changes to the management of intervention purchases are also likely to affect the pattern of international prices. For both SMP and butter, the Commission introduced a tender system rather than fixed intervention prices. In practice this has meant that with significant sales to intervention, purchase prices are around 90% of the full intervention price. However, sales from intervention are made at the full intervention price plus 10 ECU per ton. Thus a move out of net intervention purchasing triggers a rapid change in internal wholesale prices--from 10% below intervention to slightly above. For SMP, this equates to around a 15% increase in EC export prices and for butter around a 20% increase.

UNITED STATES. SMP and butter are the major US dairy exports. Export volumes have fluctuated widely, largely in response to the level of government purchasing and stockholding. While exports in 1992 are likely to be up on year-before levels (particularly for butter/butter oil), for SMP they are well below the volumes of the 1970s and 1980s. The fall in exportable surplus since the mid-1980s reflects the impact of the 1985 US Farm Bill. This provided for minimum prices to be reduced in response to substantial government purchasing.

Over the period 1985 to 1990, the minimum farm gate milk price was reduced by 16%, to $222.67/ton. Over most of this period government purchasing was limited mainly to butter, whose market prices remained at their minimum while non-fat solids were priced well above support levels. As a consequence, although farm prices were constrained by the falling value of milk fat, they remained significantly above the minimum.

Policies impose market discipline for milk but butter surplus remains. The 1990 Farm Bill weakened this provision, providing no reduction in the minimum price below its value at that time ($222.67/ton). Despite this and other changes, the legislation appears to have imposed a higher level of market discipline than its predecessors before 1985, as illustrated in late 1990 and early 1991 when the market moved into overall surplus (i.e., for all milk solids). The consequent fall in the milk price to the minimum farm gate price reduced supply sufficiently to eliminate the surplus in total milk solids. The milk fat surplus remained--in the final analysis, an outcome of government intervention, but exacerbated by falling demand (i.e., rising demand for low fat and non-dairy fat products). At mid-1992, government butter stocks reached 280,000 tons. Subsequent aid and subsidized sales to the FSU have reduced these to around 200,000 tons.

In response to the continuing surplus of butter, in the first half of 1992 the USDA twice lowered its minimum price for butter, to US$1,681/ton. As the minimum price for milk cannot be reduced, this was offset by increases in the minimum price for SMP (to US$2,145/ton). The US butter price is now only US$330/ton (24%) above the GATT International Dairy Agreement (IDA) minimum

price and around US$280/ton (20%) above the current international price. This price represents a price ceiling for international trade. Once international prices reach this level, commercial exports from the United States become possible.

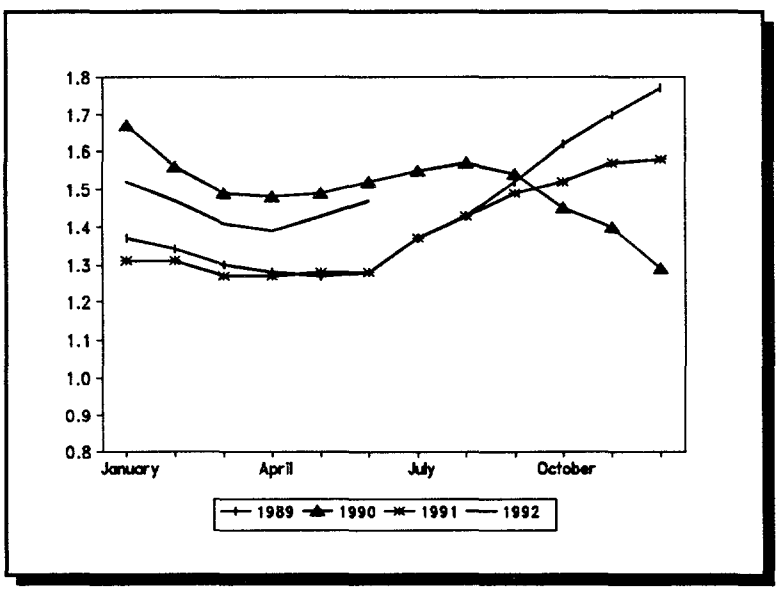
US milk production was relatively stable in the late 1980s. However, in early 1990, production increased strongly. This increase pushed the market into surplus (government purchases of intervention products increased) and the subsequent fall in farm gate prices resulted in a production decline to earlier levels.

Despite relatively stable milk production, in the late 1980s, surplus butter has been an ongoing problem for US policymakers. While the support price for butter has been cut by 42% over the past four years, butter (milk fat) consumption has not risen sufficiently to eliminate the persistent surplus. Underlying this problem has been a shift in demand away from high milk-fat products. This has been evidenced by falling demand for butter and rising demand for low-fat versions of standard dairy products (e.g., drinking milk and cheese).

Disposal of butter into the international market, particularly as aid, has increased. It appears likely that exports for 1992 will reach or exceed 100,000 tons. This is around twice the levels of 1990 and 1991 and five times higher than for the period 1985. With domestic demand trends likely to continue, and limited scope to adjust support pricing under current legislation, exports at this or even higher levels are likely until at least the mid-1990s. In effect, the United States has become a major supplier to the international market at a time of declining international market demand. As discussed in the product review, this has significant implications for prices in the international market.

In the second half of 1992, US dairy production began to increase. USDA and other forecasters are predicting that this increase will continue into 1993. The increase follows the recovery in farm gate prices over the last year (in response to the earlier decline in production) and favorable feed prices (see Figure 1). With production increasing and domestic economic conditions not conducive to

Figure 1: United States: Milk-to-Feed Price Ratio, 1989-92



Source: US Department of Agriculture.

significant increases in demand, the United States may now be moving towards a total milk solids surplus similar to that of 1990/91. Under current legislation and policy measures, the production surplus and price cycle of the early 1990s is likely to be repeated.

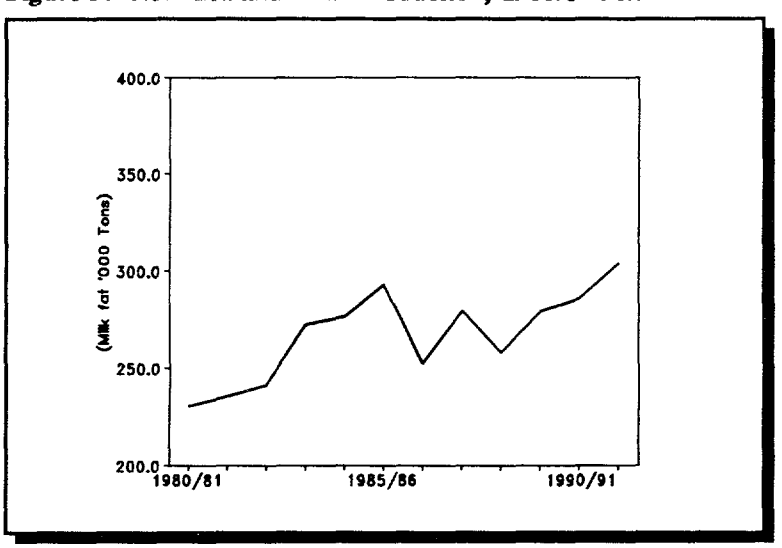
US milk exports to Mexico to expand under NAFTA. Mexico is already the United States' largest dairy export market as well as the world's largest importer of milk powders, particularly of SMP. Except for state trading arrangements, most dairy imports are subject to duty. However, duties on imports from the United States will be phased down to zero during the 1990s under the terms of NAFTA. This provides the potential for the United States to significantly expand its exports to Mexico. An increase in US exports to Mexico is likely to result in a net increase in total US exports, rather than diversion from other markets.

NEW ZEALAND. The second largest supplier to the international market, New Zealand, is almost unique in its degree of exposure to the international market; around 80% of production is exported.

Milk production increased significantly (up 6%) in 1991/92, despite a period of low farm gate prices (see Figure 2). In part, the increase in production reflected very favorable seasonal conditions. However, it also underscored the relative insensitivity of production to short-term price changes.

Based on average seasonal conditions, most observers expect production in the 1992/93 season to fall a little. However, investment and development at the farm level appear to be increasing. For at least the first half of the 1990s, production is likely to continue its upward trend, with production increases reflected in rising export availability. The production mix has changed significantly since 1980. The principle change has been to promote whole milk products as an alternative to butter, but despite these efforts butter remains a major product.

Figure 2: New Zealand Milk Production, 1980/81-90/91



Source: New Zealand Dairy Board statistics.

New Zealand's continuing need to diversify export destinations. Both domestic sales and quota access to the EC have been falling and hence export availability has been rising. Compared with 1983, New Zealand's export availability for non-EC destinations has risen 40,000 tons (33%) to 185,000 tons.

As shown in Table 1 below, the FSU has become a major outlet for New Zealand, accounting for an average of 40,000 tons a year over the period 1987-91. The impact of lower import demand from the FSU, but greater food aid and subsidized exports from other countries, is likely to decrease New Zealand's exports to this destination over the medium term. This should maintain pressure for New Zealand to maximize:

- sales to other destinations, hence maintaining pressure on international prices;

- production of whole milk products, particularly whole milk powder. As discussed in the product review, this is likely to be one of number of factors shifting price relativities within the milk powder market away from those operative in the 1980s.

CENTRAL EUROPE AND THE BALTICS. ***Eastern European and FSU production recovery to be slow.*** The three major dairy producers in the old Eastern European bloc were Poland, Czechoslovakia, and East Germany. In each case, the economic and political changes of the last three years have seen major declines in milk production and consumption. In Poland, milk production has fallen by two million tons (15%) to around 14.3 million tons. Deliveries to dairies have fallen by around three million tons (30%), with more milk being retained for use within the farm sector (by small semi-subsistence units). These declines are indicative of the decline in the relative profitability of dairying since the reforms of 1989 and 1990 and of the structural problems of the sector. Very small herds predominate, limiting milk quality and making new investment difficult. Overall, the standard of the processing sector is poor; large investments are needed to improve quality and productivity.

In response to pressures from the farm sector, the Polish government has introduced a range of price support measures. Tariffs have been imposed for many dairy imports and a minimum price regime implemented. These changes may help stabilize the industry but may also hinder development of a fully competitive export sector.

The recent increase in international prices for SMP and casein (principal exports for Poland) should assist industry profitability. However, the medium-term outlook is for production to recover only slowly. The upward trend in milk powder exports during the 1980s would appear to have been halted. The volume of exports is likely to be held at levels somewhat below the average for the early 1990s.

The Czecho Slovakian dairy industry is very different from that of Poland, with most production coming from large state and cooperative farms. However, the impact of the political and economic changes has been similar. While production was maintained in 1990 (7.1 million tons), it fell by 10% in 1991 and is falling further in 1992.

Table 1: FSU Imports of Butter by Origin, 1987-91

	1987	1988	1989	1990	1991	Average 1987-91	% Total Exports
	('000 tons)						
EC	307.4	306.3	149.3	28.7	154.6	189.3	45.6
New Zealand	11.4	38.6	25.3	66.8	61.1	40.6	18.9
Australia	0.0	3.0	10.0	1.0	15.5	5.9	11.7
Nordic Countries	6.2	8.6	19.1	53.7	12.9	20.1	40.4
Other	55.6	56.0	54.0	97.1	6.0	53.5	51.0
Total	380.6	412.6	257.8	247.1	250.0	309.6	
% World Trade[a/]	37.5	38.9	32.7	33.1	35.3	35.8	

a/ Excludes intra-EC trade.

Source: Australian Dairy Corporation.

Like Poland the dairy processing sector is not adequately equipped by modern standards and considerable investment will be required to improve productivity and quality. While this may occur more quickly than in Poland (because of a better general infrastructure and a stronger/wealthier economy), it is not clear that Czechoslovakia has a comparative advantage in dairying. Restructuring is likely to see a more sophisticated but smaller industry, one catering for the domestic market.

With the need for hard currency and with dairy consumption in Russia falling, Baltic countries have a clear incentive to increase exports to the international market. The Baltic states of the FSU have large dairy industries. Prior to independence, they collectively produced and exported (on a milk-fat basis) around the same volume of milk as Australia (currently the third largest supplier to the international market). Butter was the principle export and Russia the principal destination.

How rapidly these countries can re-orient their industries to supply non-FSU destinations is not clear but the incentive is strong. In Poland, Czechoslovakia and other countries of the old Eastern European bloc, the immediate impact of economic reform was an increase in exports at heavily discounted prices, with declining domestic consumption and a strong need for hard currency fueling the process. However, these countries already had significant experience in exporting to non-CMEA destinations. This is not the case in the Baltics.

Sales of butter for processing into butter oil would be a potential fast-track option and one which could further aggravate the already difficult balance in the butter sector. The capacity of the Baltics to increase milk powder exports is not clear but relative inactivity in the rising market of late 1991 and in the first half 1992 suggests their capacity is limited.

AUSTRALIA. Australia is the third largest supplier to the international market, currently accounting for around 8% of total supply. Production has been rising, despite a reduction in the level of domestic price support. Since 1986, the level of price support for manufactured products has halved and with recent policy decisions support further halve over the 1990s. Still, support for the farm gate price of drinking milk continues at relatively high levels. In key regions the returns from drinking milk sales are averaged with manufacturing milk returns, thereby encouraging production above market-clearing levels. With declining domestic demand for milk fat and increasing imports from New Zealand, export availability is likely to increase slightly.

CANADA AND NON-EC WESTERN EUROPE. In total these countries account for around 10% of supply to the international market. They maintain relatively high rates of protection for their dairy industries and, with the exception of Sweden, also operate supply management programs. Total exportable surplus from these countries is likely to remain relatively static, at least until around the mid-1990s. After that point it is possible that GATT commitments and/or accession into the EC may generate restructuring and lower exports in some of these countries.

(ii) KEY IMPORTERS

FSU. ***Commercial imports by FSU plummet.*** In recent years, the FSU has played a pivotal role in the international butter market, absorbing a large proportion of the export surpluses of the EC, Nordic countries and, to a lesser extent, New Zealand. In the period 1987 to 1991, the FSU accounted for over one third of all international butter trade (see Table 1). For the EC, Finland, and United States, sales to the FSU accounted for over 40% of exports. New Zealand relied on the FSU to absorb around one fifth of its exports.

Against this background, the parlous state of the new economies of the FSU is of major concern to butter exporters. Thus far in 1992, commercial imports have been virtually nonexistent. New lines of credit being provided by the EC, United States, and others may improve the situation in the latter half of the year, but commercial transactions seem destined to be well below recent years. Even including aid, total imports are expected to be well down, probably to around 150,000 tons.

As Table 2 indicates, no market apart from the FSU accounted for more than 4% of world butter trade during 1987-91. Indeed, in volume terms, the next five markets--Egypt, Algeria, Saudi Arabia, Iran, and Mexico--collectively accounted for less than one half the trade to the FSU.

MEXICO. ***Continuing pressures to reduce Mexican governments intervention in dairy market.*** As indicated by Table 3, Mexico is by far the largest importer of SMP. Its importance is further heightened by noting that the imports of the third largest importer, Japan, are predominantly of stock feed quality.

Mexico's SMP imports are subject to state trading, in part as a means of protection for the domestic industry. In addition, utilization of SMP is subject to considerable government intervention, with around 60% being used in subsidized consumption in social programs.

Table 2: Major Butter Markets: Average Imports, 1987-91

Importer	Source: EC	New Zealand	Australia	Nordic Countries	Total Imports	Share World Trade
	(tons)					(%)
FSU	186,079	40,658	5,905	20,114	309,645	35.8
Egypt	40,526	2,727	0	960	45,619	5.3
Algeria	23,018	5,314	0	1,993	32,847	3.8
Iran	9,473	16,864	2,902	492	31,516	3.6
Saudi Arabia	17,930	4,641	1,149	220	23,945	2.8
Mexico	8,839	5,275	54	270	18,939	2.2
Total Exports	414,109	214,963	50,673	49,850	863,742	100.0

Source: Australian Dairy Corporation.

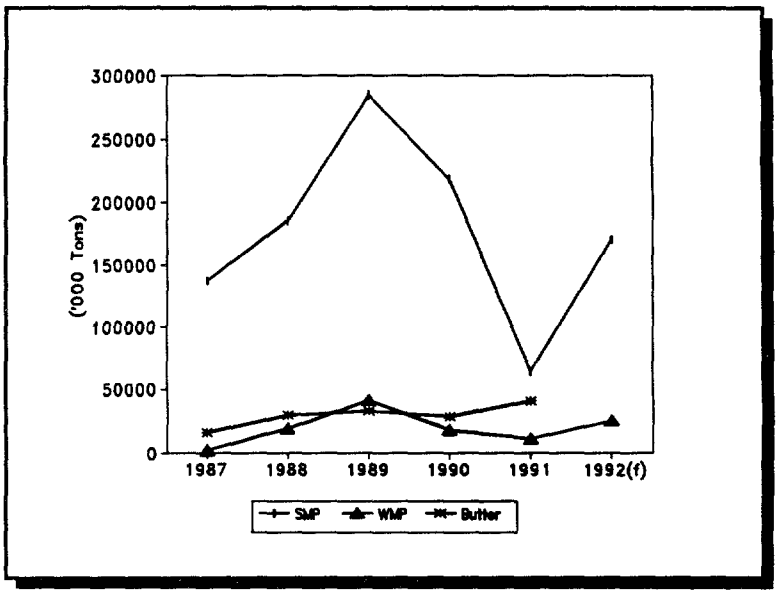
The variability in SMP imports in recent years (Figure 3) was mainly the result of "overpurchasing" by the state trading agency and the consequent accumulation in stocks. Some increase in domestic production and changes to the subsidized consumption programs exacerbated the situation. However, by 1992, the stocks had been cleared and imports recovered. For 1992, imports are likely to be near the average for the previous five years. Future import demand will depend significantly on government policy. Pressure for liberalization of the industry and further reductions in consumption subsidies continue.

In the longer term, the effect of higher economic growth, strong population growth, and trade liberalization (especially under NAFTA) is likely to be an increase and broadening of the import demand for dairy products. However, in the short term, local production is likely to expand (with the benefit of significant protection) and subsidized consumption of reconstituted milk products (the principle use of SMP) is likely to be reduced.

ALGERIA. ***Uncertainty in Algerian market.*** Algeria is a major importer of dairy products. On average, it accounted for 12% of world trade in whole milk powder (WMP) in the period 1987 to 1991 (see Table 4). While Algeria's demand for dairy imports has been strong in recent years, this market faces considerable uncertainty. The economy is not strong and financing of imports remains a significant problem. Whether imports can be maintained will depend substantially on political developments within Algeria and on the decisions of US and EC (principally France) governments to provide lines of credit.

JAPAN. Despite high levels of support for its domestic dairy industry, Japan's demand growth has outstripped supply and import demand has trended upwards over the past two decades. Japan is now the largest importer of dairy products, with the principle product being cheese. Japan also imports significant quantities of dairy products in the form of industrial food mixtures. For example, its imports of cocoa preparations (containing a high proportion of milk powders) is valued at over US$150 million.

Figure 3: Exports to Mexico, 1987-92



*Butter includes anhydrous milk fat.

Source: Export statistics for exporting countries.

This trend of rising import demand is expected to continue, fueled by high and growing incomes, increasing diversity in food preferences, and further liberalization of trade.

(iii) TECHNOLOGICAL CHANGE

Increasing productivity could intensify. The dairy industry in industrial countries is characterized by a long-run trend of increasing productivity. This can be expected to continue and perhaps to intensify. While slowed by a cautious-to-hostile reaction from various governments, industries, and consumer groups, the introduction of Bovine Somatotropin (BST) offers the likelihood of sharply increased productivity. The US market should provide the key to its widespread introduction. The US Food and Drug Administration has been considering approval of this product for some time. Despite slow progress to date, it is likely that approval will be granted. Notwithstanding consumer concerns, commercial use would probably follow such a decision. Adoption of BST in Europe is less likely, for two reasons. First, the EC currently has a moratorium on its introduction. Second, the effect of the EC quota system is to limit the farm level return from the use of BST. Other major exporters such as New Zealand are unlikely to move to introduce BST until it is accepted in the EC. Overall, therefore, the introduction of BST is likely to be relatively slow during the next five years.

Independent of the adoption of BST, productivity growth is anticipated to continue at strong rates. A variety of emerging livestock technologies (e.g., cloning and low-cost embryo transfer) plus continued application of existing technologies are likely to maintain past rates of productivity improvement.

Table 3: Major Importers of Skim Milk Powder: Averages for 1987-91

Importer	Source: EC	New Zealand	US & Canada	Australia	Total Imports	Share World Trade
	(tons)					(%)
Mexico	75,731	24,504	53,051	3,132	156,440	17.4
Algeria	53,103	4,669	3,399	0	65,101	7.2
Japan	28,240	11,677	53	17,706	63,658	7.1
Philippines	8,250	16,691	12,157	21,542	58,927	6.6
Malaysia	4,134	20,779	1,370	16,309	46,882	5.2
Thailand	9,891	7,723	2,965	11,549	33,197	3.7
Brazil	9,614	1,576	14,784	0	29,388	3.3
Total Exports	388,422	146,145	184,600	92,190	899,402	100.0

Source: Australian Dairy Corporation.

(iv) Dietary Concerns

Milk fat substitutes continue to gain ground. In most countries with high rates of dairy consumption, concern regarding the consumption of fats, in particular, animal fats persists. In many countries these concerns have resulted in significantly lower butter consumption and an increasing preference for low-fat dairy products. This trend can be expected to continue with resulting increases in exportable surpluses of butter in key markets such as the EC and the United States.

(v) Substitutes

In both domestic and international markets, the main area for substitution of non-dairy for dairy product is milk fat. This is particularly so in the international market where butteroil has been largely replaced by vegetable oils in milk-recombining markets. Butteroil is a small and relatively high priced segment of the international fats/oils market.

Over the forecast period new products are likely to continue to erode the demand for milk fat. These products will include low-fat (high moisture) tablespreads, low-fat dairy products, and replacement of milk fats in some products such as "analogue" cheeses.

Protein substitutes are also growing. Soy-based drinks have a small but growing market in many traditional dairy consuming countries. They are a major market segment in many "non-dairy" countries (e.g., in Asia).

(vi) Multilateral Trade Reform

Dunkel draft suggests little change in world dairy markets. While still to be concluded, it has become increasingly clear that the Uruguay Round will yield only small changes in the international

Table 4: Major Importers of Whole Milk Powder: Average 1987-91

Importer	Source: EC	Source: New Zealand	Source: US & Canada	Source: Australia	Total Imports	Share World Trade
	(tons)					(%)
Algeria	85,754	11,557	3,164	0	100,475	12.0
FSU	42,760	3,329	0	3	64,346	7.7
Venezuela	34,515	28,515	0	0	63,493	7.6
Saudi Arabia					52,409	6.2
Malaysia	6,966	31,251	0	4,551	42,811	5.1
Taiwan, China	15,352	8,611	50	11,623	35,656	4.2
Philippines	14,009	5,698	0	1,328	21,628	2.6
Total Exports	551,647	182,747	19,378	47,746	840,316	100.0

Source: Australian Dairy Corporation.

dairy market. The Dunkel Draft of 1991 represents the limit to possible reform of agricultural trade in the current round. If adopted, its formula for reform, choice of base period, and treatment of food aid are likely to result in relatively little discipline over subsidized exports until the latter part of the decade.

A possible exception (depending on implementation) is cheese. EC exports of this product have been trending up, hence any commitment to reduce subsidized exports would have an immediate impact on the level of its exports. In the case of butter and SMP, the base period coincides with a period of major government stock reduction by the EC. Its base period exports of these products are therefore abnormally high.

(vii) Currency Movements

Weak US dollar means higher dairy prices. EC export pricing is the major determinant of international prices. However, most dairy trade is denominated in US dollars. Given the importance of EC export pricing and its relative independence from developments in the international market, international prices are strongly affected by the value of the US dollar against ECU currencies. In most circumstances, appreciation(depreciation) of the US dollar against the ECU results in relatively rapid reduction(increase) in international prices (in US$/ton). In some circumstances this impact is counteracted by EC refund management. For example, when prices are at the GATT IDA minimums, appreciation of the dollar will be offset by reducing EC export subsidies. Still, trends in the value of the dollar do affect the market. In analyzing current prices it is important therefore to allow for the current weakness in the value of the US dollar against the ECU. The dollar is at a post-war low against the DMark. This has been a significant factor in the strengthening of international dairy prices in 1992.

Market Outlook

(i) BUTTER/BUTTEROIL

Competition among supplies has kept prices weak since 1990. Following the short-lived price resurgence from 1987 to 1989, international prices have continued to trade near the GATT IDA minimum price. In the main, the rise in prices from 1987 to 1989 reflected the impact of both declining EC production and its successful stock reduction program (mainly to the FSU). These factors allowed wholesale prices within the EC to rise and export subsidies to be reduced.

The decline in international butter prices was initially associated with falling wholesale prices within the EC. This price decline began in the last quarter of 1989 and by January 1990 EC wholesale prices had declined to the effective intervention price (then 93% of the official intervention price). International prices tracked the fall in EC prices. While intervention acted to stabilize prices within the EC, international prices were pushed lower by increases in EC export subsidies (e.g., the butter subsidy was increased US$270/ton in 1990).

Importantly, weak pricing has continued despite improvements in the EC market, higher EC export prices, and a fall in total traded volumes. For much of 1992, EC export prices have been well above (e.g., US$200/ton) the international market and there has been little new EC export business. Competition between New Zealand, Australia, United States, and other minor exporters has been sufficient to keep prices low. A key factor in this ongoing weakness in international butter prices is the collapse of the FSU.

Renewed intervention buying by the EC in 1990 triggered a change in policy management. Milk quotas were reduced in 1991 and internal subsidized disposals of butter were increased. EC internal prices have risen and notional export pricing by mid-1992 was around US$1,600/ton. International prices remained around US$1,350-1,400/ton.

Market demand likely to be well below desired exports in medium term. Most factors suggest that butter prices will remain weak in the medium term. Real incomes in the FSU have plummeted and food prices increased relative to prices of other goods. Dairy consumption is down and experience in Eastern Europe suggests further falls. Production is also falling but because of scarce foreign currency and the fall in consumption, import demand is likely to remain weak for several years and possibly for the rest of this decade. It appears that imports in 1992 are unlikely to exceed 150,000 tons. Much of this will be direct aid and the remainder sold on the basis of extended and subsidized credit. This level of imports is around one half of the level averaged over the previous five years.

A number of other importers (e.g., Algeria and Egypt) face lesser but substantial economic and political difficulties. The surplus in US butter supplies appears likely to continue and its export "requirement" should remain high for a number of years. Over the next few years, its exports (including aid) are likely to be well above the average for the past five years, probably adding around 50,000 tons to available annual international supplies.

Within the EC, subsidized domestic disposals in 1991 were up by around 50,000 tons on year-before levels and seem likely to increase by a similar amount in 1992. It is unlikely that they could be increased much above this level, however, without resort to substantially greater subsidies. Meanwhile, commercial demand is vulnerable to consumer taste changes (in key countries such as

Germany and France, per capita consumption of butter is high by international standards). In recent years commercial demand appears to have been falling at over 30,000 tons per year. Therefore, exports will have to remain at substantial levels (e.g., 300,000 tons per year) unless production is cut further.

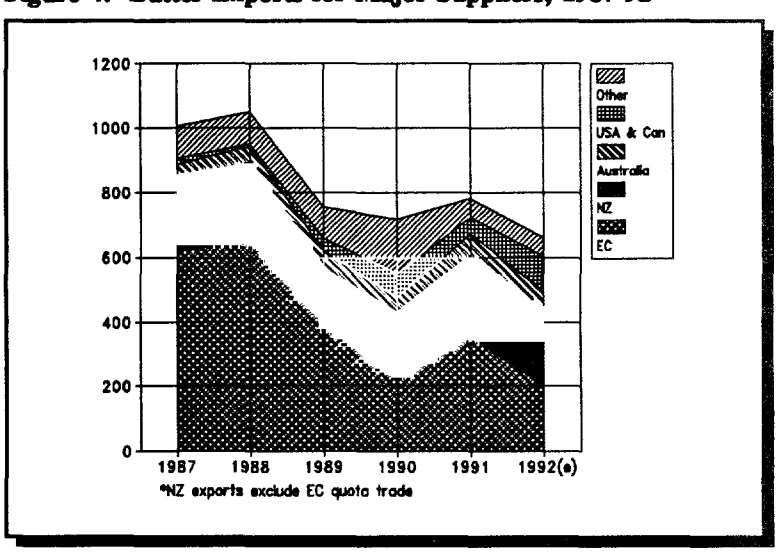
Excluding quota access to the EC, international trade in butter/butteroil has been around 700,000 tons in recent years (see Figure 4). If FSU imports fall to 150,000 tons and other markets do not increase, this market would fall to 550,000 tons. Excluding quota trade with the EC, New Zealand must export around 180,000 tons and Australia 60,000 tons, while the United States will be looking to export in the order of 100,000 tons and the EC 300,000 tons, so that total desired exports from these countries would be around 640,000 tons.

Existing markets are unlikely to take up this level of increase. While butteroil demand in Asia is likely to grow and imports by Mexico appear to be trending up, Algeria could well reduce its demand. One market with potential is India. Domestic consumption, mainly in the form of ghee, is large but to date imports have been virtually prohibited. However, India is moving to liberalize its economy, reducing regulation of international trade. In the dairy market, import licensing is due to be liberalized, but liberalization for dairy products is not likely to be rapid. Over the past two decades, India has greatly expanded its milk production (cow and buffalo)--strong government intervention and guidance have been central to this development and social objectives important. So this program is unlikely to be changed rapidly.

Butter prices, therefore, are expected to remain weak for some time with policy adjustments in the EC and the United States being critical factors in future price developments. Prices will also be affected by the degree to which higher prices for non-fat solids can offset the low international returns for butter, which will impact on supply from New Zealand and Australia.

In 1992 and 1993, butter prices are likely to remain around US$1,300-1400/ton. Prices in 1994 will depend critically on the level of quota cut in the EC. The 19% cut currently proposed is

Figure 4: Butter Exports for Major Suppliers, 1987-92



Source: Australian Dairy Corporation.

insufficient to assist prices. Unless the cut is greater or large-scale aid/donations are made to the FSU, downward pressure on the international market should continue, with the likelihood that the IDA minimum would be significantly breached/lowered (i.e., prices below US$1,300/ton).

In the second half of the decade, improved prospects in the FSU, import liberalizing (e.g., Japan and India), subsidy restrictions under the Uruguay Round outcome, and market growth in Asia are likely to allow some recovery in prices, but this should be limited because of the declining consumption in industrial economies with a tradition of dairy consumption. Prices are unlikely to be sustained above US$1,600/ton (in current dollar terms).

(ii) MILK POWDERS

Like butter, the international market price of milk powders increased from 1986 to 1989 before declining in 1990. However, two key differences are that the 1986-89 price rise for milk powders was more sustained and prices rose significantly above earlier peaks, and that prices recovered in 1991 and 1992. Currently, milk powders are trading well above the GATT IDA minimum prices. Prices for WMP have followed a very similar pattern to that of SMP prices. While important in its own right in the international market, a range of institutional and market relationships ensure that the price of WMP is closely linked to the equivalent value of the milk solids for butter/SMP. Since butter prices were discussed in the previous section, most emphasis is given here to SMP prices.

EC domestic market disposals strongly influence international prices. Prices for internationally traded milk powders are strongly influenced by developments in the EC, particularly by the management of domestic market disposal programs of SMP. These programs are far more important than exports in determining the EC's supply and demand balance. Commercial (nonsubsidized) sales of SMP within the EC account for only a minor fraction of total supply. The major outlet for SMP in the EC is for use in formulated calf feed. (Since 1987, this program has been the outlet for virtually all of the subsidized domestic disposal of SMP.) Subsidized domestic sales have been usually around three times as high as exports. The subsidies for SMP sales to the beef sector typically has been conditional on a minimum percentage of SMP in the final compound feed. During 1988 this minimum usage rule was removed. Abandonment of this regulation, the rising price of SMP within the EC, and lower rates of subsidy subsequently caused a substantial decline in the proportion of SMP used in compound calf feeds. In addition, calf rearing has declined since 1988. The net result of these developments was a large fall in disposals to this sector, from around 1.2 million tons in 1987 to 0.75 million tons in 1989.

As illustrated in Figure 4, production of SMP began to increase again in 1989. A significant factor favoring higher production was the decline in casein manufacture brought about by the change in regulations controlling the use of casein produced from subsidized skim milk. By the latter part of 1989, higher production and lower domestic disposals pushed the market toward surplus and wholesale prices moved toward intervention levels. Export prices fell accordingly, with a direct impact on the international market. In late 1989, heavily discounted product from Eastern Europe also began to be marketed.

Falling casein manufacture and, to a lesser degree, falling production of WMP and condensed milk products pushed SMP production higher again in 1990. (Casein manufacture in 1990 was 40% below the levels of 1988 and 1989.) This released sufficient skim milk to produce 100,000 tons of SMP. With domestic disposals remaining low and export demand dampened by the discounted Eastern European product, intervention purchasing began in March 1990 and increased rapidly (see Figure 5).

The EC Commission increased export subsidies by 40% (around US$270/ton) in July 1990, further weakening international prices. These were pushed lower by the progressive reduction in effective intervention prices following the Commission's introduction of intervention tenders.

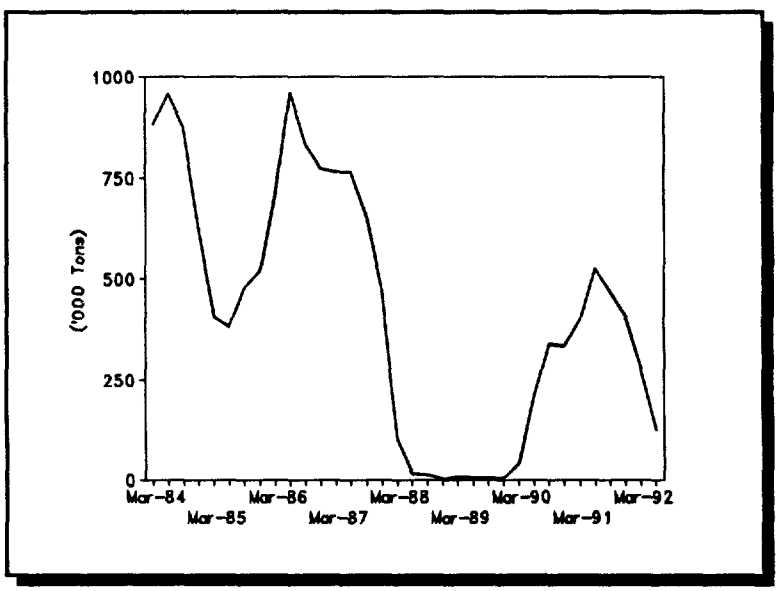
In the second half of 1990 the Commission acted to increase internal disposals. It relaxed regulations controlling the use of subsidized casein and reinstated the minimum incorporation provisions of the subsidy for SMP used in calf feed.

In 1991, the disposals of SMP to calf feed increased by 100,000 tons. This and a 15% fall in production (mainly because of lower milk production following the 1991 quota cut and increased production of WMP) were sufficient to move the market back into "balance." Intervention purchases virtually ceased by September 1991 and wholesale prices moved up by around 15%.

In 1992, the market for SMP in the EC has tightened. Milk production has fallen (because of adjustment to the 1991 quota cut and drought conditions in key producing regions) and casein manufacture increased by around 40% in the first half of the year. SMP production in 1992 appears likely to be reduced by around 250,000 tons from the 1991 level and to fall to its lowest level for well over a decade. This and strong demand by the calf feed manufacturers (in part to increase commercial inventories) has led to a rapid fall in the level of intervention stocks. By the end of 1992 these are likely to be around 50,000 tons, compared to opening stocks of 414,000 tons.

During 1992, international prices denominated in US dollars were also pushed up by the falling value of the dollar against ECU currencies. Compared with September 1991 (when EC prices began to recover), by mid-1992 the US dollar had fallen by 14% in value against the ECU. This increased the US dollar value of EC export prices by around US$200/ton, i.e., around one third of the total rise in international prices over this period.

Figure 5: EC SMP Intervention Stocks



Source: Agra Europe.

Demand in the international milk powder market is more robust than it is for butter and less dependent on the state of any one market. There are major import markets in all regions including North Africa, the Latin American markets of Mexico, Venezuela, and Brazil, the Middle East, and Asian markets such as Japan and the Philippines.

International demand strong in 1992. While supply and policy management issues tend to be the most important determinants of price, the international milk powder market was stimulated in the first half of 1992 by renewed buying from a number of key import destinations. Mexico, the world's largest SMP market, purchased approximately 150,000 tons of SMP and, as illustrated in Figure 7, its imports in 1992 seem to be back to their average over the preceding five years (following the slump in 1991).

Demand from traditional Asian markets has been strong and market intervention agencies in Japan and the Republic of Korea have imported SMP. These commercial developments were complemented by increased food aid deliveries of SMP to Russia and Eastern European countries. In the first half of 1992, the EC provided around 40,000 tons of SMP to Russia, Romania and Albania–volumes which are well in excess of normal commercial deliveries. Also, in the first half of 1992 Venezuela and Algeria, both traditionally large-scale buyers, maintained purchases despite economic and political difficulties.

In the medium term, demand prospects for milk powders are mixed. Algeria, Venezuela, and the FSU, key markets for WMP, are facing internal difficulties. Of these countries, the situation is perhaps most assured in Venezuela where export income should be sustained by crude oil earnings. The ability of Algeria to maintain imports at current levels is not as clear. In the case of the FSU, imports are likely to remain a mixture of aid, extended credit, and commercial sales. Despite the economic difficulties, FSU imports may be maintained because, with internal production and distribution in turmoil, good quality WMP provides an alternative to fresh milk.

Counteracting the difficulties in these major markets, there is likely to be: (i) continued demand growth in Southeast Asia (in response to higher incomes and population growth); (ii) sustained demand in Mexico (possibly with some shift from SMP to WMP); (iii) good prospects for growth in imports in north Asia (in the case of the Republic of Korea and Japan, from trade liberalization and, in the case of mainland China, from economic growth); and (iv) fluctuating but improving demand in the Americas (e.g., Brazil and Chile).

In the medium term, supply and policy management are likely to be far more important to international market prices than demand shifts, although the latter will no doubt generate short-term fluctuations. In this regard, it is notable that the overall trend in milk powder prices since the mid-1980s has been predicated on lower exports from the EC and the United States, not on demand growth. While exports of WMP have been relatively stable (trending slowly up) SMP exports have declined markedly since the mid-1980s. In particular, SMP exports from the United States are reduced by around 250,000 tons from the levels of 1985 and 1986. EC exports have declined following the stock reduction program of 1987-89.

Most factors suggest that prices should remain firm for the remainder of 1992. Looking to 1993, the major determinants of prices on the international market are likely to be:

- management of EC calf feed and casein programs. It is clear that utilization of skim milk for these programs will be reduced. Thus far it appears that the Commission may manage the cut in a better fashion than in 1988 when its regulatory changes reduced disposals through these programs by too great an amount, contributing to the subsequent market imbalances and price falls;

- whether proposed milk quota cuts in the EC eventuate. Low opening stocks and the French election may make the proposed 1% cut in 1993 difficult to achieve;

- the degree of expansion of US milk production and consequent accumulation of public stocks;

- increased US export activity as a result of increases in subsidized exports or NAFTA-generated sales to Mexico; and

- the value of the US dollar against the ECU. Its decline to post-war lows (as of mid-1992) has lifted international powder prices. These are vulnerable to a reversal of this trend (an appreciating dollar).

It is likely that powder prices have neared their peak of the current upswing. While timing is difficult to predict, developments in the EC and United States and currency realignments are likely to see lower prices in the 1993 and 1994 period. However, this price decline is likely to be less than in 1989/90, in part because of the better management position of the EC and also because of likely higher GATT IDA minimum prices.

Longer-run prospects for the international milk powder market are relatively favorable. While facing some increased challenge from vegetable proteins, positive factors include:

- good demand for non-fat solids in traditional (high-income) dairy markets. In contrast to milk fat, health and nutrition attributes of dairy protein (e.g., calcium) and growing diversity and sophistication in its use (e.g., protein and skim milk concentrates and fractions) are likely to see demand grow;

- rising demand in rapidly expanding economies in Asia and elsewhere. In addition to the income effect, demand in many of these countries is likely to be encouraged by the nutritional attributes of dairy proteins (e.g., for bone and overall growth in children);

- further import liberalization (e.g., in Japan and the Republic of Korea);

- A GATT Uruguay Round outcome which may moderate subsidized exports in the latter part of the 1990s; and

- lower milk production in the EC, in part in response to a Uruguay Round agreement outcome but more importantly in response to the extent and cost of the current disposal programs, combined with the desire to move at least some way toward targeted income support.

Weakness in butter prices and other uncertainties in that market are likely to result in a change in the price relativities between WMP and SMP. During the 1980s WMP maintained a premium; this is not likely to be sustained in the 1990s. Indeed, with strong growth in WMP capacity in New

Zealand, impending difficulties in the butter market may be sufficient to cause WMP to trade at a discount to SMP.

Our forecast is for milk powder prices to be sustained in the US$1,800 to US$1,900/ton range for most of 1992, with the probability of a price decline in the 1993-94 period. Currency realignment (appreciation of the US dollar against the ECU) and policy management in the EC and United States are key factors. In this period, a price decline of the order of 25% (e.g., to US$1,400/ton) is possible. The duration of such a price decline is likely to be shorter than in the 1970s and 1980s.

In the second half of the 1990s, prices are likely to be sustained at higher levels. In current dollar terms, prices should move more in a range of US$1,600 to US$2,000/ton. The price of WMP is expected to average near or below that of SMP; in the latter part of the decade, it is more likely to average below the SMP price.

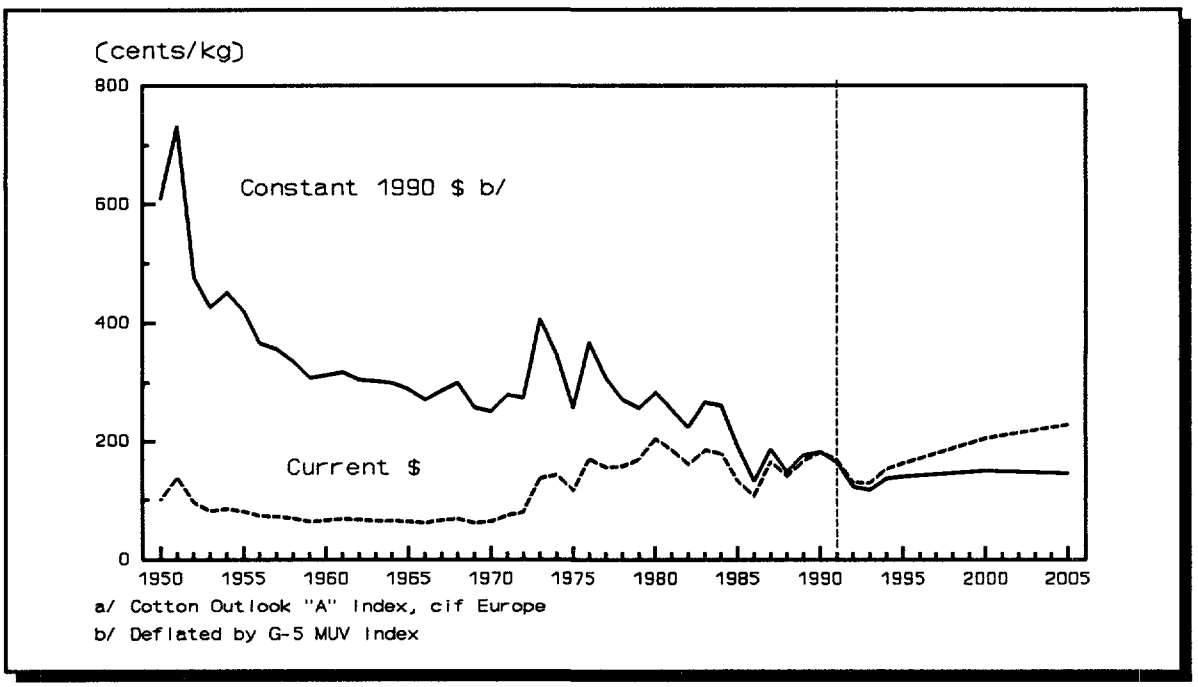
Cotton

Summary

- Both cotton fiber and cotton product prices declined in 1991/92 as global production exceeded demand and stocks accumulated. Medium staple prices in Europe (Cotlook A Index) were 33.8% lower in March 1992 than in March 1991, while the Cotlook cotton yarn export price index at the end of June 1992 was 14% lower than a year earlier.

- Any recovery in prices in 1992/93 will be moderate since the anticipated reduction in cotton area is small and world production is expected to remain higher than consumption. A full recovery to the declining long-run trend is not expected before the mid-1990s.

Cotton Prices a/, 1950-2005

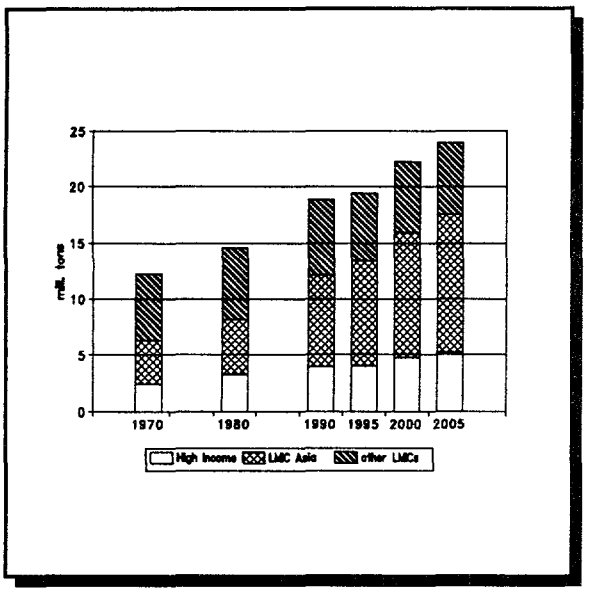


- Cotton consumption is expected to recover with per capita income growth, with rapid growth likely in high-income non-OECD countries and slowly increasing growth in the LMIC Europe.

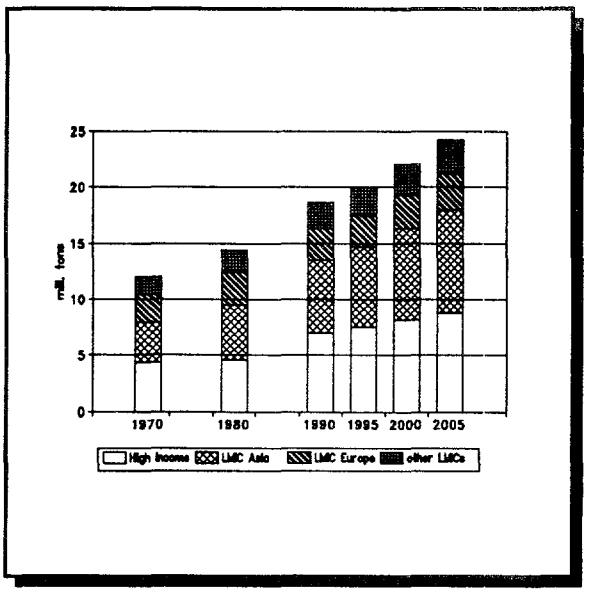
- Production growth rates to 2005 appear low mainly because the projection base year (1991/92) crop was exceptionally large. The Asia region (China, India, and Pakistan) is expected to continue to be the largest cotton-producing area. LMIC Europe is likely to have a net negative production growth rate.

- The ratio of exports to consumption of cotton should continue to decline as major producing countries increase their mill consumption.

Projected Cotton Production, by Region



Projected Cotton Consumption, by Region



Consumption

The level of world demand for cotton normally varies less from one season to the next than does world production. Excess supply resulted in cyclically low prices in 1969, 1975, 1982, 1986, and 1992. Often, excess supply has been associated with a delayed production response to a period of favorable prices coinciding with a reduction in demand due to poor economic conditions. Typically, low prices have stimulated reductions in cotton production which, in conjunction with a recovery of demand, have brought about an upswing in prices towards a new cyclical high within a period of one to four years.

A notable example was the surge in world cotton production in the mid-1980s, which increased global stocks to the equivalent of over eight months of mill requirements in 1986. The response of cotton growers to the lowest prices in many years and to government policy initiatives to deal with the excess supply was decisive; four successive seasons with production below consumption eliminated the surplus (stocks were reduced to the equivalent of four months of consumption) and, by 1990, real cotton prices were 39% higher than the cyclical low in 1986.

Decline since 1990 as prices recover and economies weaken. However, the period of low prices from 1985 increased the competitiveness of cotton relative to substitute fibers. The increased competitiveness and favorable economic conditions in many countries during the 1986-89 period raised world cotton consumption growth well above the trend level of the previous two decades. However, the recovery of cotton prices and less favorable worldwide economic growth, particularly in Eastern Europe and the FSU, resulted in slight declines in world cotton consumption during 1990/91 and 1991/92.

CONSUMPTION PROJECTIONS. Projections of apparent consumption of cotton[1] in the near term reflect continued weakness in the LMIC economies undergoing severe restructuring in Europe and slow income growth in Africa. The economic slowdown in the high-income countries is also expected to restrain cotton consumption through 1992. However, the supply constraint on cotton milling in China was lifted by the very large 1991/92 crop, and improved economic growth there is expected to support a recovery in consumer demand for cotton textiles in the near term. Cotton consumption in Latin American countries that are recovering from the constraints associated with their large external debts should also increase with their improving economic performance in the near and medium term.

Large consumption increases in LMICs. In the longer term (the decade beginning in the mid-1990s), world income growth trends are projected to be higher than those experienced in the early 1990s. In LMIC Europe, increasing per capita incomes are expected to result in dramatic increases in per capita use of fiber products, including cotton textiles, due in part to low consumption in the 1991 base year. However, in the world at large, the declining trend in world population growth is expected to moderate slightly the growth rate of cotton consumption compared with the historical rate of 2% p.a. during the 1964-90 period (see Table A2).

In the high-income countries, the above-trend growth of cotton consumption which occurred in the last half of the 1980s has abated, and their projected rates are closer to their historical rate of 1.8% p.a. The fastest growth among those countries is expected to be in the smaller non-OECD group.

The region with the largest population and the fastest economic growth--the LMICs of Asia and the Pacific--is projected to experience the greatest increase in cotton consumption. This region is expected to increase its share of world consumption to around 38% in 2005 from 35.3% in 1990. A large proportion of this increase should be accounted for by China, although China's growth in cotton use should be at a lower pace than in recent years due to competition from domestically produced synthetic fibers. Synthetic fiber production is being considerably expanded in China.[2] Cotton consumption in India is expected to continue increasing at near the rate of the past two decades--in spite of increased synthetic fiber substitution--as the liberalization of economic policies contributes to improved income growth. Pakistan's large capacity for cotton and textiles production will provide it an opportunity to continue as a major exporter of raw cotton and cotton textiles while increasing its rate of growth of domestic cotton consumption.

Production

World cotton production increased from 9.8 million tons in 1961/62 to 19 million tons in 1990/91. The average annual rate of production growth was 1.9% during this period, but an increase in the late 1980s in response to a surge in consumption raised the annual average growth in the 1970-90 period to 2.2%. Annual production growth has varied in response to consumption requirements, the

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[1] Apparent consumption is defined as domestic mill consumption of cotton plus the fiber equivalent of imports of cotton manufactures minus exports of cotton manufactures.

[2] China plans to increase chemical fiber production to 2 million tons per year during its Eighth Five-year Plan (1991-95).

relative prices for cotton and competitive crops, and the level of cotton stocks. The growth rate in yields has varied from 2% during the 1960s to 0.4% in the 1970s and to 3.4% during the 1980s. The area under cotton has increased only slowly (0.02% p.a.) during this period but there have been marked year-to-year changes.

Although cotton is produced in about 70 countries, the major producers account for a very large share of world output. During the latest five-year period (1987-91), the five largest cotton-growing countries produced almost 75% of the world total.[3] China has had the greatest increase in cotton production, raising its share of world production from 10.1% in the early 1960s to 24% during the past five seasons. The United States has seen its share of world output decline from 30.5% in the 1960s to 17.6% in the 1987-91 period.

High prices since 1989/90 stimulate strong output growth. Production/price cycles commonly occur in the cotton market in response to supply/demand imbalances. Since cotton is produced as an annual crop, producers may adjust their cotton growing area each year according to their perception of the profitability of growing cotton or other crops. During the current cycle, world cotton production declined by more than 1 million tons in 1989/90 due largely to a 6% decline in cotton area in response to an 8% decline in cotton prices during the previous season. With world cotton consumption at a record high in 1989/90, cotton stocks declined by over 1 million tons and cotton prices increased by 24%. The price recovery resulted in increased cotton area in many countries during 1990/91 but the increase in world area was held to 4.5% by continued declines in other countries, particularly in the FSU, Sudan, and Turkey. Record cotton production in 1990/91 provided a partial replenishment of world stocks but the net increase was concentrated in China and Pakistan, both of which were experiencing sizable increases in mill consumption and relatively low exports. Therefore, cotton prices in 1990/91 remained at about the previous season's high level, which stimulated a further increase in cotton area during 1991/92. This crop, enhanced by record yields, produced a world record output of 20.8 million tons. With mill consumption of cotton leveling off during 1991/92 due to slowing global income growth, cotton stocks increased sharply and cotton prices averaged about 24% lower than during the two previous seasons.

PRODUCTION PROJECTIONS. World production is expected to decline moderately in the 1992/93 crop year in response to the low prices resulting from the addition of about 2.5 million tons to world stocks during 1991/92. Even so, world output is again expected to exceed consumption. Cotton growers' planting intentions indicate that if growing conditions are favorable stocks could increase by a further 1 million tons. In the United States, the 1992/93 cotton area is estimated at 4.5 million ha or about 4% less than the area planted in 1990/91. The US Department of Agriculture estimated in October that, under average conditions, US production could reach 3.5 million tons during 1992/93--about 10% less than last season. Given present prospects for domestic mill use and exports, a crop of that size would result in a moderate increase in US stocks.

Trade sources indicate that the cotton area in China will again be large in 1992/93, raising expectations that production will be sufficient to supply its domestic mills and increase its export supply. Cotton plantings have been increased in response to cotton producer prices being set at more attractive levels than the producer prices for other crops. Although the anticipated production would increase cotton stocks, the impact on the volume of Chinese cotton exports may be moderated by financial considerations,

[3] These countries are China, the FSU, India, Pakistan, and the United States.

since the current level of producer prices (converted at prevailing exchange rates) makes exporting at present world prices unprofitable. This may also raise the domestic mills' costs of producing cotton textiles. In India, a recovery in yields should result in an increase in cotton production. Lower production is expected in the FSU, Mexico, and Pakistan due to decreased area planted.

Stock buildup should depress production for a few years. Given the build up in stocks in 1992/93, the need to liquidate stocks should depress cotton production via lower prices until the mid-1990s.[4] Following the stock reduction, an upswing in prices can be expected to stimulate an expansion of production to match the trend in consumption. The Asian and Pacific region, led by China, India, and Pakistan, is expected to continue to be the world's largest cotton-producing area. This region's large investments in cotton manufacturing capacity in recent years will also maintain its position as the foremost cotton textile and clothing producer. Among the high-income countries, Australia and the United States are expected to continue as major cotton producers due to their technological lead in labor efficiency in cotton growing, applied biotechnological techniques in cotton crop protection, and variety development by genetic engineering methods. Two areas where promising research results have been obtained are in fiber quality and yield improvements for Pima cottons and in plant protection from insects.

The Sub-Saharan Africa region's cotton production increased by over 4% p.a. during the 1980s and reached nearly 1 million tons in the early 1990s. However, it has lost some of its momentum because of setbacks in East and Southern Africa, due partly to the sustained drought. Projections for the region assume a continued modest increase in cotton growing under reformed agricultural policies, resulting in its concentration in the more efficient regions. In the Middle East and North Africa region, crop diversification, particularly in Egypt, is expected to continue to result in a slow decline in cotton production. Cotton production in Latin America is expected to increase in Argentina, Brazil, and Paraguay. There is also the potential for increased production in other countries, but recent experience in Mexico indicates that in some cases other agricultural crops may be more attractive under reformed policies.

In Europe, diverse prospects for cotton growing in the FSU and Turkey tend to offset. Our expectation is that crop diversification in the FSU will have a greater effect on cotton production than the net increase in output from the Southeastern Anatolian irrigation project in Turkey. The completed project is envisaged to encompass 1.7 million ha of land under irrigation from water collected by 22 dams, servicing 19 hydroelectric power plants. Cotton will be only one of the many agricultural commodities grown. The seedcotton production expected implies about 400,000 tons of lint from the project by 2002. These, however, are very uncertain assumptions since there is sufficient scope in each case for major changes in the direction or magnitude of the actions taken to strongly affect the eventual outcomes. Other uncertainties in the production projections arise from the impact on cotton growing of agricultural and trade policy reforms (ongoing or potential).

The growth in world cotton production needed to meet the projected demand of 24.2 million tons in 2005 is around 1% p.a. during the 1991-2005 period. The required growth is made to seem low by the record production in the 1991 base year. From a 1990 base, the growth rate is 1.6% p.a.

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[4] The high level of production in 1991/92--the base year for the projections--makes the projected growth of production seem even smaller unless account is taken of the need to run down stocks.

Trade

World cotton export volume had been increasing slower than mill consumption because some major cotton producers have expanded milling capacity faster than production. In Pakistan, for example, cotton production during the past three seasons averaged 24% higher than the previous three-year period, while cotton exports declined by one half due to rapidly increasing domestic mill consumption. During the same period, Pakistan's exports of cotton textiles increased dramatically--70% for cotton yarn and 25% for cotton fabrics.

One-off increase due to FSU restructuring. In 1991/92, the level of world cotton exports was raised by about 1.5 million tons due to the restructuring of the FSU into 15 independent countries. Cotton exported by six former republics within the FSU will now be regarded as world exports rather than domestic transfers. As a result, Uzbekistan became the world's second largest cotton-exporting country and Russia became the largest importer. Uzbekistan's recent cotton production and exports on a calendar year and crop year basis as published in the International Cotton Advisory Committee's *Cotton: Review of the World Situation*, May-June, 1992 are presented in Table 1. Due mainly to the change in recording of the FSU trade, world cotton exports as a proportion of world consumption are estimated to have increased from 27% in 1990/91 to 35% in 1991/92.

Influence of decisions about stock levels. World cotton trade is basically determined by mill demand in cotton-importing countries but mill purchasing for stocks is influenced by expectations about future supply and prices. For example, net importers of cotton added about 8% to their stocks during 1988/89 while prices were relatively low. During 1989/90, those additional stocks were fully utilized as cotton prices increased and, in 1990/91, stocks were reduced further as supplies continued to tighten and prices remained high. Importers' stocks were kept low during 1991/92 as manufacturers were

Table 1: Uzbekistan's Cotton Production and Exports, 1987-92

Calendar Years	1987	1988	1989	1990	1991
			('000 tons)		
Production	1,599	1,572	1,581	1,636	1,532
Total Exports	1,458	1,416	1,427	1,138	1,315
To FSU	890	886	832	790	1,021
To rest of world	567	530	595	348	295
Production minus exports	142	155	154	498	217
Crop Years	1987/88	1988/89	1989/90	1990/91	1991/92
Production	1,478	1,732	1,673	1,634	1,508
Total Exports	1,434	1,423	1,431	1,174	1,168
Production minus exports	44	309	242	460	340

Notes: - Crop year exports estimated from calendar year (CY) data.
- 1992 exports estimated to be 1.15 million tons.

Source: Production and CY exports, Uzbekistan Government statistics.

faced with slackening demand for textiles and the record crop being harvested removed concerns about the adequacy of supplies. This caused a sharp decline in cotton prices but expectations for another large crop in 1992/93 dampened the incentive for importers to immediately accumulate stocks.

TRADE PROJECTIONS. ***Textile industry expands in Asia Pacific, Latin America, Middle East, and North Africa.*** The import demand for cotton is heavily concentrated in Asia where investment in cotton textile capacity has increased rapidly in recent years. The International Textile Manufacturers Federation's survey of textile machinery shipments in 1990 revealed that, of the nearly 5 million cotton-type spindles shipped, two thirds went to Asian countries. The equipment went to both cotton-producing countries and to countries with little or no cotton production. The highly productive textile industries in this region are expected to continue to increase their import demand for cotton throughout the projection period. However, the recent investment growth rates recorded are not likely to be maintained. Asian and Pacific countries at all income levels are projected to increase their share of world cotton imports to more than one-half by early in the 2000s--from 44% in 1991/92.

Latin American countries are expected to continue increasing cotton imports to meet requirements for their expanding textile industries. Mexico's cotton requirements now substantially exceed the declining level of domestic production. Brazil is the region's largest cotton producer, but its large textile industry's needs for qualities not produced locally also make it the region's largest importer. Excess locally produced qualities are exported.

The expanding textile and clothing exporters in the Middle East and North Africa region will have an increasing need for cotton imports.

Multilateral reforms may cause major production adjustments. The long-term decline in cotton imports into the OECD countries has been moderated by large investments in very efficient spinning and fabric-forming machinery. However, the likely easing of constraints on textile and clothing imports from lower-cost producers is expected to continue the downtrend in cotton imports in these countries. The timing and speed of this adjustment depends on the outcome of the multilateral negotiations currently taking place within the Uruguay Round of the GATT. Present discussions anticipate a ten-year phasing-out period for current MFA trade constraints on textile and clothing. Negotiations are also being held to reduce agricultural subsidies in producing countries. Substantial reductions in production subsidies and freer market access would greatly increase the efficiency of resource allocation and economic efficiency in the agricultural and textile industries. The NAFTA will have some impact on the location of production and the patterns of trade as location of production in Mexico becomes more favorable because of access to Canada and the United States.

The sources of cotton exports during the projection period are expected to include the current major suppliers. However, the possibility of significant multilateral reform of agricultural policies could result in major adjustments in the cotton-producing countries that have substantially subsidized cotton growing. Such changes would likely be introduced gradually, but the impact on individual countries could be very significant late in the projection period.

Based on a continuation of current policies, the two major OECD cotton exporters--Australia and the United States--would supply around 30% of world exports. Australia's export position is enhanced by the good quality of its cotton and its relatively low production cost. US exports are aided by the broad range of cotton qualities produced and its export subsidies.

Uncertainties in FSU. Among the LMIC regions, Europe supplies the largest amount of cotton exported. The leading exporters are Azerbaijan, Tadzhikistan, Turkmenia, and Uzbekistan. For the near term, their cotton supply for export outside the FSU republics has been increased by the buildup of stocks since 1990/91 and the decline in mill consumption in the other former republics. However, a recently reached agreement for Uzbekistan to supply cotton to other former republics should ease concerns about the adequacy of raw materials when economic recovery begins. In the medium term, these countries' exports should decline in aggregate due to crop diversification. However, their longer-term export performance will be determined largely by policies yet to be formulated. Exports from Turkey will be enhanced by increased cotton production from the Southeastern Anatolian irrigation project. In the Asian and Pacific region, Pakistan has the most promising export potential, but its realization depends on the relative growth in cotton production and cotton manufacturing. India also has good potential for developing cotton exports.

Price Outlook

With world cotton stocks having increased by around 2.5 million tons during the 1991/92 season, medium staple cotton prices have declined sharply. The average of our world indicator price during the January-June period in 1992 (Cotlook A index for middling 1-3/32 inch quality, c.i.f. North Europe), at US¢130.1/kg, was 29% lower than a year ago. The potential stock buildup is the combined result of record global cotton production and the tendency for world consumption to level off. In some cases mill consumption has declined, particularly in the European LMICs; cotton use in Russia is expected to decline by 12% this season and it may continue to decline sharply there during 1992/93.

Supply overhang. Several factors contributed to the decline of cotton prices during 1991/92 and those of particular importance included: (i) the buildup of world cotton stocks; (ii) the large crop in China reducing its need for imports; (iii) the highly competitive pricing of FSU cotton in export markets in order to sell the accumulated stocks from the 1990/91 crop along with the 1991/92 crop; and (iv) the use of marketing certificates in the United States as authorized by the US 1990 Farm Bill (applicable to 1991-95 crops).

The supply overhang can be alleviated by appropriate adjustments to production and consumption. Income projections for the near term indicate prospects for world cotton consumption to increase at a faster rate in 1993. The decline in cotton prices will contribute to the demand recovery by increasing cotton's competitiveness relative to substitute manufactured fibers. If the recovery in demand is brisk and cotton production declines decisively in response to two seasons of relatively low prices, as would be expected from past experience, cotton prices would begin recovering in 1993. However, if the cotton production adjustment is delayed by the stimulation of support prices above the level of market prices, (particularly in China, Pakistan, and the United States) and with inadequate limitations on area planted, the necessary adjustment could well require a longer period.

Competition and productivity increases mean long-term price decline continues. The importance of relative prices of textile fibers has been clearly demonstrated during the past two decades. During most of the 1970s, cotton prices were at a competitive disadvantage relative to those of its most important synthetic fiber substitute--polyester (see Figure 1). In that period, the non-cellulosic fibers' market share increased from around 20% to over 36%, while cotton's share declined from 56% to 47%. During the 1980s cotton prices gained competitiveness and cotton's market share during the last half of the decade was slightly higher than during the last half of the 1970s. The non-cellulosic fibers increased

their market share by over four percentage points, but their gains were at the expense of the cellulosic fibers and wool, which were undergoing a period of high prices.

During the projection period the intense price competition between cotton and polyester fibers is expected to continue. Moderate increases expected in the real cost of raw materials for producing synthetic fibers are likely to be largely offset by declining process costs in the new plants to be constructed during the 1990s. Their construction is being concentrated in the Asian countries which have relatively low costs of production. The real cost of producing cotton is expected to be held down by stable real costs of fertilizers and improved varieties requiring less chemical pest control and having improved productivity.

In the longer term, cotton prices are strongly influenced by trends in productivity. During the 1960-91 period, the real cotton indicator price declined at an average rate of 2.03% p.a., while the world average cotton yield was increasing at a rate of 2.05% p.a. New plant breeding techniques have improved the potential yields for new varieties of cotton, have improved fiber quality, and have developed better resistance to insect damage. The widespread use of new varieties incorporating these qualities holds promise for the declining trend in real cotton prices to continue. Even so, the influence of weather and agricultural policies are expected to continue to result in price cycles due to temporary imbalances of supply and demand.

Cotton and Polyester Staple Prices, 1955-91

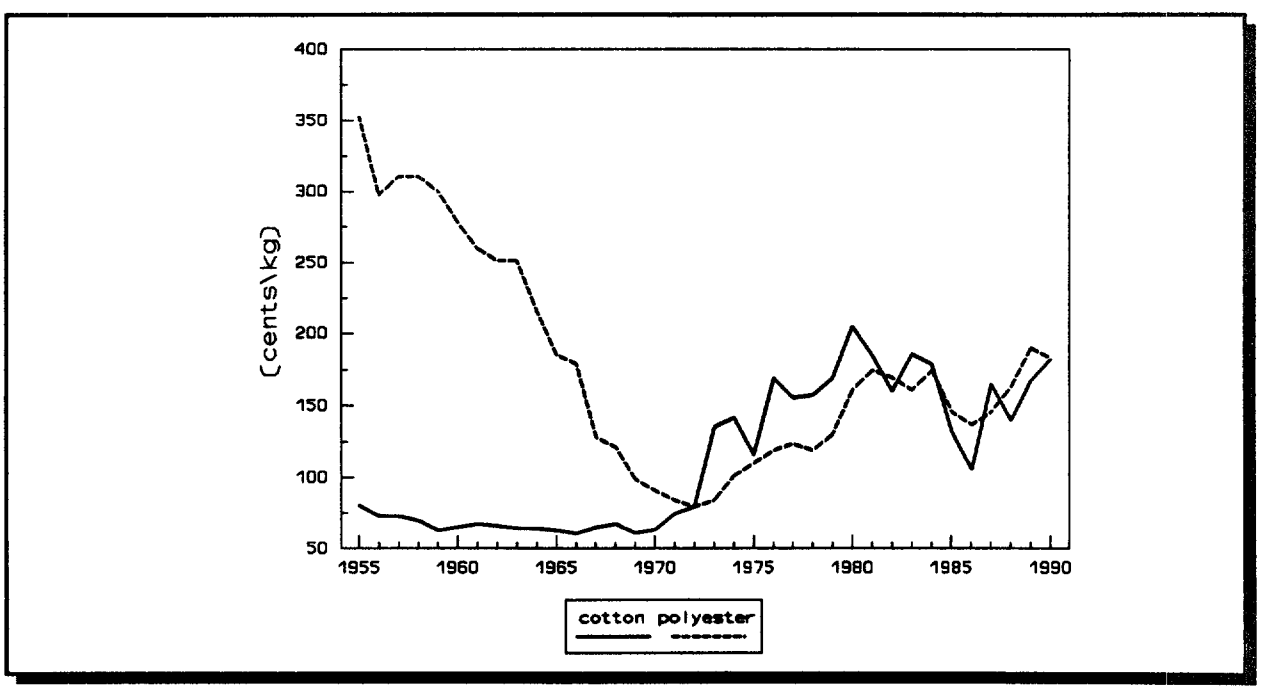


Table A1: Cotton - Production By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	2,347	3,249	3,935	4,278	4,115	3,780	3,880	4,025	4,705	5,165	0.5	1.7	1.6
OECD	2,309	3,167	3,884	4,255	4,085	3,750	3,856	3,990	4,660	5,115	0.5	1.7	1.5
United States	2,225	3,004	3,375	3,819	3,675	3,340	3,410	3,590	4,100	4,400	0.1	1.0	1.0
LMICs	9,909	11,320	15,030	16,572	15,985	14,720	15,120	15,475	17,600	18,835	2.4	2.3	0.9
Africa	796	605	961	988	945	870	885	890	1,000	1,140	2.1	1.6	1.0
Americas	1,538	1,632	1,703	1,847	1,610	1,525	1,610	1,665	1,845	1,925	0.2	0.3	0.3
Brazil	614	615	697	831	778	690	697	710	770	850	1.3	1.9	0.2
Asia & Pacific	3,898	4,824	8,222	9,856	9,620	8,820	9,110	9,395	11,235	12,405	4.0	4.5	1.7
China, People's Rep.	2,159	2,620	4,507	5,663	5,475	4,960	5,084	5,110	5,725	6,050	4.7	4.6	0.5
India	1,089	1,371	2,003	1,955	2,200	2,040	2,084	2,034	2,440	2,725	2.5	3.5	2.4
Pakistan	597	735	1,636	2,142	1,850	1,735	1,925	2,080	2,350	2,500	4.7	5.7	1.1
Europe	2,792	3,490	3,498	3,257	3,210	2,945	2,950	2,945	2,925	2,785	2.0	0.7	-1.1
Turkey	441	488	655	565	590	550	575	580	690	765	2.7	1.1	2.2
Middle East & North Africa	885	769	647	624	600	560	565	580	595	580	-0.6	-1.7	-0.5
Egypt	520	504	300	293	280	266	262	270	280	275	-1.0	-2.1	-0.7
World	12,257	14,569	18,965	20,850	20,100	18,500	19,000	19,500	22,320	24,000	1.9	2.2	1.0

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: US Department of Agriculture, Foreign Agricultural Services (actual);
World Bank, International Economics Department (projected).

Table A2: Cotton - Apparent Consumption By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	4,297	4,547	6,910	6,880	6,960	7,115	7,280	7,445	8,080	8,720	1.8	2.4	1.7
OECD	4,242	4,392	6,723	6,695	6,770	6,915	7,070	7,225	7,820	8,420	1.7	2.3	1.7
United States	1,906	1,538	2,653	2,665	2,675	2,715	2,755	2,800	2,990	3,180	0.9	1.7	1.3
Japan	625	832	1,129	1,100	1,130	1,165	1,195	1,245	1,370	1,500	3.6	3.0	2.2
Non-OECD	55	155	187	185	190	200	210	220	260	300	4.9	6.3	3.5
LMICs	7,685	9,832	11,763	11,770	11,880	12,145	12,345	12,555	14,050	15,530	2.3	2.2	2.0
Africa	436	478	395	400	410	410	415	415	420	425	0.2	-0.5	0.4
Americas	783	944	1,215	1,250	1,260	1,300	1,330	1,360	1,510	1,680	2.0	2.2	2.1
Brazil	278	435	600	610	615	620	625	635	720	830	3.4	3.9	2.2
Asia & Pacific	3,542	4,913	6,585	6,730	6,810	7,000	7,105	7,225	8,220	9,225	3.1	3.0	2.3
China, People's Rep.	1,686	2,941	3,765	3,800	3,910	4,000	4,095	4,185	4,700	5,250	4.2	4.0	2.3
India	1,039	1,133	1,618	1,620	1,622	1,660	1,705	1,755	1,970	2,200	1.8	2.2	2.2
Pakistan	220	169	238	240	245	246	247	248	256	265	0.3	0.4	0.7
Europe	2,586	2,927	2,821	2,645	2,650	2,670	2,710	2,750	3,000	3,200	0.9	0.4	1.4
Middle East & North Africa	338	570	747	745	750	765	785	805	900	1,000	4.1	4.0	2.1
World	11,982	14,379	18,673	18,650	18,840	19,260	19,625	20,000	22,130	24,250	2.0	2.1	1.9

a/ Least squares trend for historical periods (1964-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: FAO, World Apparel Fiber Consumption Surveys (actual);
World Bank, International Economics Department (projected).

Table A3: Cotton - Gross Exports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	784	1,766	2,152	1,982	2,060	2,050	2,070	2,100	2,390	2,580	3.1	3.8	1.9
OECD	763	1,689	2,080	1,942	2,020	2,010	2,030	2,060	2,340	2,530	2.8	3.5	1.9
United States	737	1,576	1,697	1,481	1,540	1,535	1,550	1,575	1,785	1,930	2.0	2.3	1.9
LMICs	3,145	2,792	2,883	4,518	4,500	4,615	4,660	4,720	4,980	5,300	0.6	0.4	1.1
Africa	627	372	699	813	775	790	800	815	900	975	1.3	1.3	1.3
Americas	859	645	669	692	580	610	615	640	760	800	-2.3	-2.0	1.0
Mexico	219	180	37	55	30	40	40	45	60	60	-6.5	-6.4	0.6
Brazil	316	13	156	109	95	100	100	105	120	125			1.0
Asia & Pacific	204	380	729	727	840	895	915	945	1,000	1,175	6.9	11.7	3.5
Pakistan	146	273	304	425	500	525	530	540	590	675	5.4	9.9	3.4
Europe	892	1,086	644	2,150	2,190	2,200	2,210	2,195	2,185	2,205	1.3	-1.2	0.2
Turkey	279	189	164	50	45	50	75	120	160	200	-2.5	-6.5	10.4
Middle East & North Africa	563	310	142	136	115	120	120	125	135	145	-4.3	-6.6	0.5
Egypt	307	183	33	25	28	28	28	28	28	28	-5.4	-7.5	0.8
World	3,929	4,558	5,035	6,500	6,560	6,665	6,730	6,820	7,370	7,880	1.3	1.5	1.4

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: US Department of Agriculture, Foreign Agricultural Services (actual);
World Bank, International Economics Department (projected).

Table A4: Cotton - Gross Imports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	2,388	2,201	2,267	2,196	2,233	2,250	2,255	2,260	2,360	2,480	0.0	0.4	0.9
OECD	2,085	1,742	1,651	1,578	1,600	1,590	1,575	1,560	1,535	1,500	-0.8	-0.4	-0.3
Japan	775	729	634	610	600	599	598	594	585	565	0.0	-0.5	-0.5
Non-OECD	303	459	616	618	633	660	680	700	825	980	4.7	3.6	3.3
Hong Kong	157	189	218	236	239	241	246	251	272	294	2.8	2.5	2.3
Taiwan, China	132	249	358	340	348	364	378	392	467	557	7.1	5.4	3.6
LMICs	1,607	2,442	3,062	4,310	4,327	4,415	4,475	4,560	5,010	5,400	3.2	2.8	1.6
Africa	48	24	146	87	105	106	100	95	105	112	2.2	2.0	1.8
Americas	81	84	235	288	310	315	325	330	410	500	4.3	6.7	4.0
Asia & Pacific	578	1,414	1,847	1,698	1,677	1,768	1,832	1,930	2,305	2,630	5.3	4.0	3.2
Indonesia	85	105	324	363	385	391	406	421	508	611	11.5	9.7	3.8
Korea, Rep. of	113	337	447	414	409	440	457	477	569	682	8.2	7.2	3.6
Thailand	42	75	354	370	403	410	417	435	531	650	11.6	9.1	4.1
Europe	880	864	688	2,079	2,067	2,056	2,046	2,030	1,990	1,930	0.8	0.2	-0.5
Middle East & North Africa	21	56	146	158	168	170	172	175	200	228	10.7	10.4	2.7
World	3,995	4,643	5,329	6,506	6,560	6,665	6,730	6,820	7,370	7,880	1.4	1.5	1.4

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: US Department of Agriculture, Foreign Agricultural Services (actual);
World Bank, International Economics Department (projected).

Table A5: Cotton - Prices, a/ 1950-91 (Actual) and 1992-2005 (Projected)

	(¢/kg)		
	Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/
Actual			
1950	99	608	801
1951	138	731	1,001
1952	94	475	655
1953	82	427	566
1954	85	451	576
1955	80	420	545
1956	73	367	483
1957	72	358	471
1958	69	337	442
1959	63	309	401
1960	65	314	408
1961	67	319	412
1962	66	306	392
1963	64	304	370
1964	64	300	362
1965	63	290	342
1966	61	271	320
1967	65	288	335
1968	67	300	337
1969	61	258	292
1970	63	252	286
1971	74	280	314
1972	79	275	305
1973	136	406	455
1974	142	348	429
1975	116	257	314
1976	169	369	442
1977	155	309	367
1978	157	271	303
1979	169	257	308
1980	205	284	334
1981	185	255	298
1982	160	224	262
1983	185	267	299
1984	179	262	289
1985	132	192	209
1986	106	131	139
1987	165	186	192
1988	140	147	151
1989	167	177	182
1990	182	182	182
1991	168	164	160
Projected			
1992	130	122	116
1993	129	117	112
1994	153	136	129
1995	162	140	133
2000	206	150	140
2005	229	145	130

a/ Cotton Outlook "A" Index for Middling 1-3/32", c.i.f. North Europe.
b/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.
c/ Deflated by G-7 Consumer Price Index (CPI).

Sources: Cotton Outlook, Cotlook Limited, Liverpool (actual); World Bank, International Economics Department (projected).

Jute

Summary

- Jute consumption outside the major jute-producing countries continues to decline as new technology in substitute synthetic fiber bag manufacturing intensifies competition in the packaging materials market. In Western Europe, however, the erosion of imports of jute goods has stopped because of a growth in consumption of imported jute yarn in carpet manufacturing.

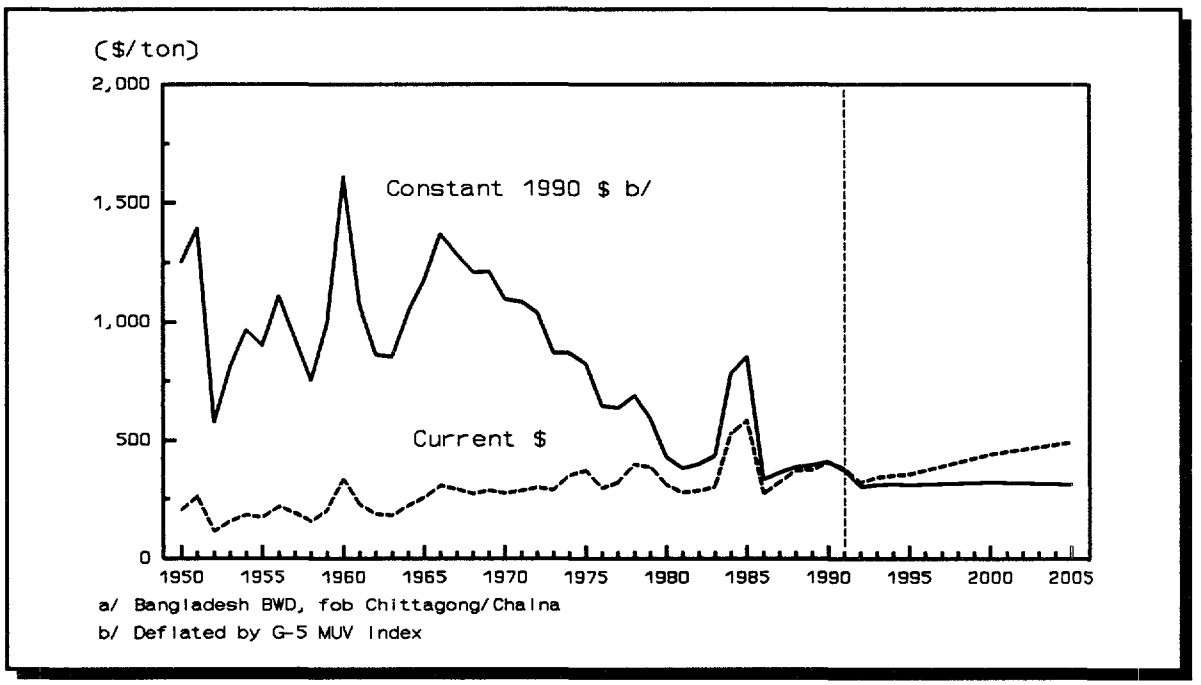
- Jute consumption prospects are most promising in the largest jute-producing countries, but even there the expanding use of synthetic bags is limiting the growth of jute consumption.

- Jute goods' trade with Eastern Europe and the FSU should recover as these economies recover, although new currency arrangements may threaten jute's competitive position.

- Jute production prospects in the medium and longer term, based on the demand for traditional jute products, indicate a declining trend. But positive results from marketing non-traditional jute products suggest that this trend could be moderated.

- Jute prices in real terms are expected to continue the long-term declining trend but at a slower rate than that of the past three decades.

Jute Prices a/, 1950-2005



Production Prospects

Jute production (including mesta and kenaf) is concentrated in South and East Asia. The four largest producers--Bangladesh, China, India, and Thailand--accounted for 94% of world average output of 3.4 million tons during the past three crop years. By comparison, their share of average annual world output of 3.3 million tons during 1973-75 was 85%. The similar cropping patterns and seasonal growing conditions of the major producing countries, due to their geographical proximity, contribute to the high variability of world jute supply. The most competitive crop for jute land in Bangladesh, China, and India is rice paddy and in Thailand it is tapioca. Due to the high variability in the jute-growing area and in yields, the change in world jute production from one season to the next has ranged from +85% to -42% over the 1973-90 period.

World jute production increased reasonably fast during the 1973-80 period (+1.7% p.a.) but declined slowly during the 1980-90 period (-0.2% p.a.). Production trends were mixed in the largest producing countries during the 1980-90 period. Average growth rates were positive in China (+1.6% p.a.) and in India (+0.04% p.a.), but negative in Bangladesh (-0.3% p.a.) and in Thailand (-2.5% p.a.).

Production trends downward, concentration continues to increase. In the medium and longer term, the three largest jute producers will likely account for an increasing share of world output. China and India are expected to continue producing jute mainly for domestic use in packaging materials for their large supply of agricultural inputs and products. Jute production in India could also benefit from its lead in the development and marketing of nontraditional jute products, especially for home furnishings and travel and shopping bags. Although the sales volume of these products is currently low, the potential returns to manufacturers make their efforts for further development appear worthwhile. However, China and India have expanded petrochemical industries and their jute production is becoming more vulnerable to competition from synthetic products. Jute production in Bangladesh has become increasingly dependent on the incremental changes in world import demand for raw jute and jute products as a result of its increasing share of those markets. Therefore, the continuing decline in world import demand, particularly for raw jute, will impact more directly on production in Bangladesh. In Thailand, jute/kenaf production has declined since the mid-1980s due to losses of growing area to tapioca. With the jute spinners being integrated to produce both jute and synthetic twine and sacking products, jute/kenaf production is expected to decline during the projection period. Jute production in the rest of the world has also declined since the mid-1980s and now accounts for about 6% of world output. Those countries are not expected to significantly increase jute production during the projection period.

Consumption Prospects

From 1973 to 1990, traditional jute products lost market share to bulk handling in the transport and storage of commodities and materials and to synthetic materials substituting for jute sacks and fabrics. World jute production and apparent consumption increased at an annual rate of only 0.5%. The growth in consumption occurred mainly in the jute-producing countries. World trade in jute fiber declined by over 3% p.a. during this period. Trade in manufactured products declined by an average of 1.5% p.a.

Competition severe in packaging and wrapping; quality advantage in carpet manufacturing. The major jute products, hessian and sacking, are used as packaging and wrapping

materials. The next two most important jute products are carpet-backing cloth and jute yarn. The demand for these products is derived from their service in packaging, transport, and storage of commodities and materials, or their use as an intermediate good in the manufacture of other consumer products. These same services can be performed by other materials, and often the product choice has been determined by relative costs. Periodic wide swings in jute carpet-backing prices provided the incentive for synthetic carpet-backing manufacturers to expand their capacities, which ultimately enabled them to dominate the North American carpet-backing market. A recent development has been for large carpet manufacturers to acquire synthetic carpet-backing production capacity to support their carpet production. This further integration will limit jute's prospects for recovering a larger share of this use.

Nevertheless, technical considerations and quality requirements are also important considerations when determining the choice of alternative intermediate goods for manufacturing consumer products. A successful example of this for jute has been the response since the 1970s of jute yarn spinners to the opening European market for weft and stuffer jute yarns used in the manufacture of woven carpets. Technically, jute yarns contribute more to the carpet's quality than synthetic yarns, but those jute yarns must be made from jute of desirable color and be free of slubs and unevenness in order to be processed successfully on high-speed looms. By meeting these requirements, jute yarn spinners have held this market niche against competition from lower-priced, but technically less desirable, synthetic yarns. These quality advantages, and the decline of jute spinning industries in Western Europe, resulted in exports of jute yarn from the major producers increasing from around 58,000 tons during the 1981/82 season to about 142,000 tons during 1990/91.

Consumption in producing countries slows. The share of world apparent consumption of the three leading producing countries increased from 38% during 1973-75 to 56% during 1988-90. Jute consumption in Bangladesh and in India increased at a slower rate during the 1980-90 period than during the 1973-80 period. The annual average growth rate in India was 7.5% during 1973-80 and 2.5% during 1980-90. Bangladesh's consumption growth rate was 3.3% p.a. during the 1973-80 period and 0.4% p.a. during the 1980-90 period. China's consumption growth was slower than in the other two countries, at -1.8% p.a. during 1973-80 period and 0.5% p.a. during the 1980-90 period. Apparent consumption of jute in the rest-of-the-world group declined at an average rate of 1.9% p.a. during the 1973-80 period and by 2.8% p.a. during the 1980-90 period.

Future trends in jute demand are most promising in the major jute-producing countries, though even in these cases the outlook is pessimistic. Their large agricultural sectors provide food commodities and industrial raw materials to domestic consumers which were typically packaged in jute sacks or wrapped in jute fabrics for distribution. However, the slowdown in growth in domestic demand for jute during the 1980s in China and India resulted, in part, from the substitution of domestically produced synthetic products for jute cloth and sacks. Future demand growth will also likely be slowed as transport and storage facilities adopt bulk-handling practices.

In India, the jute industry has undertaken an energetic program to develop new products to diversify the uses of jute. Many products have been developed and are undergoing market testing. For jute consumption in India to continue increasing, the demand growth for nontraditional products would have to more than offset the losses from synthetic substitution and bulk handling. In China, installed capacity for production of synthetic sacking fabrics is now sufficient to meet domestic demand for synthetic bags and provide a large supply of these bags for export. The planned expansion of synthetic fiber capacity in China indicates that synthetic substitution for jute will continue. In Bangladesh, the modest increase in jute consumption will likely continue.

Largest importer also expects lower consumption. In the nonproducing countries, jute consumption is expected to continue its declining trend. In Pakistan, the jute-manufacturing industry--the world's largest importer of raw jute--is facing intense competition from the domestic synthetic bag industry. Despite domestically produced synthetic bags being only one third of the price of domestically produced jute bags, the profit margins derived from their sale are said to be attractive. These developments indicate that future growth in jute consumption in Pakistan will likely be at a substantially lower rate than the 3% p.a. experienced during the 1980-90 period and it may well be negative. The demand for raw jute imports is also expected to decline further in other importing countries that are opting for imported jute products to replace local manufactured ones or installing capacities for production of substitute synthetic products.

Jute goods consumption outlook poor too. Jute consumption outside the jute-producing countries is increasingly dependent on imports of manufactured jute goods. However, the volume of trade in jute goods is expected to decline due to the overall reduction in jute use in the importing countries. Apparent consumption prospects imply only a small increase in jute goods imports in the low- and middle-income countries in Asia, modest declines in Europe, and more substantial declines in the other regions.

The four largest jute-producing countries--Bangladesh, China, India, and Thailand--are also the dominant jute goods exporters (together, they supplied 85% of world's jute goods exports during the past three seasons) and should continue to be.

The high-income countries in Western Europe, after experiencing a sharply declining trend in jute use during the 1970s (-6.85% p.a.), had only a modest decline during the 1980s (-0.2% p.a.). Jute yarns used by woven carpet manufacturers appear to have a positive outlook because of their technical superiority over their synthetic substitute, but the import of jute hessian for making bags is facing intense competition from imported synthetic bags. Net imports of polypropylene and polyethylene bags into Western Europe more than doubled between 1985 and 1990. In the near term, imports of jute goods by the newly-independent European countries will be constrained by a shortage of convertible currency and the reorganization of trading structures. In the longer term, jute products will be competing with synthetic products and the development of bulk handling in these countries.

Price Prospects

The world jute market is subject to severe supply/price cycles. During the current cycle, the indicator price (Bangladesh white, D grade, f.o.b. Bangladesh)[1] increased from its low average of $270/ton in 1986--due to a sharp increase of stocks from the extremely large 1985/86 crop--to $408/ton in 1990 as the excess stocks were gradually liquidated. Jute prices declined during the second half of 1991 due to the interruption of import demand by disruptions in Eastern Europe and the Persian Gulf and averaged $378/ton during the year.

Short-term price recovery expected in 1992/93. Jute prices continued to decline during the first nine months of 1992 as demand for jute remained weak, in spite of prospects that production in

[1] Jute prices vary by type and grade. Generally, tossa jute is more valuable than the same grade of white jute due to tossa's longer and finer fiber, strength, and greater flexibility.

Bangladesh and India would be substantially less than in 1991. A critical factor for determining jute prices in the near term is whether the supply adjustment taking place will anticipate correctly the timing of an increase in demand that should materialize with the recovery of the economies in LMIC Europe. A supply shortfall at that time could result in prices moving up to levels detrimental to jute's longer-term interest.

In the medium and longer term, real jute prices are expected to continue the declining trend experienced since the 1960s. However, the decline may not be as severe as in the past because the largest exporter, Bangladesh, is reforming trade policies and extending privatization in the manufacturing industry, and thus reducing government support for the industry.

Table A1: Jute - Prices, a/ 1950-91 (Actual), 1992-2005 (Projected)

	($/ton)		
	Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/
Actual			
1950	204	1,249	1,645
1951	262	1,392	1,907
1952	113	573	789
1953	155	808	1,073
1954	181	965	1,234
1955	171	896	1,163
1956	219	1,107	1,457
1957	187	927	1,219
1958	155	752	988
1959	201	989	1,283
1960	333	1,609	2,091
1961	225	1,068	1,380
1962	185	860	1,101
1963	179	850	1,035
1964	223	1,041	1,256
1965	254	1,176	1,386
1966	306	1,369	1,616
1967	290	1,283	1,493
1968	271	1,210	1,357
1969	286	1,212	1,372
1970	274	1,093	1,239
1971	286	1,082	1,212
1972	299	1,038	1,148
1973	289	866	971
1974	353	868	1,071
1975	371	821	1,002
1976	296	645	773
1977	321	637	759
1978	398	688	769
1979	387	590	706
1980	308	428	502
1981	276	382	446
1982	286	402	468
1983	302	435	487
1984	531	780	858
1985	583	850	924
1986	270	334	355
1987	323	363	375
1988	370	388	400
1989	373	394	405
1990	408	408	408
1991	378	370	359
Projected			
1992	320	300	287
1993	340	308	294
1994	350	311	296
1995	356	308	292
2000	441	321	301
2005	493	313	281

a/ Bangladesh BWD, f.o.b. Chittagong/Chalna.
b/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.
c/ Deflated by G-7 Consumer Price Index (CPI).

Source: World Bank, International Economics Department.

Rubber

Summary

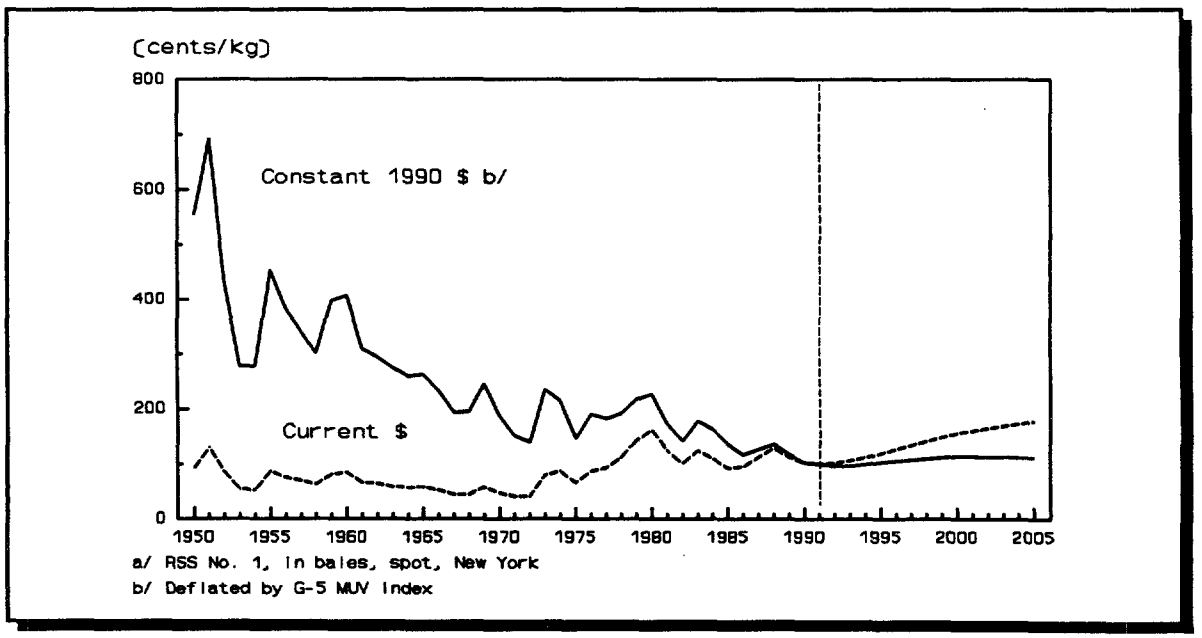
- In the projection period 1992-2005, market prospects for rubber will be heavily influenced by rates of economic growth, technical changes that will affect both demand and supply, environmental reforms in Eastern and Central European countries and the FSU, and the impact of the tire industry's globalization on trade patterns.

- Over the longer term, income growth of the LMICs where current per capita rubber consumption is low provides fundamental support for market expansion. But projecting the pace of market expansion over the next 15 years is heavily clouded by medium-term demand uncertainties, particularly for Eastern Europe and the FSU.

- Unlike in the post-World War II period when stability in the synthetic rubber industry offset the instability of the natural rubber industry, in the coming period the reverse may be the case with the synthetic rubber industry becoming a destabilizing factor. Economic reforms in Eastern Europe and the FSU are likely to shift consumption away from synthetic rubber and this change in input-mix is likely to cause increased market instability. However, such instability should be mitigated somewhat by supply side developments, such as new budgrafting and tapping techniques that will lower production costs and lead to shorter supply response times.

- The supply outlook is for gradual expansion in the first half of the 1990s, accelerating thereafter. World production should increase at 2.8% p.a. over the forecast period. The expansion in world trade is expected to be 2.5% p.a. with gross exports rising from 4.1 million tons in 1991 to 6.1 million tons in 2005. During the projection period, prices in constant 1990 dollars are expected to average around $1,020/ton.

Rubber Prices, a/ 1950-2005



Supply

Despite recent expansions in the smaller producing countries of Africa, Latin America and elsewhere in Asia, production should remain concentrated in the three Southeast Asian countries of Indonesia, Malaysia, and Thailand. The continued competitiveness of these Southeast Asian producers derives from land availability, predominance of smallholders with a long tradition in rubber cultivation, and the development and diffusion of new technologies that enhance efficiency in labor and land utilization.

Technical developments increase productivity and supply elasticity. In the coming decade a new labor-saving tapping technique, development of which was prompted by increasing labor costs in Malaysia, should become widespread in Malaysia and be adopted elsewhere thereafter. Instead of the traditional two to three times per week tapping that entails bark removal, the new Hypodermic Latex Extraction (HLE) tapping technique requires only a single puncture once a week and without bark removal. The combined use of this puncture technique with continuous chemical stimulation causes gradual, continuous dripping of latex for about 40 hours. The latex is collected on the third day.

The known advantages of this puncture tapping technique are: (i) the sharp reduction in the time and labor skill requirements at both tapping and collection stages; (ii) the elimination of crop loss during the rainy season due to the air-tight design of the collection bags; and (iii) flexibility in the timing of the tapping and latex collection tasks instead of the fixed dawn and midday timing, respectively, of traditional tapping tasks. The new puncture tapping technique is expected to result in a 50% increase in weekly yields. The benefits of higher yield and lower labor input associated with this puncture tapping will be partially offset by lower planting density for efficient puncture tapping as well as the higher initial cost of the tapping equipment. The net effect is an estimated lowering of production cost by 15-20%. However, the longer-term effect of the technique on tree life remains to be verified. The technique is likely to be applied to older trees in the initial period.

Another technological change that will lower the cost of rubber production is the development of young budgrafting. By budgrafting the seedlings at three to four months, instead of the usual eight months, the seedlings can be transplanted into the field in eight months. Assuming proper maintenance throughout the immaturity period, the gestation period can be reduced from seven to five years.

The demonstration effect of these techniques in Malaysia as well as competitive market forces should induce their adoption elsewhere, including the relatively labor-abundant countries. These technical changes will impact positively on the rubber market over the longer term, not only through reduced labor costs and the elimination of latex contamination, but also because the shorter gestation period will lead to a shorter-term supply response to price changes, thus raising the supply elasticity and, *ceteris paribus*, reducing market instability. Furthermore, the gains from higher yields through use of chemical stimulants over the productive life span of the trees, and from the rising commercial value of rubber wood, provide the economic rationale for a potential shortening of the rubber tree's life-cycle to about 20-22 years from 25-28 years. Both the shorter gestation period and life-cycle and higher scrap value for the tree will enhance the attractiveness of rubber investment and reduce market instability originating from the supply side.

SUPPLY PROJECTIONS. ***Higher growth rates for many producers.*** The supply outlook for the 1992-2005 period presented here differs from that presented in the 1990 edition of this Report for two reasons. Firstly, the new production technologies together with the prospect of faster demand growth in the ex-COMECON countries make accelerated replanting and new plantings more attractive than previously. This perception of increased demand in the ex-COMECON countries underlies, for example, the recent pronouncements by Malaysian producers to expedite replanting on Peninsula Malaysia and extend rubber cultivation to new areas in East Malaysia to overcome the land constraint in Peninsula Malaysia. Secondly, economic (particularly fiscal and trade) reforms in India and Viet Nam are likely to cause higher growth rates in the rubber output of these countries. In India, faster output growth should derive from the accelerated replanting and new plantings program underway. In Viet Nam, supply should increase faster than previously projected for two reasons. Firstly, data now available reveal that extensive replanting and new plantings were undertaken during the early 1980s to enhance Viet Nam's role as the key rubber supplier to the COMECON market. Production now coming onstream from these planting efforts should increase sharply from the mid-1990s when the trees reach maturity and their yield profile peaks. Furthermore, the diversion of Viet Nam's rubber exports to Malaysia in recent years has paved the way for a joint venture between Malaysia's MARDEC and Viet Nam's UTANIMEX (both state-owned enterprises) for the transfer of new planting and processing technologies from Malaysia to Viet Nam.

World output is expected to grow at 2.7% p.a. from 5.2 million tons in 1992 to 7.64 million tons in 2005. Of the three major producers, Indonesia is projected to become the lead producer with output growth of 3.5% p.a. from 1.1 million tons in 1992 to 1.9 million tons in 2005. Higher investment by Malaysian producers than was previously projected should lead to 2.4% p.a. growth from 1.2 million tons in 1992 to 1.8 million tons in 2005. Because of its land constraint, Thailand is likely to increase supply at the lower rate of 1.3% p.a. to 1.62 million tons by 2005. Faster output growth in India and Viet Nam is forecast to lead to production of 600,000 tons and 250,000 tons, respectively, in 2005. Output in China is projected to increase at 4.3% p.a. to 500,000 tons in 2005. For Sri Lanka, where export duties were reduced by 50% in 1991, output is projected to rise by 2.4% p.a. to 160,000 tons. Within the Asia Pacific region, production is expected to grow at 2.7% p.a. from 4.8 million tons in 1992 to 7.1 million tons in 2005. The projected share of world output from the three major producing countries increases by 1 percentage point to 93% by 2005.

The balance of world supply will come primarily from Africa where production is projected to rise marginally in countries such as Cameroon, Cote d'Ivoire, and Nigeria. Liberian production is projected to recover slowly and to reestablish its 1988 production level only by 2005. Investment in African rubber production is basically constrained by political and economic instability. Production in Latin America is likely to expand slowly because of the production hazard posed by the leaf blight disease and the lack of smallholder cultivation. However, given the growing environmental concerns and the higher economic value of rubber wood, *Hevea Brasiliensis* may become an increasingly attractive choice in afforestation efforts for environmental and preservation purposes within the tropical belt.

Demand

Continuing radialization of tires increases natural rubber demand. About 65% of natural rubber is consumed by the tire industry, with the balance used in a wide range of consumer and producer goods ranging from medical insulation products, carpet-backing and shoes to automotive parts,

industrial belts and hoses. One technical change that will continue to affect demand for some years yet is the innovation made in the mid-1960s of radial tires that require higher natural rubber content than cross-ply tires. *A priori*, the replacement of cross-ply tires by radial tires leads to higher rubber consumption. However, because radial tires give higher mileage, the net increase in natural rubber consumption over the lifetime of a vehicle is less than suggested by the higher natural rubber content per tire. The experience of radialization in the high-income countries has been gradual and progressing in sequence from passenger cars to commercial vehicles. In these countries, radialization in the passenger car sector was completed by the early 1990s and is now taking place in the commercial vehicle sector. In the LMICs, radialization has begun in the passenger car sector. Over the longer term, radialization across all sectors in the LMICs may be anticipated. However, because of the diversity in road conditions across these countries, radialization may not yield the tire mileages obtained in the high-income countries.

Besides radialization, more recent technological changes that have affected demand are (i) automation of tire production processes and (ii) the development of high-performance tires. These precipitated demand for quality-consistent rubbers that, in turn, led to rubber differentiation by supply origin. In the non-tire industries, the need for specialized properties or better handling characteristics of the final product is manifested in the demand for speciality rubbers such as thermoplastic elastomers, epoxidized natural rubber and deproteinized natural rubber.

DEMAND PROJECTIONS. The major determinants of natural rubber demand will be income growth rates, growth rate of the transport sector, the rates at which the LMICs adopt tire radialization, and the rates at which the FSU and Eastern European countries substitute natural for synthetic rubbers in their rubber goods industries.

A difficulty in projecting demand growth in the coming decades stems from the growing concern with the environmental problem posed by scrap tires. Efforts to resolve this problem are two-pronged, aimed at (i) finding alternative uses for scrap tires, and (ii) reducing the speed of scrapping tires. The former has led to increasing use of scrap tires in fuel generation, and the second to improving tire retreading and increasing mileage yields.

Potential for substantial per capita consumption increases. Notwithstanding the uncertainties that make projections particularly hazardous, the potential for increased demand over the longer term is clear from the gaps in per capita consumption between the high-income countries and the LMICs. In Japan and the United States, where consumption is perceived to be at or near saturation, per capita consumption is about 5 kg. This contrasts with per capita consumption of 1.5 kg in Eastern Europe, 0.6 kg for China, and 0.4 kg for India. The margins for error in demand projections are therefore substantially smaller for the high-income countries than for the LMICs.

Because of the importance of road transportation for tire--and hence rubber--consumption, a comparison of road transportation statistics for a range of countries provides useful insights. The differentials in commercial transportation across countries can be seen from Table 1 showing key road statistics for the G-5 countries. For example, there is a ten-fold gap between Japan and the United Kingdom.

The impact of income-generating policy reforms on rubber consumption growth is illustrated by the 50% increase in China's natural rubber consumption from 450,000 tons to 660,000 tons during the 1986-88 period, and by the 30% increase in India's consumption from 278,000 tons to 358,000 tons over the 1987-90 period. Moreover, consumption in these two populous countries had already nearly

Table 1: Key Statistics on Road Transport in Higher Income Countries, 1989

Country	Persons/Car	Motorway (km)	Commercial Vehicles (million)	Freight Ton a/	
				Road	Rail
Japan	3.7	4407	22		
United States	1.6	83964	44		
Germany (West)	2.0	8721	3.1	163	62
France	2.4	6950	4.7	144	52
United Kingdom	2.6	2993	1.9	130	18

a/ Freight ton in billion kilometers.

Source: Rubber Developments, Vol. 45 (1:4), 1992, published by the Malaysian Rubber Research and Development Board.

doubled in the 1980s from 0.35 kg to 0.61 kg in China, and from 0.25 kg to 0.4 kg in India. Conversely, the adverse impact of policy reversals and political upheavals on demand is exemplified by the situations in China and the former East Germany during the 1989-91 period. In China, annual consumption declined from 675,000 to 600,000 tons after the June 1989 upheaval while the fall of the Berlin Wall precipitated a two-thirds decline in East German annual demand from 41,000 tons to only 14,500 tons.

It should be emphasized that the higher growth rates presented here compared with those presented in 1990 are partly the result of a lower base-year value--there was a 100,000 tons decline in world consumption in 1991 to 5.2 million tons. World consumption is projected to grow at 2.6% p.a. from 1992 to 7.6 million tons in 2005. Among the major tire-producing OECD countries, the highest demand growth rate is 1.7% p.a. for Japan and Italy. In Japan, demand is expected to reach 895,000 tons by 2005 while demand in Italy should reach 155,000 tons. The United States will remain the largest single consumer with consumption of 986,000 tons by 2005. Some tire "transplanting" to Mexico is expected, thereby resulting in a high growth rate of 5.8% p.a. for Mexico. Mexico's consumption is expected to reach 130,000 tons in 2005.

Demand growth in Germany should remain slow until 1995 because of the ongoing reform and restructuring in the eastern part of the country. Thereafter, demand is projected to accelerate. Likewise, per capita consumption is expected to remain at about 2 kg p.a. until the mid-1990s and to recover to the former West German per capita consumption level of 3.6 kg p.a. only towards the end of the projection period. Total German consumption is therefore projected to grow at 1.1% p.a. to 258,000 tons in 2005. Growth of consumption in the other leading EC countries should be gradual. Demand in France is projected to grow at 1.3% p.a. and reach 202,000 tons in 2005. A lower growth rate of 1% p.a. for the United Kingdom translates into demand of 140,000 tons by 2005.

Major LMIC markets grow at 2-4% p.a. The fastest demand growth area is in the LMICs of the Asia Pacific region where projected growth of 3.5% p.a. during the 1991-2005 period will raise consumption from 1.9 million tons to 3.1 million tons. Driven largely by growth in tire production,

rubber consumption in the Republic of Korea should increase at 2.3% p.a.--from 254,000 tons in 1991 to 355,000 tons in 2005. In the three major rubber-producing countries, demand growth is supported by the spread of globalization in the tire industry to these countries. The lowest demand growth rate of 2.1% p.a. projected for Malaysia stems from the prior establishment of latex-based dipped goods industries that significantly increased domestic consumption in 1989/90. In the projection period, demand growth in Malaysia should be driven by investments in tire manufacturing. Similarly, the establishment of both tire and dipped goods manufacturing in Thailand is reflected in the projected 3.9% p.a. demand growth to 200,000 tons in the year 2005. Unlike Malaysia and Thailand, growth in rubber consumption in Indonesia will derive from demand for solid rubber for tires, shoes and other industrial rubber goods that have less stringent quality requirements. Indonesia's consumption is projected to grow at 3.6% p.a. to 195,000 tons by 2005.

Trade

Changes caused by technical change and tire industry globalization. Since the mid-1970s rubber trading has undergone several changes. The factors behind these are technological changes in demand and supply, adoption of variable exchange rates in the world economy, growth of financial engineering and associated instruments, emergence of newly industrializing economies (NIEs), development of modern telecommunications, and globalization of the tire industry. The main impacts of these developments have been the increased share of rubber imports by the NIEs, the differentiation of rubber by supply origin, and the growth in direct and closed trading between consumers and producers of the differentiated rubber.

The impact of technical change on trade has been through increased automation in tire manufacturing. This has led to more stringent demands for quality consistency and material processability so as to reduce machine down-time and material wastage caused by contamination in the rubber. The demand for rubber quality has been reinforced by heavier demands on tire performance and safety and by just-in-time material deliveries to minimize inventories. Increased product differentiation, as part of the competition strategy among tire manufacturers, has resulted in increased emphasis on raw material specifications and their supply origins. The upshot of these developments has been more direct trading and confidentiality about product specifications and price premia. The growth of closed and direct trading has implications for the interpretation of published prices that are discussed later.

Another development that has affected the pattern of trade is the globalization of the tire industry. Motivated by competition for market share amidst growing protectionism, globalization began in the mid-1980s with tire "transplants" from Japan to the United States. Subsequent adoption of globalization strategies by all the tire majors accelerated the dispersion of tire manufacturing facilities worldwide in competition for regional markets. Amongst other things, such dispersion lowers transport costs and enhances the growing trend towards output differentiation by category (cars, trucks, commercial vehicles, etc.) and design (conventional and high-performance radials for various climatic and road conditions) to suit the respective regional markets. The result has been rapid growth of rubber consumption in several LMICs such as China, Indonesia, Malaysia, Mexico, Thailand, and Turkey that: either (i) have large domestic markets; (ii) are strategically located within a regional market of growing potential; or (iii) have both domestic and regional market potential.

The significance of globalization is accelerated demand for natural rubber in the major producing countries. The AIDS-induced growth in demand for latex-based medical insulation products

in the late 1980s had already caused the relocation of such industries to the major latex-producing countries to minimize freight cost of latex (which has a 35-40% water content), production cost (because of labor-intensity in dipped goods' production), and to take advantage of fiscal incentives that were designed to attract direct foreign investments to the producing countries.

World export growth likely to be 2.6% p.a. During the 1992-2005 period, world gross exports are projected to grow at 2.6% p.a.--from 4.1 million tons to 6.1 million tons. Because of their rising domestic consumption, the share of total exports from the three major producing countries should decline from 84% to 82%. Exports as a share of production are projected to decline from 96% in 1989 to 90% by 2005 for Malaysia, from 92% to 90% for Indonesia, and from 93% to 91% for Thailand. Between 1991 and 2005 gross exports from Indonesia are expected to grow at 3.8% p.a. (from 1.09 million tons to 1.89 million tons). Growth of exports from Malaysia is projected to be 1.9% p.a. (from 1.17 million tons to 1.55 million tons); while Thailand's export growth is expected to be 1.6% p.a. (from 1.18 million tons to 1.49 million tons). A caveat to these projections is that were the economic reforms in Eastern Europe and the FSU to yield results earlier than reflected in the demand growth projected here, exports from Indonesia and Malaysia would benefit most because of their production potential.

The fastest export growth should be experienced by Viet Nam where exports are projected to grow at 7.9% p.a.--from 70,000 tons in 1991 to 220,000 tons in 2005. African exports are expected to grow at only 1.7% p.a. with Cameroon, Côte d'Ivoire, Liberia, and Nigeria remaining the major exporters.

LMICs' strong growth rate. Over the projection period, the relatively faster increase in imports by the LMICs should result in the expansion of their share of world imports from 41% in 1992 to 49% in 2005. Among the high-income countries, the United States should remain the single largest importing country, followed by Japan. The low EC import growth rate of 1.1% p.a. is largely explained by the slow growth of 0.9% p.a. projected for Germany during the first half of the 1990s. This slow growth is one manifestation of the cost of German unification. Total German imports fell from 262,500 tons in 1989 to 202,000 tons in 1991. In the 1991-95 period, Germany's imports are projected to grow very slowly to 212,000 tons in 1995, and only to recover to their 1989 level of 262,500 tons by 2005. Import growth in the other major EC tire producing countries will be restrained by slower economic growth and some transplanting of tire manufacturing facilities to Asia and the Americas.

Among the LMICs, the Asia Pacific region should have the highest import growth of 3.8% p.a. with its share of LMIC imports reaching 43% by 2005. Within this region, the largest importers are China and the Republic of Korea. China's imports are projected to grow at 4% p.a. to reach 652,000 tons in 2005. Korean imports are projected to grow at 2% p.a. to 344,000 tons by 2005. In India, the benefits from economic reforms, combined with the low import base in 1991, underlie the high growth of 8.2% p.a.

The importing European LMICs are differentiated by the degree of uncertainty attached to their import projections. Projections for Greece, Portugal, and Turkey have a higher degree of certainty. Of these three, Turkey is the largest importer. This stems from its strategic location within the Near and Middle East, and its incorporation as an "export platform" by the tire majors in their globalization plans. Imports by Turkey are projected to grow at 4.2% p.a. to 85,000 tons in 2005.

The less predictable importers are the FSU and East European countries. Import projections for these are highly uncertain because of the uncertainty of their economic reforms and of the rate at which they will reduce their dependence on domestically produced synthetic rubbers.

Price Outlook

It was mentioned earlier that the projected growth rates for demand presented here are not directly comparable with those presented in 1990 because of the much reduced levels of consumption in 1991 which affect the growth rate calculations. Likewise, the price outlook in the medium-term is significantly influenced by some of the events of the early 1990s.

Slow recovery from 1991 price fall. Reportedly, 1991 was the worst year in the history of the US tire industry as demand for original equipment tires declined by 5 million units and the world's top three tire manufacturers (Bridgestone, Goodyear and Michelin) took a combined $6 billion loss. Political upheavals in the East European countries and the FSU added further price pressure as rubber originally traded under the COMECON arrangement, or intended for that market, was diverted to other markets. This involved mainly sheet and crumb rubber from Viet Nam and latex crepe from Sri Lanka. The sharp fall in demand in the FSU must account in part for the reduced efficacy of International Natural Rubber Agreement buffer stock purchases in 1991. The change in the market structure also contributed to the negligible, and occasionally negative, price premium of RSS1 over lower-grade rubbers.

The depressed market led to a price decline from $1,020/ton in 1990 to $1,008/ton in 1991. Despite the early 1992 upswing in the US automobile sector, prices have not broken out of the $1,020-1,030/ton trading range. Indications at the time of writing (June, 1992) suggest limited potential for price increases in the near term. Moreover, given the ample supply situation, natural rubber prices are expected to remain sluggish until 1994.

Real prices to peak around 2000, then decline. Under the assumptions for world economic growth in the 1992-2005 period, some upturn in real prices could be expected by 1994. With the projected demand growth in the second half of the 1990s, led by the high-income countries (such as the United States, Japan, and Taiwan, China) and some of the LMICs in the Asia Pacific region (such as China, India, and the Republic of Korea) and Latin America (such as Mexico), real prices (in 1990 dollars) are projected to follow a rising trend to a peak of $1,300/ton towards 2000. A later and/or slower rate of economic recovery than projected for the East European countries and the FSU provides the main downside risk for this price outlook. Thereafter, real prices are projected to decline (to $1,250/ton by 2005) because the adoption of the new budgrafting and tapping techniques should result in lower production costs. Higher price trends may be observed if consumption in major developing countries such as China, India, and Mexico were to grow faster than projected, or if the former centrally planned economies were to adopt the input mixes of the tire majors within this time frame.

International Natural Rubber Agreement (INRA2) and Futures Trading

INRA and closed trading inhibit market price signals. Since early 1992 a gulf has developed between the positions of the consuming and producing countries over the scheduling of negotiations for a successor agreement to INRA2 that expires in 1993. Underlying this is a difference in opinion about the efficacy of INRA2. While both producing and consuming member countries agree that INRA2 has stabilized prices, producing countries argue that this has been at the cost of less-than-remunerative price levels. Producing countries have also become concerned about the growth of closed trading and its impact on the price formation process. This has revived interest in futures trading. In May 1992 a Commodity Exchange was established in Singapore to trade RSS1, RSS3, and TSR20 rubber

futures. This was followed by International Natural Rubber Organization (INRO) approval for the buffer stock manager to trade futures on this exchange, and to take delivery of physicals.

Because of technological and financial market developments since the 1970s, futures trading had faded in all markets except in Japan. The survival of futures trading on the Tokyo and Kobe markets stems not only from regulatory aspects of the Japanese financial system that lead to use of rubber futures as a currency hedge but also from Japan's huge domestic base of RSS3. Elsewhere, futures trading started declining in the 1970s for a variety of reasons including the introduction of new financial trading instruments that competed for speculative funds. This was exacerbated when INRA1 implemented its buffer stock operations in 1981 and when demand for origin-specific rubber increased closed trading. By the late 1980s, openly traded rubber was estimated at about one third of total trade. Since the initial impact of this reduction was on the traders and dealers, concern over the diminishing trade opportunities was first voiced by this group. Over time, concern has become more widespread because of the declining transparency of the price formation process and the market signalling efficacy of official price quotations. Further concern over the efficiency of the marketing system has been fueled by the price depression since 1990, and interest in futures trading has persisted despite the unsuccessful 1990 futures contract on the London FOX.

Another market development behind the establishment of the futures contract in Singapore is the growth in demand within the producing countries, consequent to the choice of Indonesia, Malaysia and Thailand as tire "export platforms" by the multinational corporations. Singapore is located near to countries with 85% of world output and 55% of world consumption. These recent developments provide motivation for the mushrooming of Japanese rubber trading operations in Singapore since the late 1980s. The unsuccessful attempt by the London FOX to revive futures trading in rubber in 1990 raises questions about whether globalization of the tire industry has led to merging of primary and terminal markets into a new marketing center away from London, whether rubber differentiation by supply origin has taken sufficient hold, and whether the eventual maturization of rubber into a highly differentiated industrial material will render futures trading unattractive. But in trying to provide answers to these questions, it is important to note that successful futures trading is contingent on free movement in prices. The operation of INRA, in attempting to stabilize prices within a range, is inhibiting the process of price discovery.

Table A1: Natural Rubber - Prices, a/ 1950-91 (Actual) and 1992-2005 (Projected)

	(¢/kg)		
	Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/
Actual			
1950	91	555	731
1951	130	692	948
1952	85	431	593
1953	53	278	370
1954	52	278	355
1955	86	452	587
1956	75	381	501
1957	69	340	448
1958	62	301	395
1959	81	398	516
1960	84	407	529
1961	65	309	399
1962	63	294	376
1963	58	274	334
1964	56	259	313
1965	57	263	309
1966	52	233	275
1967	44	194	226
1968	44	195	219
1969	58	245	277
1970	46	185	209
1971	40	151	169
1972	40	139	154
1973	79	235	264
1974	87	214	264
1975	66	146	178
1976	87	190	228
1977	92	182	217
1978	111	191	214
1979	142	217	260
1980	162	226	265
1981	125	173	203
1982	100	141	164
1983	124	178	200
1984	110	162	178
1985	92	135	146
1986	95	117	124
1987	112	126	130
1988	129	135	139
1989	112	118	121
1990	102	102	102
1991	101	99	96
Projected			
1992	102	96	91
1993	106	96	92
1994	112	99	95
1995	119	103	98
2000	156	114	106
2005	177	112	101

a/ RSS No. 1, in bales, spot, New York.
b/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.
c/ Deflated by G-7 Consumer Price Index (CPI).

Sources: International Rubber Study Group, Rubber Statistical Bulletin (actual); World Bank, International Economics Department (projected).

Tobacco

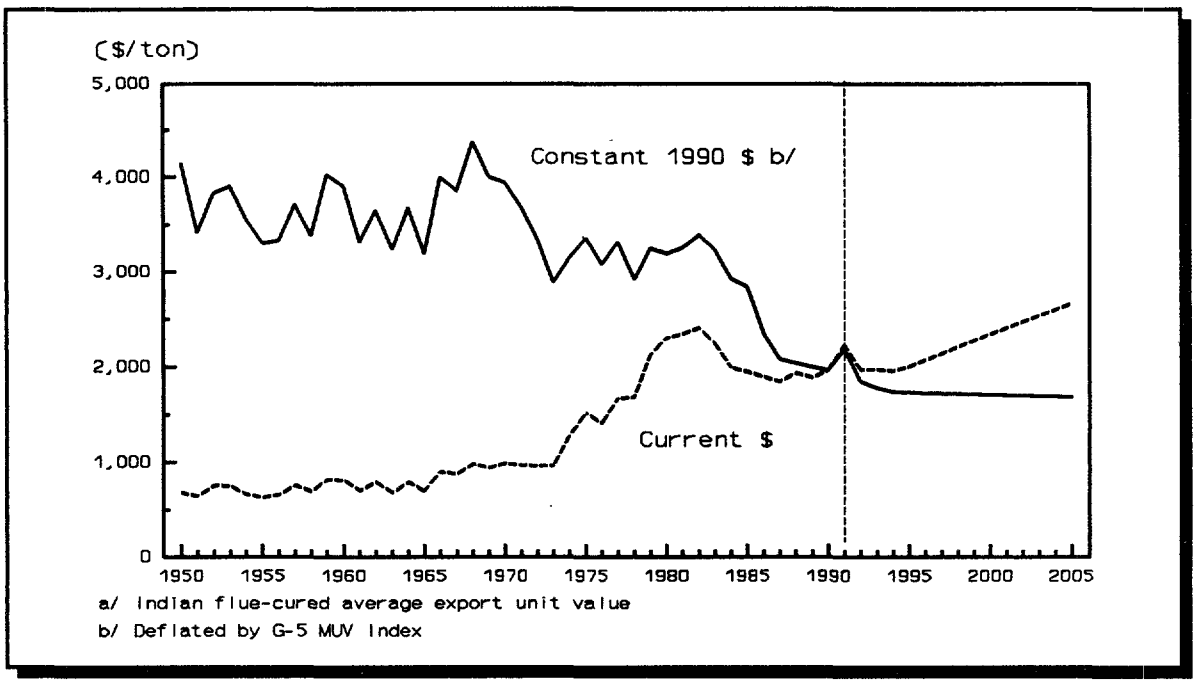
Summary

- World apparent consumption of tobacco increased slightly faster during the 1980s than during the previous two decades. Most of the increase in world consumption occurred in the LMICs of the Asia and Pacific region (6% p.a. growth in the 1980s), while elsewhere apparent consumption declined at an annual rate of 0.9% during the 1980s.

- Future world consumption growth is heavily dependent upon the Asia and Pacific region with its large share of the world population and its good income growth prospects.

- Tobacco production is shifting to the low-cost countries in Africa, Asia, and Latin America, and trending downward in North America and Japan. This shift to lower-cost growers and the potential for increasing productivity in tobacco growing with current technology is expected to support a continued downward trend in real tobacco prices.

Tobacco Prices a/, 1950-2005



Consumption

In many countries in recent years, consumer reaction to information on the detrimental effects of using tobacco products and the increasing real cost of tobacco products--primarily due to greater taxation, both at the local and national levels--have led to sharp changes in tobacco consumption trends. During the 1980-90 period, the apparent consumption of tobacco in the OECD countries declined by 2.3% p.a., while increasing by 4.2% p.a. in the low- and middle-income countries, due mainly to a surge in tobacco use in China.

Shift in consumption away from OECD. At a world level, consumption of tobacco maintained a growth rate of over 2% p.a. during the 1960s and 1970s and this increased to 2.3% p.a. in the 1980s. However, this increased growth in the use of tobacco in the 1980s was due mainly to a shift in the geographical pattern of consumption. During the 1970s, apparent consumption of tobacco in China increased at less than 3% p.a. But during the 1980s, China's rapid increases in per capita income and, with a larger proportion of its population using tobacco products, its consumption growth rate increased to around 10% p.a. This change increased China's predominance in the world tobacco industry during the past two years by raising its share of the world's tobacco consumption to 36% and its current share of cigarette production to 30%. Apparent consumption of tobacco also increased in other LMICs in Africa, Asia, and Europe during the 1980s.

However, tobacco consumption during the 1980s declined by 0.6% p.a. in Latin America and by 2.2% p.a. in the high-income countries. In the United States, for example, cigarette consumption declined by 3% in 1990, as the proportion of adults 18 years or older that smoke cigarettes fell to around 23%. Since the peak in US domestic cigarette consumption in 1981, it has declined by 19%.

Government actions discourage consumption. Private and official campaigns to discourage the use of tobacco products have changed many consumers' attitudes toward the consumption of tobacco. Ministries of Health have discouraged the use of tobacco products, and with widespread public support, legislative and administrative actions in many countries have placed limits on tobacco advertising, restricted public areas where smoking is permitted, and required warning messages proclaiming the dangers to health of using tobacco to be placed on consumer packages of tobacco products.

In spite of the demand for tobacco products being relatively price inelastic, tobacco product prices have increased so much faster than general inflation that consumer demand has been adversely affected. The rapid rise in tobacco product prices in many countries has been partly driven by heavy taxation--in 1990, taxes on tobacco products at all levels of government in the United States averaged US¢46.8/pack of 20 cigarettes, and government revenues from all tobacco products amounted to $10.7 billion, which was 3.9 times farm cash receipts from tobacco.

Consumption Prospects

Tobacco consumption is expected to continue declining in the high-income countries where the restraints on public use of tobacco products have been most severe for the longest period. Also, the publicity campaigns for increasing public awareness of the adverse effects of tobacco use have been most intense in those countries.

US Supreme Court ruling against tobacco manufactures. Until 1992, efforts in courts of law to hold tobacco manufacturers legally liable for a tobacco user's subsequent illness from diseases deemed related to the use of tobacco were, for the most part, unsuccessful. However, in June 1992, the US Supreme Court ruled that suits can be brought against tobacco companies under individual states' product liability laws, opening the way for some personal injury claims. The potential impact of this decision is unclear at this time. Nevertheless, the declining use of tobacco products in high-income countries has resulted in the multinational tobacco companies diversifying their investments in manufacturing geographically into the countries with positive tobacco consumption growth--often as joint ventures with local tobacco companies--and into alternative industries, particularly the food products industry.

Low income growth constrains many markets. In the near term, tobacco consumption in LMIC Europe will continue to be constrained by weakened personal income until the economic restructuring succeeds in reviving economic growth. In the longer term, tobacco consumption in this region is expected to increase at a moderate rate.

In Africa, the growth of tobacco consumption increased at an average annual rate of 1.9% p.a. during the 1970-90 period, and projected per capita income growth indicates little scope for a faster rise in the growth rate over the medium and longer terms.

In Latin America, tobacco consumption declined slightly during the 1980s due largely to declining per capita incomes. In Brazil--the region's largest tobacco producer and consumer--apparent consumption declined by around 1% p.a. In spite of increasing exports of Brazilian cigarettes, their production declined during 1991 and 1992 due to the continuing decline of domestic consumption. Income projections indicate an improvement from the mid-1990s that may bring about a recovery in tobacco consumption. However, in Mexico, cigarette sales declined in 1991 although per capita income increased. This decline in cigarette consumption was attributed to increased prices and the impact of anti-smoking campaigns.

Chinese and Indian markets strong. Apparent consumption of tobacco in the LMICs in the Asia and Pacific region increased at over 6% p.a. during the 1980s. Chinese tobacco consumers are showing a preference for higher quality blended cigarettes and, in response, the domestic production of brand name cigarettes increased by 20% during 1991. In response to the shift in demand for higher quality products, cigarette manufacturers are using improved technology and the pricing system rewards the production of higher-quality leaf. Although China is the leading country in increasing tobacco use, many other countries are also increasing consumption. In India, with real per capita income increasing at 3.3% p.a. during the 1980s, tobacco consumption increased at an annual rate of 2.2%. Real per capita income in other South Asian countries increased at 1.9% p.a. and their use of tobacco increased at a moderate rate. Relatively favorable income growth prospects and the present propensity for consumption of tobacco products in the Asia and Pacific region indicate that it will continue to lead the world's growth of tobacco use.

Production Prospects

World tobacco production declined moderately during 1990 and 1991 due to efforts in many countries to reduce excess stocks. As a result, global tobacco stocks at the end of 1991 are estimated to have been 6% lower than in 1989. The stock adjustment reduced and liquidated some of the accumulation of stocks of tobacco types for which demand is declining.

Production continues to shift away from high-income countries. World production patterns during the projection period are expected to reflect those prevailing in the 1980s. Production in the industrial countries will continue to decline as cigarette production shifts to the countries where demand is increasing and liability risks are less intimidating. Moreover, labor-intensive tobacco production is giving low-wage areas a cost advantage in its cultivation.

The oligopsonistic structure of the tobacco-manufacturing industry and the technical requirements for tobacco growing favor its production in countries with established producers and marketing systems. China's position as the world's leading tobacco producer will be further strengthened by its fast-growing domestic consumption. The leading African tobacco producers and exporters--Malawi and Zimbabwe--are expecting record tobacco harvests in marketing year 1992 in spite of drought damage to its quality. The momentum of growth in these two countries is likely to continue for several more years. They produce types of tobacco demanded in blended cigarettes, mainly burley in Malawi and flue-cured in Zimbabwe, although other types are grown in smaller quantities in both countries. Tobacco production in South Brazil has increased by 15% to a record level since 1991 in response to support provided by the tobacco industry.

High yields limit area needed for crops. The attraction of tobacco production to farmers is its high-value product per unit of cropland. This makes tobacco highly competitive with most other crops in the areas with suitable soils and climate. However, its relatively high yields limit the area needed for producing tobacco; the world's average production of 6.1 million tons during the past five years were grown on an average of only 4.6 million hectares of cropland. By comparison, the world's average coffee production of 6 million tons required 11.3 million ha of land.

Trade and Price Prospects

Manufacturing moving to producing countries. World trade in tobacco leaf is increasing at a rate less than one half the rate of growth of world consumption. This results from the tendency for tobacco manufacturing to be concentrated in major tobacco-producing countries. However, trade in leaf tobacco is stimulated somewhat by the increasing preference of consumers for blended cigarettes, which often require types of tobacco not produced in the manufacturing country; for example, the two largest cigarette manufacturers--China and the United States--are importers of oriental tobacco for blending with other types produced domestically.

The sourcing of tobacco exports is shifting to low-cost producing countries that have developed the production techniques for quality leaf and established marketing systems. These requirements have been met successfully by Malawi and Zimbabwe in Africa and by Brazil in Latin America. These countries are increasing their shares of world exports by supplying the types of tobacco in greatest demand--burley and flue-cured.

World trade in cigarettes is increasing as consumption decreases in the high-income countries so that the high-income countries have manufacturing capacity increasingly in excess of domestic consumption requirements. This trend is likely to moderate as cigarette production expands in countries with the highest consumption growth.

Lower 1992 prices part of downward trend. Export prices for tobacco are subject to the policies of the producing country, the quantity and quality of the crop, and the actions of competitive

suppliers and oligopsonistic buyers in export markets. Our indicator price--the f.o.b. export unit value of Indian flue-cured tobacco--is affected by all of these factors. The 1991 Indian flue-cured crop was of better quality than recent crops. The improved quality and aggressive export promotion resulted in increased sales in Europe and substantially higher prices (US$2,228/ton compared with US$1,964/ton for the 1990 crop). In response to the higher prices received in 1991 the Indian Tobacco Board permitted increased acreage for flue-cured planting in 1992. However, export demand in 1992 has been weakened by limited demand from the FSU. In these circumstances, average farm prices for the 1992 crop sold in Andhra Pradesh are substantially lower than those received in 1991.

Over the longer term, tobacco prices in real terms are expected to continue to decline. The declining consumption of cigarettes in many countries is depressing the demand for unmanufactured tobacco imports. On the supply side, there is the expectation that the lower-cost producing countries will increase their share of world production and exports. The relatively low yields now achieved in some LMICs provide scope for substantially increased productivity even with existing technology, which should result in an adequate supply at declining real prices. Our 1990 constant dollar indicator price is therefore expected to fall from about $2,182/ton in 1991 to around $1,690/ton by the year 2005.

Table A1: Tobacco - Prices, a/ 1950-91 (Actual), 1992-2005 (Projected)

	($/ton)		
	Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/
Actual			
1950	677	4,145	5,458
1951	642	3,407	4,669
1952	756	3,832	5,277
1953	747	3,897	5,172
1954	666	3,550	4,539
1955	631	3,299	4,283
1956	659	3,330	4,383
1957	750	3,708	4,877
1958	695	3,378	4,435
1959	816	4,024	5,219
1960	807	3,898	5,065
1961	697	3,310	4,274
1962	783	3,644	4,669
1963	681	3,234	3,938
1964	787	3,672	4,434
1965	688	3,186	3,754
1966	893	3,996	4,714
1967	871	3,852	4,482
1968	979	4,372	4,902
1969	944	3,999	4,528
1970	988	3,938	4,467
1971	970	3,670	4,110
1972	962	3,339	3,694
1973	962	2,883	3,233
1974	1,280	3,148	3,883
1975	1,517	3,356	4,097
1976	1,411	3,079	3,688
1977	1,670	3,317	3,949
1978	1,690	2,917	3,261
1979	2,130	3,246	3,884
1980	2,300	3,196	3,751
1981	2,350	3,252	3,801
1982	2,410	3,387	3,948
1983	2,245	3,229	3,620
1984	1,990	2,925	3,218
1985	1,950	2,843	3,090
1986	1,900	2,349	2,495
1987	1,850	2,082	2,151
1988	1,941	2,037	2,096
1989	1,891	1,998	2,051
1990	1,964	1,964	1,964
1991	2,228	2,182	2,120
Projected			
1992	1,970	1,849	1,764
1993	1,975	1,787	1,708
1994	1,961	1,742	1,657
1995	2,003	1,733	1,645
2000	2,350	1,712	1,601
2005	2,663	1,690	1,517

a/ Indian flue-cured average export unit value.

b/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.

c/ Deflated by G-7 Consumer Price Index (CPI).

Sources: US Department of Agriculture, Foreign Agricultural Service (actual); World Bank, International Economics Department (projected).

Fertilizers

Summary

- In 1991, world fertilizer consumption was slightly higher than the previous two years' reduced levels as consumption increases in Asia more than offset the decreases in Eastern Europe and the FSU. Significant increases in consumption are expected from 1992, with world consumption of fertilizers projected to increase from 141 million tons in 1991 to 192 million tons in 2005 as grain production increases.

- About 85% of the increase in fertilizer consumption is expected to take place in the LMICs, with Asia being the major growth market. Consumption in OECD countries is expected to grow more slowly than previously (1.1% p.a. compared with 3.4% p.a. over the past three decades) because of slower growth in the area planted to grains, while consumption in LMICs is also expected to grow more slowly (2.6% p.a. compared with 10.8% p.a. over the past three decades) mainly because of slower growth in grain production too. Future developments in Eastern Europe and the FSU remain uncertain--we assume that consumption there decreased substantially over the 1989-91 period, but we expect a steady recovery from 1993.

- World production of nitrogenous fertilizer is projected to increase from 84 million tons in 1991 to 114 million tons in 2005, a rate of increase of 2.2% p.a. compared with 5.2% p.a. during 1970-89. Major increases will take place in the LMICs, which are expected to account for 83% of the world production increase. The principal growth regions should be Asia, the Middle East, and the FSU because of cheap and plentiful natural gas supplies. Production expansion in Asia and Latin America is expected to accommodate increasing demand in those regions, whereas production expansion in the Middle East should be mainly for export.

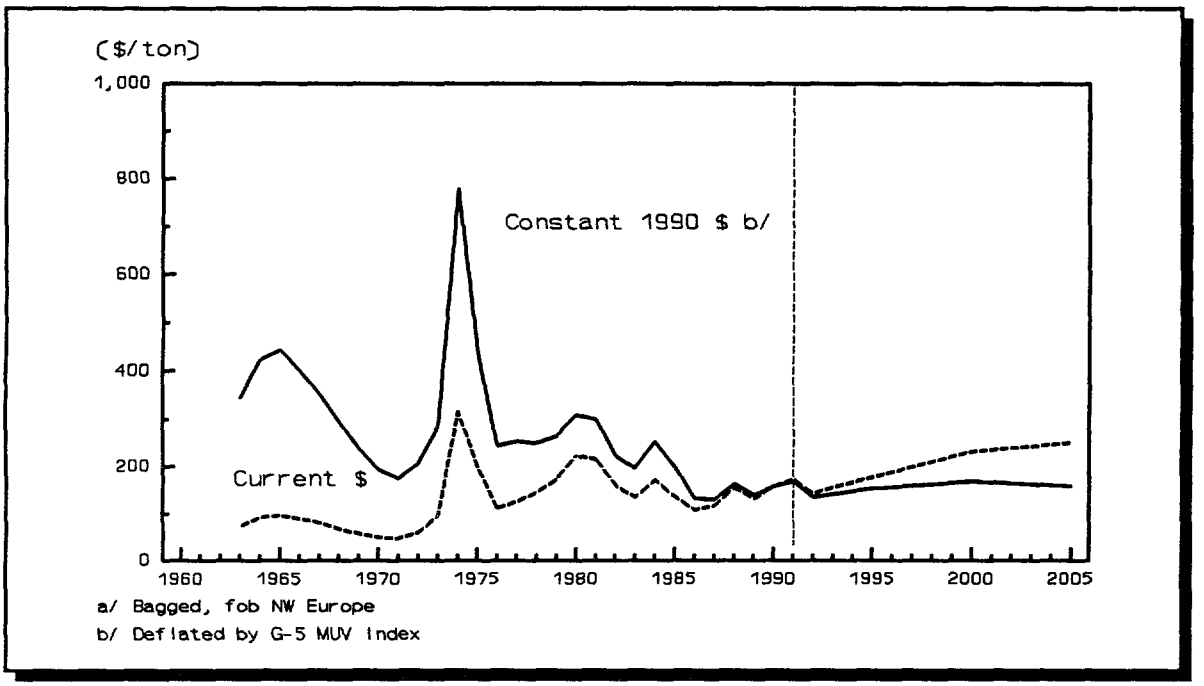
- World production of phosphate fertilizer is expected to increase from 39 million tons in 1991 to 50 million tons in 2005, an annual average growth of 1.7% compared with 2.9% p.a. during 1970-89. Approximately 85% of the increase will be in the LMICs, as the major raw material-abundant countries (e.g., Morocco, Tunisia, Jordan, and China) expand production. While the United States should continue as the world's leading producer and exporter of phosphate fertilizer through 2005, its market share is expected to decline significantly.

- World production of potash fertilizer is expected to increase from 29 million tons in 1991 to 38 million tons in 2005--an average annual growth rate of 2% compared with 2.4% p.a. during 1970-89. The FSU and Canada are expected to continue to dominate world potash fertilizer production.

- The supply-demand balance projections for the fertilizer markets indicate that the importing regions will be LMIC Asia, Latin America, and Africa. High-income countries, LMIC Europe (mainly FSU and Eastern Europe), and the Middle East will have large amounts of surplus for export.

- Prices of nitrogenous and phosphate fertilizers increased substantially beginning with the last quarter of 1990 due to the supply disruption caused by the Gulf war. After the war, prices declined with supplies returning to normal but there was reduced demand due to severe flooding in China and bad weather in the United States which curtailed autumn plantings. Potash fertilizer prices increased significantly in 1991, although not in 1992 due to weak demand. Fertilizer prices in real terms are expected to increase steadily until the late 1990s due to tight supply-demand balances. However, as new capacity comes on-stream around the turn of the century, prices are expected to decline in real terms.

Urea Prices, a/ 1960-2005



Demand Outlook

The long-term projections of fertilizer demand are based on simulations of the World Bank's integrated grains/fertilizer model. In the model, fertilizer demand is determined by the area harvested for grains, fertilizer prices, and grain prices. Farmers are assumed to respond to changes in these prices with some lag. The low price elasticities of demand estimated indicate that the impact of changes in relative prices between fertilizer and grains on fertilizer demand is rather small.[1] However, as shown in Table 1, relative prices between fertilizers and grains are expected to increase quite substantially over the projection period, which should have a depressing effect on fertilizer demand.

Growth in fertilizer demand qualified by uncertainties about government policies and Eastern Europe/FSU recovery. Change in the political and economic systems in Eastern Europe and the FSU is an important factor affecting future fertilizer demand. With this region accounting for about one quarter of world consumption, what happens there will have significant effects on world fertilizer markets. However, it represents an area of considerable uncertainty in our forecast. Another factor to be taken into account in our forecasts is the increasing concern over the effects of fertilizer use on the environment. The most important issue here relates to the leaching of nutrients into ground water, particularly into drinking water. In recent years, industrial countries have begun to regulate the use of fertilizers to control this form of pollution and further adoption of such regulation is likely to reduce the use of fertilizers.

[1] Short-term price elasticities of demand are estimated at -0.03 for nitrogenous fertilizer, -0.02 for phosphate fertilizer, and -0.08 for potash fertilizer. The corresponding long-term price elasticities are -0.22, -0.14, and -0.46.

Agricultural policy changes, which also affect fertilizer use, are difficult to predict. We have tried to allow for the trend toward reducing fertilizer subsidies in developing countries as well as policies to reduce crop production surpluses in Western Europe which should depress fertilizer demand, at least in the short term.

Table 1: Relative Prices Between Fertilizers and Grains,a/ 1989-2005

	Urea	TSP	Potash
	($/ton)		
1989	120	131	90
1990	157	132	98
1991	168	130	107
1995	171	134	121
2000	185	137	117
2005	200	155	131

a/ Fertilizer price/grain price index *100 (1990=100).

Source: World Bank, International Economics Department.

In response to the increasing demand for grains because of population and income growth, grain production is expected to increase from 1702 million tons in 1991 to 2,107 million tons in 2005. In turn, world total fertilizer consumption is expected to increase from 141 million tons in 1991 to 192 million tons in 2005--an average annual growth rate of 2.2%. Fertilizer consumption in industrial countries is expected to increase, on average, by 1.1% p.a.--from 45 million tons in 1991 to 53 million tons in 2005. In the developing countries, consumption is expected to increase by 2.7% p.a., from 96 million tons to 139 million tons. Thus, most of the increase in fertilizer consumption, 85% of the total, should take place in developing countries. Asia is expected to remain the largest consuming region and to account for over one half of the increase in world fertilizer consumption.

NITROGENOUS FERTILIZERS. ***Developing countries take major share of consumption increase.*** World consumption of nitrogenous fertilizers is projected to reach 110 million tons by 2005, up from 80 million tons in 1991 (see Table A6). This increase represents an average annual growth rate of 2.3% compared with 5.1% p.a. in the period 1970-89. Consumption in industrial countries is expected to grow at a slower rate than previously--1.3% p.a. compared with 2.2% p.a. in the 1970-89 period. The current high application rates per hectare in industrial countries (about twice the rates in developing countries) should slow the increase in application rates in the future. Environmental attempts to reduce nitrates in ground water should also have a depressing effect on nitrogenous fertilizer use in the EC and, to a lesser degree, in the United States. Lack of any growth in planted area in the EC and decreases in area planted in Japan are also expected to contribute to slower growth in fertilizer use.

Consumption is expected to grow at 2.7% p.a. in the developing countries which should account for 84% of the increase in world consumption in 1991-2005. About 57% of the increase in world consumption should go to the Asia region, mainly China and India, due to increasing grain production. Grain production in China is expected to increase from 336 million tons in 1991 to 415 million tons in 2005, while during the same period grain production in India is expected to increase from

155 million tons to 188 million tons. Consumption in Eastern Europe and the FSU is assumed to start to recover slowly in 1993, after a sharp drop in 1990-92, and to return to current levels by the year 2005. However, the consumption forecast for this region should be viewed as very uncertain.

PHOSPHATE FERTILIZERS. ***Large increases in use expected in Asia, especially China.*** World consumption of phosphate fertilizers is projected to increase from 36 million tons in 1991 to 47 million tons in 2005 (see Table A10). This represents an average annual growth rate of 1.8%, compared with 2.9% p.a. in the period 1970-89. Consumption growth in the developing countries is expected to be much faster than in the industrial countries--2.3% p.a. versus 0.5% p.a. Over one half of the increase in world consumption should take place in Asia as most Asian soils are highly receptive to phosphate nutrients. The application ratio between nitrogenous fertilizer and phosphate fertilizer is 1:0.33 in Asia as compared with 1:0.44 in the industrial countries. An improved balance between nitrogenous fertilizer and phosphate fertilizer applications is required in order to get better economic results; as well, increased phosphate applications can reduce nitrogen run-off. China alone is expected to account for 28% of the increase in world consumption. The application rate between nitrogenous fertilizer and phosphate fertilizer in China is 1:0.28. The Chinese government has realized the need for improving the balance in nutrient applications and has been promoting increased use of phosphate fertilizer substantially in recent years. China's consumption of phosphate fertilizer grew at an average annual rate of 8.8% over the 1970-89 period, and the country should maintain growth of 3% p.a. from 1991 to 2005.

The declining trend in phosphate fertilizer consumption in the United States in the past decade is expected not only to halt but to turn around because soil phosphate levels have fallen substantially and need replenishment. However, the declining trend in the EC is likely to continue because of pressure from environmental interests, although the rate of decline could slow. The consumption forecast for Eastern Europe and the FSU is for consumption to recover slowly in 1993, after a sharp drop in 1990-92, and to reach 1989 levels by 2005.

POTASH FERTILIZERS. ***Potential increases in rice paddy areas.*** World consumption of potash fertilizers is expected to increase from 25 million tons in 1991 to 34 million tons in 2005, an average annual growth rate of 2.4% (about the same growth rate as in the period 1970-89, see Table A14). The United States, the FSU, France, Brazil, and China will remain the major users of potash fertilizer. Consumption in Asia should grow the fastest at 4.8% p.a. in the projection period. This is because the very low application rate--8.7 kg/ha (nitrogen-to-potash ratio is 1:0.12)--leaves considerable room for increased consumption, particularly in rice-growing regions where intensive farming with high application rates of nitrogenous fertilizer has been slowly depleting the potash content in the soil. Rice paddy production in Asia is projected to increase from 466 million tons in 1990 to 632 million tons in 2005, with growth occurring mainly in China, India, Indonesia, Bangladesh, and Thailand. Among these countries, China has the greatest growth potential in potash use. Over the last decade, potash consumption in China has grown from less than 300,000 tons per year to over 1.5 million tons. Its consumption is expected to grow at 7% p.a. and to reach 3.4 million tons by 2005.

Consumption in the industrial countries is expected to grow at a slow rate of 1.2% p.a. This slow growth forecast is due to the already high application rate--28.3 kg/ha (nitrogen-to-potash ratio is 1:0.49)--and environmental pressures to reduce the impact of fertilizers on water systems.

The potash fertilizer application rate is the highest in the FSU and Eastern Europe--36.3 kg/ha (nitrogen-to-potash ratio is 1:0.61). Therefore, their trend consumption growth should slow in the projection period. After a sharp drop in 1990-92, consumption should return to 1989 levels by the year 2005.

Supply Outlook

Two sources of information and analysis have been used in deriving the supply projections. One is the information on capacity expansion projects under construction or firmly committed and factory closures. This information is compiled by the World Bank/FAO/UNIDO Working Group on Fertilizers. The other is the World Bank's grain/fertilizer model. The former has detailed information, by country, up to 1996/97, while the latter generates aggregate projections by economic region up to the year 2005. Table 2 summaries the fertilizer capacity projections made by the World Bank/FAO/UNIDO Working Group on Fertilizers. For convenience, nitrogen capacity is measured in terms of ammonia and phosphate capacity is measured in terms of phosphoric acid.

Table 2: World Fertilizer Capacity, 1990/91 - 1996/97

	Ammonia ('000 tons N)	Phosphoric Acid ('000 tons P205)	Potash ('000 tons K20)
1990/91	113,371	35,613	37,578
1991/92	115,054	35,631	36,498
1992/93	117,559	36,547	36,314
1993/94	120,019	36,171	37,064
1994/95	121,927	36,331	37,494
1995/96	123,107	36,721	37,494
1996/97	124,507	37,411	37,494

Source: World Bank/FAO/UNIDO/Industry Fertilizer Working Group, World and Regional Supply and Demand Balances for Nitrogen, Phosphate, and Potash,1990/91 - 1996/97, 1992.

The Working Group's short-term capacity projections were treated as exogenous in the grain/fertilizer model simulations. In this model, it is assumed that short-term supply responds to prices under a given level of capacity. For the long term (long enough to bring investment projects on-stream) simulation of the model, supply responds to changes in prices through changes in production capacity.

World total fertilizer production is expected to increase from 152 million tons in 1991 to 202 million tons in 2005--representing a growth rate of 2% p.a., compared with 3.7% p.a. in 1970-90. More growth is expected in the developing countries as they are developing fertilizer industries using their abundant and cheap input raw materials.

NITROGENOUS FERTILIZERS. ***Major investments in Asia support strong production growth.*** World production of nitrogenous fertilizers is projected to increase from 84 million tons in 1991 to 114 million tons in 2005, representing an average annual growth rate of 2.2%. The major growth is expected to be in the developing countries--2.7% p.a. Much slower growth is projected in the industrial countries--1.2% p.a.

The largest increase in nitrogenous fertilizer production is expected in Asia--particularly in China, India, Indonesia, and Bangladesh (see Table A5). There are major investment programs in these countries to produce ammonia and urea, mainly to meet domestic needs. In China's Eighth Five-Year Plan, eight large-scale urea plants are to be built and 100 small-scale plants to be refurbished. China plans to increase new ammonia capacity by 4 million tons during the 1990s. In India, several new plants will come on-stream and add 2.4 million tons of new capacity by 1995. There are three large plants under construction in Indonesia with planned capacity of nearly 1 million tons. One new plant is under construction in Bangladesh and it will add more than 500,000 tons to capacity.

The Middle East has the greatest potential for development of ammonia/urea capacity due to its large resources of inexpensive natural gas and its favorable location to the growing markets in Asia. There are several projects planned or under construction in countries such as Saudi Arabia, Qatar, Iran, and Bahrain. In Latin America, Mexico will remain the leading producer. There are two ammonia plants with a total capacity of 1 million tons currently under construction.

US and Western European industry affected by higher gas prices. Production of ammonia grew rapidly in the United States during the 1960s and 1970s. However, since 1980, there has been more than 3 million tons of capacity closed due to rising gas prices and sluggish demand for agricultural products. It seems likely that the United States will continue to meet its increases in demand for ammonia by imports, rather than by building new capacity. Some existing plants will be refurbished to conserve energy and expand capacity. Therefore, production growth in the United States is expected to be rather slow. Ammonia capacity in Western Europe is expected to continue to decline because of increases in gas prices which are linked to oil prices. This will make it more difficult for European producers to compete with low-priced imports.

Rationalization of industry in FSU, but production to suffer minimally. The sharp fall in demand for nitrogenous fertilizers in Eastern Europe and the FSU during 1990-92 caused reductions in production. In the past, ammonia production in Eastern Europe was highly dependent on the FSU for cheap energy supplies. After the increase in natural gas prices from the FSU, inefficient plants with a total capacity of about 600,000 tons are expected to be closed out. There are two plants coming on-stream with capacity of 1.2 million tons. Production in Eastern Europe should grow slowly in pace with domestic consumption growth. Ammonia capacity in the FSU is not expected to decline substantially in the next few years, but some of the smaller and older plants are expected to close--totaling 500,000 tons. However, there are several plants being refurbished or under construction (or planned), which might add over 2 million tons of new capacity when they come on-stream. The FSU has the world's largest natural gas resources--exceeding 36,000 billion cubic meters. It should remain the world's leading producer of nitrogenous fertilizers.

PHOSPHATE FERTILIZERS. ***Fertilizer production to expand in areas of raw material abundance.*** World production of phosphate fertilizers is projected to increase from 39 million tons in 1991 to 50 million tons in 2005 (see Table A9). This represents an average annual growth rate of 1.7%, compared with growth of 2.9% p.a. during 1970-89. In order to save transportation costs, there has been a trend towards integrating mining and processing operations in phosphate fertilizer production. This trend is expected to continue and, therefore, most new investments in phosphate fertilizer plants will occur near phosphate rock deposits. Phosphate fertilizer production is expected to increase substantially in the developing countries where the major raw materials are abundant. Approximately two thirds of the increase in world production is expected to take place in Asia, the Middle East, and North Africa.

There should be large investments in China, in both phosphate mining and processing capacity, to meet domestic needs to correct the imbalance between nitrogen and phosphate applications. China is expected to increase its phosphate rock capacity to 24 million tons and phosphoric acid capacity to 2 million tons by the year 2000. Currently, nine projects are under construction or being contracted, and four potential projects are under study. Phosphate fertilizer production in China should increase from 4.1 million tons in 1991 to 6.8 million tons by 2005.

Morocco will increase its output of phosphoric acid from the large phosphate complex at Jorf Lasfar with the completion of two plants--Maroc Phosphore 5 and 6. These two plants involve construction of 1.32 million tons P_2O_5 phosphoric acid capacity and 2.6 million tons diammonium phosphate (DAP) granulation capacity. They were planned to come on-stream in early 1990. However, construction has been postponed due to difficulties in marketing the existing output from Jorf Lasfar over the past year and in raising financing for the project. The completion of these two plants is now likely to be in 1997 or beyond. In Iraq, four phosphate plants were planned to be completed in 1993. However, all of them have been delayed.

Slow growth in United States, declines in Western Europe and Japan. Production growth in the United States is expected to be slow because very little capacity expansion is foreseen. While the United States should retain its position as the world's leading producer and exporter of phosphate fertilizer through 2005, its relative position is expected to decline significantly due to the keen competition from major developing country producers. In Western Europe and Japan, production should decline because of the dependence on imported raw material for processing. Western European production is expected to continue to be restrained by environmental considerations, most notably the problem of disposal of phosphogypsum. Stringent environmental constraints mean an increasing cost burden to fertilizer processing plants, and the closure of the less economic plants is likely to continue.

In the FSU and Eastern Europe, phosphate fertilizer production is likely to decline in the short term, due to disruptions caused by the changes in their economic and political systems. In the long term, an open market system should increase competition from imported fertilizers. Undoubtedly, some old and inefficient plants in the region will be closed. Only one phosphate rock expansion project with capacity of 2.5 million tons is foreseen in the FSU, but the completion date is unknown. The region's production growth is expected to be less than 1% p.a., compared with 4.2% in the period 1970-89.

POTASH FERTILIZERS. ***FSU and Canada continue to dominate production.*** World production of potash fertilizer is projected to increase from 29 million tons in 1991 to 38 million tons in 2005--representing an average annual growth rate of 2%, compared with 2.4% p.a. in 1970-89 (see Table A13). Since currently there is excess capacity, capacity expansion should be slow. Only a few capacity expanding projects are foreseen. China has signed a joint venture agreement with the Israeli companies, Dead Sea Works and UDI, to build a potash plant at Qinghai. The planned capacity of the plant is 800,000 tons/year and it is to be completed by 1995. Jordan has embarked on a 400,000 tons/year capacity expansion project at Safi, expected to be completed by 1995. It intends to introduce a further expansion before the year 2000. Argentina has a plan to use solution mining to develop the potash deposits in the Rio Colorado basin. The total project costs were estimated at US$58 million and it has secured a loan of US$10 million from the Inter-American Development Bank. The plant will have a capacity of 250,000 tons/year. Currently, Thailand does not produce potash, however, there are plans to extract potash from large deposits by the end of the century and production capacity should be around 1 million tons/year.

Potash production is dominated by the FSU and Canada, and their domination is expected to continue. By 2005, production is expected to increase from 1991 levels by 4.5 million tons in Canada and by 3.9 million tons in the FSU.

Trade Outlook

Leading exporters and importers of nitrogenous fertilizers remain unchanged. The supply-demand projections for nitrogenous fertilizers indicate that the FSU, the industrial countries, and the Middle East should be the major surplus regions, with developing Asia, Africa, and Latin America the major deficit regions (see Table 3). Although production in China is expected to expand substantially, it will not be able to meet domestic demand and will need to import large amounts of nitrogenous fertilizer. China is expected to remain the largest importer of nitrogenous fertilizer, with imports of 9.1 million tons by 2005, while the FSU is expected to remain the leading exporter, with exports of 8.6 million tons.

The United States is expected to remain the second largest importing and exporting country for nitrogenous fertilizer. It imports large quantities of ammonia and processes it for export as DAP. The Middle East will be the fastest growing export region as it expands production for export to the large growing Asian markets. In Latin America, gas-rich countries such as Mexico, Venezuela, and Trinidad are expanding production for exports to the growing markets in North and South America.

China and India still largest importers of phosphate fertilizers. World imports of phosphate rock as a proportion of world consumption declined from 48% in 1970 to 24% in 1990, while for finished phosphate fertilizers the proportion of imports in world consumption increased from 13% to 29%. This change reflects the change in world production and trade towards greater domestic processing of raw materials by developing country producers. Pricing of phosphate rock at relatively high levels compared with phosphate fertilizer product also stimulated this change. Another reason for greater domestic processing is to get more value-added and to reduce transportation costs. Also, a large integrated mining and processing complex can offer significant savings in economies of scale. This trend towards domestic processing is expected to continue.

The supply-demand projections for phosphate fertilizers show that developing Asia and Latin America are the two major deficit regions, while OECD, North Africa, Eastern Europe and the FSU are the major surplus regions (see Table 4). China and India should remain the largest importing countries. China's imports are projected to increase from 2.4 million tons in 1991 to 4 million tons in 2005, while India's imports are likely to increase from 1.4 million tons to 1.8 million tons (see Table A12). The United States is expected to remain the largest exporter with an increase from 5.4 million tons in 1991 to 8.3 million tons in 2005. The two major exporters in North Africa are Morocco and Tunisia with total exports of 3.2 million tons in 2005. (see Table A11). About 1.8 million tons of surplus for export is expected in Eastern Europe and the FSU by 2005.

Major potash importers unchanged, but FSU could become substantial exporter. Almost all potash consumption in Asia, Latin America, and Africa is satisfied by imports. The supply-demand projections indicate that Asia should be the largest deficit region with a deficit of over 7 million tons in 2005, followed by Latin America with a deficit of 2.7 million tons, and Africa with a deficit of less than 1 million tons (see Table 5). The United States, China, and Brazil are expected to be the major importing countries (see Table A16).

Table 3: *Nitrogenous Fertilizers* - Production, Consumption, and Balance, 1988-2005
(million tons)

	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005
Production										
High-Income	29.5	28.9	28.0	28.4	28.6	28.9	29.1	29.3	30.7	33.6
OECD	28.2	27.5	26.9	27.2	27.4	27.5	27.7	27.8	28.7	30.9
Non-OECD	1.4	1.4	1.1	1.2	1.3	1.3	1.4	1.5	2.0	2.7
LMICs	55.9	55.8	55.2	55.5	57.1	59.5	61.6	62.9	70.7	80.5
Africa	0.8	0.8	0.9	0.9	0.9	1.0	1.0	1.1	1.3	1.6
America	3.2	3.3	3.4	3.4	3.5	3.5	3.5	3.7	4.1	4.7
Asia	26.0	27.0	27.9	28.0	28.8	30.3	31.5	31.9	35.1	39.6
Europe	23.5	21.9	20.4	20.5	21.0	21.7	22.3	22.6	24.8	26.6
Middle East & North Africa	2.5	2.8	2.7	2.7	2.9	3.1	3.4	3.7	5.4	7.9
World	85.5	84.7	83.2	83.9	85.8	88.4	90.7	92.2	101.4	114.1
Consumption										
High-Income	22.9	23.1	22.6	23.6	24.6	25.3	25.7	26.0	27.6	28.5
OECD	22.5	22.7	22.2	23.3	24.2	24.9	25.3	25.6	27.1	27.9
Non-OECD	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.6
LMICs	56.7	55.9	55.4	56.0	57.5	59.5	61.6	62.9	71.2	81.8
Africa	1.0	1.0	1.1	1.2	1.2	1.3	1.4	1.4	1.7	2.1
America	3.8	3.9	4.0	4.2	4.4	4.5	4.7	4.8	5.2	5.6
Asia	31.7	32.5	33.7	34.8	35.3	36.7	38.0	38.5	44.4	52.2
Europe	17.9	16.2	14.0	13.2	13.8	14.1	14.6	15.1	16.3	17.8
Middle East & North Africa	2.3	2.4	2.5	2.6	2.8	2.9	3.0	3.1	3.6	4.0
World	79.7	79.1	78.0	79.7	82.1	84.9	87.3	88.9	98.8	110.3
Supply-Demand Balance										
High-Income	6.6	5.8	5.3	4.7	4.0	3.6	3.4	3.3	3.1	5.1
OECD	5.6	4.7	4.7	3.9	3.2	2.6	2.4	2.2	1.6	3.0
Non-OECD	1.0	1.0	0.7	0.8	0.9	0.9	1.0	1.1	1.5	2.2
LMICs	-0.8	-0.1	-0.2	-0.5	-0.4	0.0	0.1	0.0	-0.5	-1.3
Africa	-0.2	-0.3	-0.2	-0.3	-0.3	-0.3	-0.3	-0.4	-0.4	-0.5
America	-0.6	-0.6	-0.7	-0.8	-0.9	-1.0	-1.2	-1.1	-1.1	-0.9
Asia	-5.7	-5.5	-5.8	-6.9	-6.5	-6.4	-6.5	-6.7	-9.3	-12.6
Europe	5.6	5.8	6.3	7.4	7.2	7.5	7.7	7.5	8.5	8.8
Middle East & North Africa	0.2	0.4	0.2	0.0	0.1	0.3	0.4	0.6	1.8	3.9
World	5.8	5.6	5.2	4.2	3.7	3.6	3.5	3.2	2.6	3.8

Sources: FAO Fertilizer Yearbook tapes (1988-90); World Bank, International Economics Department (1991-2005).

Table 4: Phosphate Fertilizers - Production, Consumption, and Balance, 1988-2005
(million tons)

	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005
Production										
High-Income	15.9	15.3	15.2	14.9	14.8	14.5	14.7	14.8	16.1	16.5
OECD	15.6	15.0	14.9	14.6	14.5	14.1	14.3	14.4	15.6	15.7
Non-OECD	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.6	0.8
LMICs	25.3	24.2	24.3	24.5	25.2	26.1	26.9	27.5	30.0	33.3
Africa	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
America	1.8	1.6	1.8	1.8	1.9	1.9	1.9	1.9	2.1	2.3
Asia	7.6	7.1	7.2	7.4	7.7	7.9	8.2	8.5	10.1	12.0
Europe	12.6	12.3	12.2	12.3	12.5	12.9	13.2	13.4	13.5	13.9
Middle East & North Africa	2.7	2.7	2.6	2.5	2.6	2.8	3.0	3.2	3.7	4.6
World	41.2	39.5	39.5	39.5	40.0	40.6	41.6	42.3	46.1	49.8
Consumption										
High-Income	11.1	11.0	10.6	10.4	10.5	10.5	10.6	10.6	11.0	11.1
OECD	11.0	10.9	10.5	10.3	10.4	10.4	10.4	10.5	10.8	11.0
Non-OECD	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
LMICs	26.9	26.4	26.0	25.9	26.3	26.9	28.6	29.6	32.5	35.7
Africa	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8
America	2.7	2.5	2.5	2.6	2.8	2.9	3.0	3.1	3.3	3.5
Asia	10.0	10.5	11.2	11.5	11.8	12.1	12.5	12.8	14.7	16.9
Europe	12.0	11.3	10.3	9.5	9.5	9.6	10.7	11.2	11.6	12.1
Middle East & North Africa	1.4	1.4	1.4	1.5	1.6	1.6	1.7	1.8	2.1	2.4
World	38.0	37.3	36.6	36.3	36.8	37.5	39.1	40.2	43.5	46.8
Supply-Demand Balance										
High-Income	4.8	4.3	4.6	4.5	4.3	4.0	4.1	4.2	5.2	5.4
OECD	4.6	4.1	4.5	4.3	4.1	3.7	3.8	3.9	4.7	4.7
Non-OECD	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.6
LMICs	-1.6	-2.2	-1.7	-1.4	-1.1	-0.9	-1.7	-2.0	-2.6	-2.4
Africa	-0.2	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.3
America	-0.9	-0.9	-0.7	-0.8	-0.9	-1.0	-1.1	-1.1	-1.2	-1.2
Asia	-2.4	-3.5	-3.9	-4.1	-4.1	-4.2	-4.2	-4.3	-4.6	-4.9
Europe	0.6	1.0	1.9	2.8	3.1	3.3	2.5	2.2	1.9	1.8
Middle East & North Africa	1.3	1.3	1.2	1.0	1.0	1.2	1.3	1.4	1.6	2.2
World	3.2	2.2	2.9	3.2	3.2	3.1	2.4	2.1	2.6	3.0

Sources: FAO Fertilizer Yearbook tapes (1988-90); World Bank, International Economics Department (1991-2005).

Table 5: Potash Fertilizer - Production, Consumption, and Balance, 1988-2005
(million tons)

	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005
Production										
High-Income	19.0	17.5	18.0	18.0	18.4	18.9	19.3	19.6	20.5	21.9
OECD	17.8	16.2	16.7	16.7	17.1	17.6	18.0	18.3	19.1	20.6
Non-OECD	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.4
LMICs	12.2	11.2	10.6	10.8	10.9	11.1	11.3	11.4	13.9	16.0
Africa	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
America	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2
Asia	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.7	0.8
Europe	11.3	10.2	9.7	9.8	10.0	10.1	10.2	10.2	11.9	13.8
Middle East & North Africa	0.8	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.1	1.3
World	31.2	28.6	28.6	28.8	29.3	30.1	30.6	31.0	34.3	38.0
Consumption										
High-Income	11.5	11.7	11.1	11.0	11.5	11.8	11.9	11.9	12.6	13.0
OECD	11.4	11.5	11.0	10.8	11.3	11.6	11.7	11.8	12.4	12.8
Non-OECD	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
LMICs	16.6	15.2	14.2	13.8	15.0	15.5	16.0	16.4	18.5	21.5
Africa	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.9
America	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.6	2.9
Asia	3.9	3.6	4.0	4.1	4.9	5.0	5.1	5.3	6.2	7.9
Europe	9.9	9.0	7.6	7.0	7.4	7.7	8.0	8.1	8.7	9.4
Middle East & North Africa	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4
World	28.1	26.9	25.3	24.8	26.5	27.3	27.9	28.3	31.0	34.5
Supply-Demand Balance										
High-Income	7.5	5.8	6.8	7.1	6.9	7.2	7.5	7.7	7.9	9.0
OECD	6.4	4.6	5.7	5.9	5.7	6.0	6.3	6.5	6.7	7.7
Non-OECD	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
LMICs	-4.4	-4.0	-3.6	-3.1	-4.1	-4.4	-4.7	-4.9	-4.6	-5.5
Africa	-0.3	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.5	-0.6	-0.9
America	-2.2	-2.0	-2.1	-2.1	-2.2	-2.2	-2.2	-2.2	-2.4	-2.7
Asia	-3.8	-3.5	-3.9	-4.1	-4.8	-4.9	-5.0	-5.1	-5.5	-7.1
Europe	1.4	1.3	2.1	2.8	2.6	2.4	2.2	2.2	3.2	4.3
Middle East & North Africa	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.8	0.9
World	3.1	1.8	3.3	4.0	2.8	2.8	2.7	2.7	3.3	3.5

Sources: FAO Fertilizer Yearbook tapes (1988-90); World Bank, International Economics Department (1991-2005).

Exports of potash fertilizers are concentrated in a few countries--Canada, Germany, the FSU, Israel, and Jordan (see Table A15). Canada should remain the leading exporter, and its exports are expected to increase from 6.6 million tons in 1991 to 9.3 million tons in 2005 (accounting for over one third of world exports). Germany, following reunification, became the second largest exporter of potash. However, the FSU is expected to replace it as the second largest exporter by 2005. As economic changes occur in the FSU, potash consumption is expected to grow more slowly than production, and this could increase the potential for exports. However, as stated previously, projections for the FSU should be viewed with great uncertainty.

Price Outlook

Tight market to keep real prices firm until late 1990s, then decrease expected. The long-term price forecasts from the World Bank's grains/fertilizer model take into account, among other things, the industry's investment and production behavior in response to fertilizer prices, crop price forecasts, and crop production projections given elsewhere in this report, as well as expected movements in exchange rates and interest rates. All prices are initially projected in nominal terms. Over the long term, fertilizer prices in real terms are expected to increase steadily until the late 1990s due to tight supply-demand balances. However, prices are expected to decline in real terms around the turn of the century as new capacity comes on-stream and eases supply-demand balances.

Prices of nitrogenous fertilizers increased substantially in the last quarter of 1990 due to the supply disruption caused by the Gulf war. Urea prices in Western Europe increased from $150/ton in July 1990 to $189/ton in February 1991. However, after the war, prices declined to $145/ton in June 1992--mainly reflecting the reduction in concern about supply disruption and lower purchases from China as a result of severe flooding. Urea prices are not expected to increase substantially in real terms over the long term because crude oil prices are expected to remain near present levels except for an upturn near the end of this decade.

Similar to nitrogenous fertilizers, phosphate fertilizer prices increased in the last quarter of 1990 and declined after the Gulf war. Iraqi phosphate was taken out of the market during the Gulf war. Price decreases after the war also reflected weaker demand. China and India were absent from the markets during the fourth quarter of 1991 while fall applications in the United States were hampered by bad weather. Future phosphate fertilizer price movements will be affected by how successfully the Chinese government carries out the policy of balanced application of fertilizers and how strongly the environmental concerns about phosphate fertilizer use affect government regulations.

Potash prices increased by only $1.50/ton at the conclusion of negotiations for the first half of 1992--much less than suppliers' expectation of a $5-6/ton increase--due to strong resistance from buyers. For the second half of 1992, although the major exporters made it clear during meetings with customers at Seoul in May that they would be seeking a $4/ton increase, most buyers expect current prices to remain until December. The potash market is dominated by a few large suppliers--Canada, the FSU, Germany, and Israel. Price developments depend on how well the few producers succeed in restricting their supplies and negotiating contract prices with major buyers.

A long-term question for the fertilizer industry is whether application rates will increase dramatically in the developing countries in an effort to counter the slower grain yield increases caused by the maturing of the "Green Revolution." The expansion of high-yielding rice and wheat varieties to

new areas in developing countries has slowed in recent years because the best land has already been shifted to high-yielding varieties. Further production gains will come primarily from more intensive input use on those areas that already produce high-yielding varieties. This could lead to higher fertilizer applications in an effort to increase production--especially if additional yield increases from improved varieties are slow to develop (as researchers now believe). This possibility could lead to more rapid increases in fertilizer demand and higher prices.

Table A1: Phosphate Rock - Production By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	36,235	54,933	49,484	48,695	47,856	47,416	48,001	48,516	55,686	58,771	3.0	1.5	1.4
OECD	35,124	52,534	45,968	45,050	44,115	43,540	44,014	44,431	50,398	52,030	2.7	1.1	1.0
United States	35,110	52,326	45,401	44,427	42,873	43,331	43,952	44,527	46,932	49,850	2.7	1.0	0.8
Non-OECD	1,112	2,400	3,516	3,645	3,741	3,876	3,987	4,085	5,288	6,741	10.7	9.9	4.5
LMICs	44,051	80,361	106,501	107,691	111,757	114,527	118,439	121,806	136,664	155,497	5.7	4.7	2.7
Africa	4,222	7,673	7,801	8,006	7,326	7,552	7,982	8,262	8,609	9,056	6.1	2.2	0.9
Togo	1,566	2,698	2,314	3,079	2,405	2,555	2,805	3,005	2,905	2,905	7.2	2.4	-0.4
Asia & Pacific	5,568	14,151	19,720	20,879	21,589	22,268	23,021	23,958	29,465	36,064	6.9	6.7	4.0
China, People's Rep.	1,767	9,502	17,300	17,825	18,481	19,150	19,876	20,574	24,772	29,807	14.0	12.6	3.7
Europe	17,663	25,053	36,955	38,521	39,226	39,999	40,559	40,687	40,729	41,510	5.9	4.0	0.5
Middle East & North Africa	16,192	30,675	38,196	36,022	38,307	39,618	41,725	43,650	52,424	63,265	4.8	4.5	4.1
Jordan	851	3,771	5,925	5,167	5,520	6,000	6,550	7,150	7,350	7,550	10.6	13.3	2.7
Morocco	11,358	19,565	21,189	18,126	18,756	19,550	20,850	22,020	26,700	34,620	3.8	2.6	4.7
Tunisia	2,929	4,406	6,566	5,613	6,150	6,250	6,400	6,520	8,300	9,800	3.7	4.1	4.1
World	80,286	135,294	155,984	156,386	159,613	161,943	166,440	170,322	192,350	214,268	4.7	3.5	2.3

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: IFA, Annual Phosphate Rock Statistics (actual);
World Bank, International Economics Department (projected).

Table A2: Phosphate Rock - Apparent Consumption By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	53,360	73,066	58,853	57,925	57,561	56,376	57,079	57,491	63,231	65,171	1.9	0.3	0.8
OECD	52,838	72,105	56,864	55,844	55,340	54,000	54,542	54,786	59,473	59,950	1.8	0.2	0.5
United States	24,378	39,519	38,926	39,468	40,023	40,581	41,152	41,727	44,732	47,950	3.0	2.0	1.4
France	3,681	5,010	3,104	3,048	2,992	2,940	2,884	2,835	2,588	2,365	1.8	-0.9	-1.8
Non-OECD	522	961	1,989	2,081	2,221	2,376	2,537	2,705	3,758	5,221	9.0	9.3	6.8
LMICs	28,818	63,587	95,647	98,436	102,052	105,567	109,361	112,831	129,119	149,097	8.0	6.5	3.0
Africa	1,579	3,628	2,811	2,811	2,816	2,822	2,827	2,832	2,859	2,886	4.7	3.4	0.2
America	1,887	4,801	6,169	6,563	6,659	6,760	6,864	6,964	7,502	8,082	10.0	6.2	1.5
Asia & Pacific	5,142	15,446	26,731	27,430	28,389	29,378	30,411	31,478	37,385	44,404	9.7	9.1	3.5
China, People's Rep.	2,859	9,927	17,575	18,225	18,901	19,600	20,326	21,074	25,272	30,307	10.8	9.9	3.7
Europe	18,527	31,941	40,865	41,221	42,101	43,279	44,339	44,977	45,389	46,560	6.5	4.3	0.9
Middle East & North Africa	1,683	7,772	19,072	20,411	22,087	23,328	24,920	26,580	35,984	47,165	12.6	13.4	6.2
World	82,179	136,652	154,500	156,361	159,613	161,943	166,440	170,322	192,350	214,268	4.5	3.3	2.3

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: IFA, Annual Phosphate Rock Statistics (actual);
World Bank, International Economics Department (projected).

Table A3: Phosphate Rock - Gross Exports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	11,562	15,045	8,839	7,561	6,350	6,300	6,410	6,470	6,150	5,880	2.7	-0.6	-1.8
OECD	10,827	13,255	6,895	5,637	4,450	4,400	4,450	4,450	4,100	3,800	1.9	-1.7	-2.8
United States	10,827	13,185	6,883	5,622	4,450	4,400	4,450	4,450	4,000	3,700	1.8	-1.8	-2.9
Non-OECD	735	1,790	1,944	1,924	1,900	1,900	1,960	2,020	2,050	2,080	10.7	9.0	0.6
LMICs	26,557	35,327	28,135	23,913	23,825	24,350	25,450	26,210	26,350	26,680	2.2	0.2	0.8
Africa	2,690	4,118	4,995	5,518	4,780	5,000	5,380	5,680	6,000	6,420	6.0	1.7	1.1
Togo	1,581	2,701	2,422	3,074	2,400	2,550	2,800	3,000	2,900	2,900	7.6	2.2	-0.4
Senegal	1,108	1,378	1,356	1,280	1,200	1,230	1,300	1,300	1,300	1,300	3.1	-0.2	0.1
Asia & Pacific	3,187	3,251	966	570	590	660	690	750	750	750	-1.8	-4.9	2.0
Europe	5,789	4,569	2,609	1,650	1,600	1,650	1,700	1,650	1,600	1,550	0.2	-3.5	-0.4
Middle East & North Africa	14,787	23,369	19,565	16,165	16,830	16,980	17,620	18,070	17,940	17,900	2.7	1.4	0.7
Morocco	11,155	16,700	11,672	9,143	9,050	9,080	9,530	9,800	9,740	9,700	1.9	-0.3	0.4
Tunisia	2,125	1,337	593	426	950	1,000	1,000	1,020	800	700	-3.2	-5.1	3.6
World	38,119	50,372	36,974	31,474	30,175	30,650	31,860	32,680	32,500	32,560	2.3	0.0	0.2

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: IFA, Annual Phosphate Rock Statistics (actual);
World Bank, International Economics Department (projected).

Table A4: Phosphate Rock - Gross Imports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	28,687	33,178	18,208	16,791	16,055	15,260	15,488	15,445	13,695	12,280	0.5	-1.9	-2.2
OECD	28,542	32,826	17,791	16,431	15,675	14,860	14,978	14,805	13,175	11,720	0.5	-2.0	-2.4
Canada	2,207	3,498	1,273	1,094	1,050	1,050	1,050	1,100	1,100	1,100	1.9	-2.0	0.0
France	3,681	5,010	3,104	3,050	2,600	2,100	2,100	1,950	1,700	1,480	1.8	-0.9	-5.0
Germany	5,558	5,106	958	950	800	850	850	800	700	610	-1.7	-6.1	-3.1
Japan	3,007	2,571	1,223	1,325	1,350	1,350	1,320	1,300	1,249	1,200	-1.2	-3.7	-0.7
LMICs	11,325	18,553	17,282	14,658	14,120	15,390	16,372	17,235	18,805	20,280	5.0	2.0	2.3
Africa	48	72	5	323	270	270	225	250	250	250		-4.2	-1.8
America	1,584	2,011	2,340	2,310	1,375	1,730	1,772	1,775	2,125	2,540	5.3	-1.6	0.7
Asia & Pacific	2,761	4,546	7,977	7,121	7,390	7,770	8,080	8,270	8,670	9,090	6.7	5.7	1.8
India	765	1,388	3,236	3,000	2,900	3,150	3,300	3,400	3,800	3,980	6.7	7.3	2.0
Europe	6,653	11,457	6,519	4,350	4,475	4,930	5,480	5,940	6,260	6,600	4.5	1.2	3.0
Middle East & North Africa	279	466	441	554	610	690	815	1,000	1,500	1,800			8.8
World	40,012	51,731	35,490	31,449	30,175	30,650	31,860	32,680	32,500	32,560	2.0	-0.5	0.2

a/ Least squares trend for historical periods (1961-90); end-point for projected periods (1991-2005).
b/ Estimate.

Sources: IFA, Annual Phosphate Rock Statistics (actual);
World Bank, International Economics Department (projected).

Table A5: Nitrogenous Fertilizer - Production By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	19,433	26,523	27,971	28,383	28,627	28,886	29,087	29,294	30,714	33,569	3.6	2.0	1.2
OECD	19,112	25,672	26,921	27,183	27,355	27,538	27,658	27,779	28,687	30,856	3.4	1.8	0.9
United States	7,938	11,176	12,341	12,465	12,529	12,715	12,842	12,971	13,633	14,328	4.2	2.0	1.0
France	1,360	1,658	1,461	1,463	1,464	1,466	1,467	1,469	1,476	1,483	2.0	0.2	0.1
Germany	1,874	2,268	2,139	2,146	2,152	2,159	2,165	2,172	2,205	2,238	1.3	1.1	0.3
Japan	2,050	1,304	930	914	899	883	868	854	784	720	-1.9	-4.6	-1.7
LMICs	13,498	35,044	55,203	55,509	57,124	59,544	61,647	62,882	70,651	80,516	10.8	7.9	2.7
Americas	829	1,696	3,365	3,425	3,462	3,471	3,482	3,691	4,139	4,709	8.6	8.1	2.3
Mexico	408	753	1,558	1,620	1,684	1,752	1,822	1,895	2,309	2,818	10.7	7.3	4.0
Asia & Pacific	3,269	15,174	27,876	27,990	28,786	30,311	31,456	31,850	35,060	39,648	14.8	11.9	2.5
China, People's Rep.	1,483	9,557	14,458	14,713	14,911	15,216	15,576	16,106	17,957	20,021	15.7	12.5	2.2
India	837	2,511	7,041	7,347	7,666	7,998	8,344	8,705	10,091	11,698	14.5	11.9	3.4
Europe	8,896	16,620	20,363	20,520	21,048	21,661	22,316	22,632	24,775	26,649	8.7	5.0	1.9
World	32,931	61,567	83,174	83,892	85,751	88,430	90,734	92,176	101,365	114,085	6.9	5.2	2.2

a/ Least squares trend for historical periods (1961-89); end-point for projected periods (1991-2005).
b/ Estimate.

Note: Split Years beginning in July of the Years Shown, * Year 64-66 Data for China are Estimates.

Sources: FAO, Trade Yearbook Tapes (actual);
World Bank, International Economics Department (projected).

Table A6: Nitrogenous Fertilizer - Apparent Consumption By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	15,123	22,240	22,626	23,647	24,590	25,320	25,708	26,026	27,603	28,457	3.8	2.2	1.3
OECD	14,925	21,926	22,233	23,254	24,187	24,907	25,285	25,592	27,112	27,901	3.8	2.1	1.3
United States	7,131	10,376	9,363	10,023	10,769	11,242	11,412	11,463	12,145	12,287	3.7	1.4	1.5
France	1,407	2,158	2,700	2,740	2,782	2,823	2,867	2,909	3,134	3,376	5.0	3.3	1.5
LMICs	16,131	37,256	55,365	56,011	57,491	59,542	61,573	62,918	71,191	81,812	9.5	6.9	2.7
Americas	1,285	2,798	4,040	4,197	4,362	4,517	4,659	4,786	5,215	5,585	7.9	5.8	2.1
Asia & Pacific	6,070	18,630	33,662	34,845	35,307	36,748	37,970	38,507	44,357	52,241	11.7	9.7	2.9
China, People's Rep.	2,973	11,166	19,329	20,152	21,122	21,961	22,726	23,447	25,665	30,093	13.0	10.8	2.9
India	1,544	3,748	7,310	7,605	7,801	8,013	8,237	8,858	11,296	12,670	11.7	8.9	3.7
Europe	7,780	13,538	14,035	13,165	13,842	14,126	14,622	15,133	16,325	17,838	7.7	4.1	2.2
World	31,254	59,496	77,991	79,658	82,081	84,862	87,281	88,944	98,794	110,269	6.9	5.1	2.3

a/ Least squares trend for historical periods (1961-89); end-point for projected periods (1991-2005).
b/ Estimate.

Note: Split Years beginning in July of the Years Shown, * Year 64-66 Data for China are Estimates.

Sources: FAO, Trade Yearbook Tapes (actual);
World Bank, International Economics Department (projected).

Table A7: Nitrogenous Fertilizer - Gross Exports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	5,560	8,468	11,238	11,299	11,919	12,295	12,688	13,084	14,464	15,622	4.9	4.0	2.3
OECD	5,413	7,959	10,368	10,679	10,999	11,329	11,669	12,019	13,105	13,888	4.5	3.7	1.9
United States	1,039	2,488	2,942	3,060	3,182	3,310	3,442	3,580	4,356	5,300	8.8	6.2	4.0
Canada	421	961	1,788	1,884	1,986	2,093	2,206	2,335	3,037	3,950	10.0	10.7	5.4
Netherlands	587	1,180	1,623	1,655	1,688	1,722	1,757	1,792	1,979	2,185	7.7	4.7	2.0
Japan	1,305	584	182	180	179	177	175	173	165	157	-5.2	-12.1	-1.0
Non-OECD	147	509	870	620	920	966	1,014	1,065	1,359	1,734	18.9	9.5	7.6
Kuwait	113	231	-	-	-	-	-	-	-			3.4	
LMICs	1,263	3,736	9,260	9,359	9,743	10,146	10,569	11,014	13,614	16,985	13.9	10.7	4.3
Americas	231	219	736	783	834	887	944	1,004	1,369	1,867	3.6	5.9	6.4
Asia & Pacific	63	386	1,443	1,529	1,621	1,718	1,821	1,931	2,584	3,458		22.2	6.0
Europe	914	2,726	5,753	5,909	6,068	6,232	6,400	6,573	7,510	8,580	15.4	9.4	2.7
Middle East & North Africa	33	378	1,100	900	972	1,050	1,134	1,224	1,798	2,642		21.5	8.0
World	6,823	12,205	20,498	20,658	21,662	22,441	23,257	24,098	28,078	32,607	6.9	6.1	3.3

a/ Least squares trend for historical periods (1961-89); end-point for projected periods (1991-2005).
b/ Estimate.

Note: Split Years beginning in July of the Years Shown, * Year 64-66 Data for China are Estimates.

Sources: FAO, Trade Yearbook Tapes (actual);
World Bank, International Economics Department (projected).

Table A8: Nitrogenous Fertilizer - Gross Imports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages 1969-71	Averages 1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	2,117	5,156	9,558	9,711	9,866	10,022	10,182	10,345	11,197	12,119	8.8	8.9	1.6
OECD	2,090	5,130	9,473	9,625	9,779	9,935	10,094	10,256	11,103	12,020	9.0	8.9	1.6
United States	795	2,298	3,558	3,611	3,665	3,720	3,776	3,833	4,129	4,448	10.0	9.7	1.5
France	183	760	1,529	1,562	1,594	1,628	1,662	1,697	1,883	2,089	17.5	10.9	2.1
LMICs	4,461	7,491	10,940	10,947	11,796	12,419	13,070	13,753	16,881	20,488	6.0	4.7	4.6
Americas	697	1,339	1,411	1,555	1,734	1,933	2,121	2,099	2,445	2,743	5.2	2.6	4.1
Brazil	208	446	126	131	136	142	147	153	186	226	5.4	-3.2	4.0
Asia & Pacific	2,753	4,149	6,855	6,623	7,185	7,502	7,857	8,453	10,645	13,270	6.2	5.0	5.1
China, People's Rep.	1,490	1,609	4,979	5,540	6,310	6,845	7,250	7,440	8,710	9,070	7.3	6.6	3.6
India	542	1,287	585	648	710	773	835	898	1,210	1,070	2.7	-1.2	3.6
Europe	457	798	1,262	1,293	1,326	1,359	1,393	1,428	1,616	1,828	5.2	5.7	2.5
World	6,578	12,647	20,498	20,658	21,662	22,441	23,252	24,098	28,078	32,607	7.1	6.4	3.3

a/ Least squares trend for historical periods (1961-89); end-point for projected periods (1991-2005).
b/ Estimate.

Note: Split Years beginning in July of the Years Shown, * Year 64-66 Data for China are Estimates.

Sources: FAO, Trade Yearbook Tapes (actual);
World Bank, International Economics Department (projected).

Table A9: Phosphate Fertilizer - Production By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	13,851	16,521	15,204	14,941	14,830	14,502	14,668	14,757	16,142	16,485	1.8	0.3	0.7
OECD	13,789	16,416	14,907	14,631	14,499	14,148	14,290	14,354	15,582	15,707	1.8	0.2	0.5
United States	5,324	8,558	9,688	9,823	9,961	10,100	10,242	10,385	11,133	11,934	4.2	2.9	1.4
France	1,451	1,338	945	928	911	895	878	863	788	720	-0.2	-3.0	-1.8
Japan	693	657	436	427	419	410	402	394	356	322	-0.2	-1.8	-2.0
LMICs	8,170	16,634	24,250	24,537	25,198	26,063	26,910	27,546	29,952	33,276	7.7	5.7	2.2
Americas	478	1,677	1,770	1,831	1,858	1,886	1,915	1,943	2,093	2,255	9.8	6.3	1.5
Brazil	209	1,342	1,180	1,199	1,218	1,238	1,257	1,277	1,382	1,496	12.7	9.3	1.6
Asia & Pacific	1,485	4,016	7,216	7,406	7,665	7,932	8,211	8,499	10,094	11,989	11.0	8.5	3.5
China, People's Rep.	903	2,211	3,923	4,068	4,219	4,375	4,537	4,704	5,641	6,765	10.5	6.4	3.7
India	247	869	2,376	2,211	2,271	2,332	2,395	2,460	2,810	3,210	12.7	12.6	2.7
Europe	5,376	9,535	12,191	12,284	12,546	12,897	13,213	13,403	13,526	13,875	6.4	4.2	0.9
Middle East & North Africa	447	844	2,554	2,496	2,608	2,826	3,048	3,177	3,710	4,623	10.4	9.9	4.5
Moroco	124	178	867	819	885	955	1,032	1,114	1,637	2,405	12.6	11.2	8.0
Tunisia	190	393	702	763	795	828	863	899	1,104	1,104	8.4	9.5	2.7
World	22,020	33,155	39,454	39,478	40,028	40,565	41,578	42,303	46,094	49,761	4.3	2.9	1.7

a/ Least squares trend for historical periods (1961-89); end-point for projected periods (1991-2005).
b/ Estimate.

Note: Split Years Beginning in July of the Years Shown, * Year 64-66 Data for China are Estimates.

Sources: FAO, Trade Yearbook Tapes (actual);
World Bank, International Economics Department (projected).

Table A10: Phosphate Fertilizer - Apparent Consumption By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	12,229	12,973	10,567	10,417	10,493	10,549	10,568	10,578	10,986	11,121	0.8	-0.8	0.5
OECD	12,161	12,881	10,457	10,307	10,381	10,433	10,449	10,456	10,847	10,963	0.8	-0.9	0.4
United States	4,299	4,741	3,895	4,003	4,107	4,155	4,148	4,130	4,357	4,534	0.9	-1.1	0.9
France	1,808	1,811	1,450	1,420	1,400	1,390	1,380	1,370	1,336	1,303	0.9	-1.7	-0.6
LMICs	8,889	18,313	25,998	25,892	26,326	26,928	28,574	29,581	32,504	35,668	7.7	5.8	2.3
Africa	402	743	733	695	694	693	694	698	753	817	5.1	2.6	1.2
Americas	934	2,481	2,483	2,634	2,775	2,896	3,004	3,089	3,300	3,493	8.0	4.6	2.0
Brazil	392	1,664	1,202	1,200	1,290	1,350	1,460	1,585	1,748	1,914	11.2	5.0	3.4
Asia & Pacific	2,011	4,996	11,153	11,492	11,798	12,117	12,454	12,821	14,716	16,851	10.5	8.9	2.8
China, People's Rep.	905	2,509	5,700	5,700	5,800	5,900	6,000	6,100	7,245	8,605	12.1	8.8	3.0
Europe	5,304	9,366	10,267	9,533	9,467	9,574	10,716	11,207	11,643	12,066	6.3	4.2	1.7
Middle East & North Africa	237	727	1,362	1,538	1,592	1,648	1,706	1,766	2,092	2,441	10.8	10.1	3.4
World	21,118	31,286	36,565	36,309	36,819	37,477	39,142	40,159	43,490	46,789	4.2	2.9	1.8

a/ Least squares trend for historical periods (1961-89); end-point for projected periods (1991-2005).
b/ Estimate.

Note: Split Years Beginning in July of the Years Shown, * Year 64-66 Data for China are Estimates.

Sources: FAO, Trade Yearbook Tapes (actual);
World Bank, International Economics Department (projected).

Table A11: Phosphate Fertilizer - Gross Exports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	2,431	5,344	7,288	7,548	7,870	8,153	8,499	8,781	9,516	10,699	6.9	5.5	2.5
OECD	2,429	5,322	7,090	7,337	7,645	7,912	8,242	8,506	9,134	10,168	6.8	5.3	2.4
United States	860	3,646	5,154	5,403	5,713	5,982	6,146	6,186	7,245	8,335	11.6	9.0	3.1
Non-OECD	1	21	198	211	225	241	257	275	382	531		25.0	6.8
LMICs	590	1,575	3,420	3,270	3,436	3,750	3,798	3,998	4,991	6,251	11.7	11.1	4.7
Asia & Pacific	5	291	307	313	319	326	332	339	374	413		22.2	2.0
Europe	211	644	975	983	1,066	1,096	1,123	1,139	1,489	1,946	9.8	9.8	5.0
Middle East & North Africa	297	555	1,916	1,750	1,826	2,103	2,117	2,292	2,894	3,652	11.6	11.9	5.4
Moroco	88	98	860	774	850	1,024	1,085	1,150	1,539	2,060		13.1	7.2
Tunisia	183	355	736	764	793	823	854	887	1,004	1,136	8.6	9.2	2.9
World	3,021	6,919	10,708	10,818	11,306	11,903	12,297	12,779	14,507	16,950	7.9	6.9	3.3

a/ Least squares trend for historical periods (1961-89); end-point for projected periods (1991-2005).
b/ Estimate.

Note: Split Years Beginning in July of the Years Shown, * Year 64-66 Data for China are Estimates.

Sources: FAO, Trade Yearbook Tapes (actual);
World Bank, International Economics Department (projected).

Table A12: Phosphate Fertilizer - Gross Imports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	1,392	2,304	3,713	3,810	3,910	4,011	4,116	4,223	4,801	5,460	5.5	5.3	2.6
OECD	1,381	2,293	3,700	3,797	3,896	3,997	4,101	4,208	4,784	5,439	5.6	5.3	2.6
United States	267	207	75	76	76	77	77	77	79	81	-0.7	-6.7	0.5
France	348	649	654	663	680	697	714	732	828	937	4.0	2.2	2.5
LMICs	1,399	3,682	6,995	7,008	7,396	7,892	8,181	8,556	9,706	11,490	8.9	7.9	3.6
Africa	85	220	385	390	395	395	396	397	398	458	8.8	7.8	1.2
Americas	506	891	799	890	1,005	1,098	1,178	1,236	1,302	1,338	5.6	1.5	3.0
Asia & Pacific	382	1,297	4,378	4,533	4,828	4,929	4,909	5,045	5,761	7,295	9.8	11.3	3.5
China, People's Rep.	3	298	1,417	2,400	2,070	2,200	2,360	2,434	3,178	4,034		39.9	3.8
India	125	344	1,320	1,380	1,408	1,436	1,464	1,494	1,649	1,821			2.0
Europe	305	808	616	572	568	670	857	897	1,048	1,086	8.6	6.1	4.7
Middle East & North Africa	121	466	817	623	600	800	841	981	1,197	1,313	12.5	13.3	5.5
World	2,791	5,986	10,708	10,818	11,306	11,903	12,297	12,779	14,507	16,950	7.3	6.8	3.3

a/ Least squares trend for historical periods (1961-89); end-point for projected periods (1991-2005).
b/ Estimate.

Note: Split Years Beginning in July of the Years Shown, * Year 64-66 Data for China are Estimates.

Sources: FAO, Trade Yearbook Tapes (actual);
World Bank, International Economics Department (projected).

Table A13: Potash Fertilizer - Production By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	13,590	18,562	17,984	18,015	18,393	18,933	19,325	19,591	20,455	21,927	2.7	1.5	1.4
OECD	13,069	17,732	16,659	16,687	17,062	17,599	17,998	18,251	19,100	20,557	2.5	1.3	1.5
United States	2,224	1,977	1,321	1,311	1,300	1,290	1,280	1,269	1,219	1,171	-2.9	-4.3	-0.8
Canada	3,555	6,814	7,121	7,308	7,522	7,785	8,057	8,339	9,904	11,830		3.7	3.5
Germany	4,792	5,990	5,475	5,458	5,442	5,425	5,409	5,393	5,313	5,234	0.4	-0.3	-0.3
France	1,815	1,858	1,195	1,190	1,185	1,180	1,176	1,171	1,148	1,125	-0.7	-1.4	-0.4
LMICs	4,221	7,760	10,627	10,760	10,921	11,120	11,297	11,419	13,871	16,031	8.1	4.5	2.9
Europe	4,046	7,716	9,747	9,840	9,952	10,112	10,214	10,242	11,873	13,764	8.0	4.4	2.4
World	17,811	26,321	28,611	28,775	29,314	30,053	30,622	31,010	34,326	37,958	4.1	2.4	2.0

a/ Least squares trend for historical periods (1961-89); end-point for projected periods (1991-2005).
b/ Estimate.

Note: Split Years Beginning in July of the Years Shown, * Year 64-66 Data for China are Estimates.

Sources: FAO, Trade Yearbook Tapes (actual);
World Bank, International Economics Department (projected).

Table A14: Potash Fertilizer - Apparent Consumption By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	10,188	12,468	11,139	10,963	11,476	11,774	11,875	11,928	12,575	12,974	1.8	0.4	1.2
OECD	10,115	12,338	11,006	10,830	11,342	11,639	11,739	11,791	12,432	12,825	1.8	0.4	1.2
United States	3,801	5,502	4,563	5,064	5,493	5,708	5,734	5,720	6,084	6,289	2.7	0.6	1.6
Germany	1,805	1,684	1,359	1,332	1,305	1,279	1,254	1,229	1,111	1,004	-0.8	-1.9	-2.0
France	1,390	1,725	1,963	1,976	1,990	2,004	2,018	2,032	2,104	2,179	2.9	1.6	0.7
Japan	619	594	648	618	623	627	631	635	656	677	0.1	-0.2	0.7
LMICs	6,141	11,554	14,203	13,814	15,034	15,528	16,038	16,363	18,464	21,517	7.5	4.6	3.2
Americas	618	1,589	2,060	2,100	2,150	2,200	2,240	2,300	2,580	2,940	9.1	6.3	2.4
Brazil	286	1,059	1,298	1,333	1,369	1,406	1,444	1,483	1,694	1,935	12.4	7.0	2.7
Asia & Pacific	580	1,839	3,954	4,128	4,877	4,989	5,129	5,261	6,243	7,908	12.8	10.0	4.8
China	19	418	1,261	1,324	1,417	1,516	1,622	1,735	2,433	3,412	26.7	21.0	7.0
Europe	4,697	7,708	7,622	7,006	7,393	7,692	7,987	8,084	8,699	9,420	6.5	3.2	2.1
World	16,328	24,021	25,342	24,777	26,510	27,302	27,913	28,291	31,039	34,491	4.1	2.4	2.4

a/ Least squares trend for historical periods (1961-89); end-point for projected periods (1991-2005).
b/ Estimate.

Note: Split Years Beginning in July of the Years Shown, * Year 64-66 Data for China are Estimates.

Sources: FAO, Trade Yearbook Tapes (actual);
World Bank, International Economics Department (projected).

Table A15: Potash Fertilizer - Gross Exports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	8,375	13,162	14,261	14,321	15,173	15,441	15,740	15,888	16,768	18,631	4.8	2.6	1.9
OECD	7,864	12,381	13,037	13,073	13,900	14,142	14,415	14,537	15,276	16,984	4.6	2.4	1.9
Canada	3,352	6,190	6,453	6,614	6,780	6,950	7,123	7,301	8,260	9,345	12.5	3.4	2.5
United States	592	767	392	389	386	383	379	376	361	347	-0.3	-3.3	-0.8
Germany	2,869	4,239	3,969	4,009	4,049	4,090	4,130	4,172	4,385	4,609	2.0	1.6	1.0
France	762	605	571	563	554	546	538	530	491	455	-1.2	-1.9	-1.5
Non-OECD	511	781	1,224	1,248	1,273	1,299	1,325	1,351	1,492	1,647	8.8	5.6	2.0
Israel	511	781	1,224	1,248	1,273	1,299	1,325	1,351	1,492	1,647	8.8	5.6	2.0
LMICs	1,218	2,596	4,156	4,191	4,239	4,303	4,372	4,461	5,410	6,384	10.3	5.3	3.1
Europe	1,206	2,579	3,314	3,346	3,384	3,438	3,473	3,482	4,156	4,955	9.7	4.1	2.8
World	9,593	15,758	18,417	18,512	19,412	19,744	20,112	20,349	22,178	25,015	5.5	3.1	2.2

a/ Least squares trend for historical periods (1961-89); end-point for projected periods (1991-2005).
b/ Estimate.

Note: Split Years Beginning in July of the Years Shown, * Year 64-66 Data for China are Estimates.

Sources: FAO, Trade Yearbook Tapes (actual);
World Bank, International Economics Department (projected).

Table A16: Potash Fertilizer - Gross Imports By Main Countries and Economic Regions

Countries/ Economies	Actual				Projected						Growth Rates a/		
	Averages												
	1969-71	1979-81	1990	1991 b/	1992	1993	1994	1995	2000	2005	1961-90	1970-90	1991-2005
	('000 Tons)										(% p.a.)		
High-Income	5,875	8,733	9,040	9,067	9,185	9,307	9,428	9,552	10,109	11,081	4.4	2.1	1.4
OECD	5,813	8,603	8,900	8,927	9,045	9,166	9,287	9,411	9,966	10,936	4.4	2.1	1.5
United States	2,493	4,743	3,634	4,142	4,579	4,795	4,833	4,827	5,226	5,463	7.9	2.0	2.0
United Kingdom	508	365	383	379	374	370	366	362	343	325	-1.1	-1.8	-1.1
Japan	600	609	650	620	625	630	630	635	660	680	0.0	-0.6	0.7
LMICs	3,528	6,993	9,377	9,445	10,227	10,437	10,684	10,797	12,069	13,934	7.7	4.9	2.8
Americas	633	1,637	2,080	2,126	2,172	2,220	2,269	2,319	2,586	2,948	9.5	6.3	2.4
Brazil	286	1,059	1,300	1,335	1,370	1,410	1,450	1,485	1,695	1,940	12.4	7.0	2.7
Asia & Pacific	482	1,869	4,152	4,334	5,121	5,238	5,385	5,400	6,084	7,145	12.6	10.9	3.6
China	14	398	1,243	1,458	1,470	1,500	1,540	1,648	2,033	3,012		22.2	5.3
Europe	2,139	3,045	2,515	2,345	2,285	2,306	2,326	2,347	2,455	2,567	5.2	1.3	0.6
World	9,402	15,727	18,417	18,512	19,412	19,744	20,112	20,349	22,178	25,015	5.7	3.4	2.2

a/ Least squares trend for historical periods (1961-89); end-point for projected periods (1991-2005).
b/ Estimate.

Note: Split Years Beginning in July of the Years Shown, * Year 64-66 Data for China are Estimates.

Sources: FAO, Trade Yearbook Tapes (actual);
World Bank, International Economics Department (projected).

Table A17: Fertilizers - Prices, 1960-91 (Actual), 1992-2005 (Projected)

	($/ton)														
	Phosphate Rock a/			Urea b/			TSP c/			DAP d/			Potash e/		
	Current $	–1990 Constant $–		Current $	–1990 Constant $–		Current $	–1990 Constant $–		Current $	–1990 Constant $–		Current $	–1990 Constant $–	
		G-5 MUV f/	G-7 CPI g/		G-5 MUV f/	G-7 CPI g/		G-5 MUV f/	G-7 CPI g/		G-5 MUV f/	G-7 CPI g/		G-5 MUV f/	G-7 CPI g/
Actual															
1960	13	63	82										29	138	179
1961	13	62	80										30	143	184
1962	12	54	69										30	140	179
1963	12	55	66	72	343	418							30	142	173
1964	13	58	70	91	422	510							33	152	183
1965	14	65	76	96	444	523							30	137	161
1966	13	58	69	89	400	471							28	123	145
1967	12	53	62	79	351	408	47	208	242	69	303	353	26	113	131
1968	12	51	58	66	293	328	38	170	190	61	270	303	24	107	120
1969	11	48	54	56	237	269	39	165	187	58	246	278	22	93	106
1970	11	44	50	48	193	218	43	169	192	54	215	244	32	126	142
1971	11	43	48	46	174	195	43	164	183	62	234	262	33	123	138
1972	12	40	44	59	206	228	68	234	259	91	316	349	34	116	129
1973	14	41	46	95	284	319	100	298	334	119	356	399	43	127	143
1974	55	134	165	316	777	958	304	747	921	333	818	1,009	61	149	184
1975	67	148	181	198	438	535	203	448	547	243	538	656	81	180	220
1976	36	79	94	112	244	293	91	198	238	120	262	314	55	120	144
1977	31	61	72	127	253	301	98	194	231	133	264	314	51	101	121
1978	29	50	56	145	250	279	98	169	189	140	241	270	56	97	109
1979	33	50	60	173	264	315	142	217	259	193	295	352	77	117	140
1980	47	65	76	222	309	362	180	251	294	222	309	362	116	161	189
1981	50	68	80	216	299	349	161	223	261	195	270	315	113	156	183
1982	42	60	69	159	223	260	138	195	227	183	257	299	82	115	134
1983	37	53	60	135	195	218	135	194	217	184	264	296	75	108	121
1984	38	56	62	171	252	277	131	193	212	189	278	306	84	123	135
1985	34	49	54	136	199	216	121	177	192	169	246	268	84	122	133
1986	34	42	45	107	132	141	121	150	159	154	191	203	69	85	90
1987	31	35	36	117	131	136	138	155	160	174	196	202	69	78	80
1988	36	38	39	155	163	167	158	166	171	197	206	212	88	92	94
1989	41	43	44	132	140	143	144	152	156	173	183	187	99	105	107
1990	41	41	41	157	157	157	132	132	132	171	171	171	98	98	98
1991	43	42	40	172	168	164	133	130	127	173	169	164	109	107	104
Projected															
1992	43	40	39	143	134	128	121	114	108	145	136	130	112	105	100
1993	44	40	38	156	141	135	122	110	105	140	127	121	115	104	99
1994	46	41	39	167	148	141	129	115	109	152	135	128	122	108	103
1995	48	42	39	177	153	145	139	120	114	162	140	133	125	108	103
2000	58	42	40	232	169	158	172	125	117	203	148	138	147	107	100
2005	65	41	37	251	159	143	194	123	111	229	145	130	165	105	94

a/ For 1960-75, 75% BPL rock, f.a.s. Casablanca; 1976-80, 72% BPL; from 1981 onward, 70% BPL.
b/ Bagged, f.o.b. N. W. Europe.
c/ Bulk, f.o.b. US Gulf.
d/ Bulk, f.o.b. US Gulf.
e/ Bulk, f.o.b. Vancouver.
f/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.
g/ Deflated by G-7 Consumer Price Index (CPI).

Sources: British Sulphur Corporation; Industrial Minerals (actual); World Bank, International Economics Department (projected).

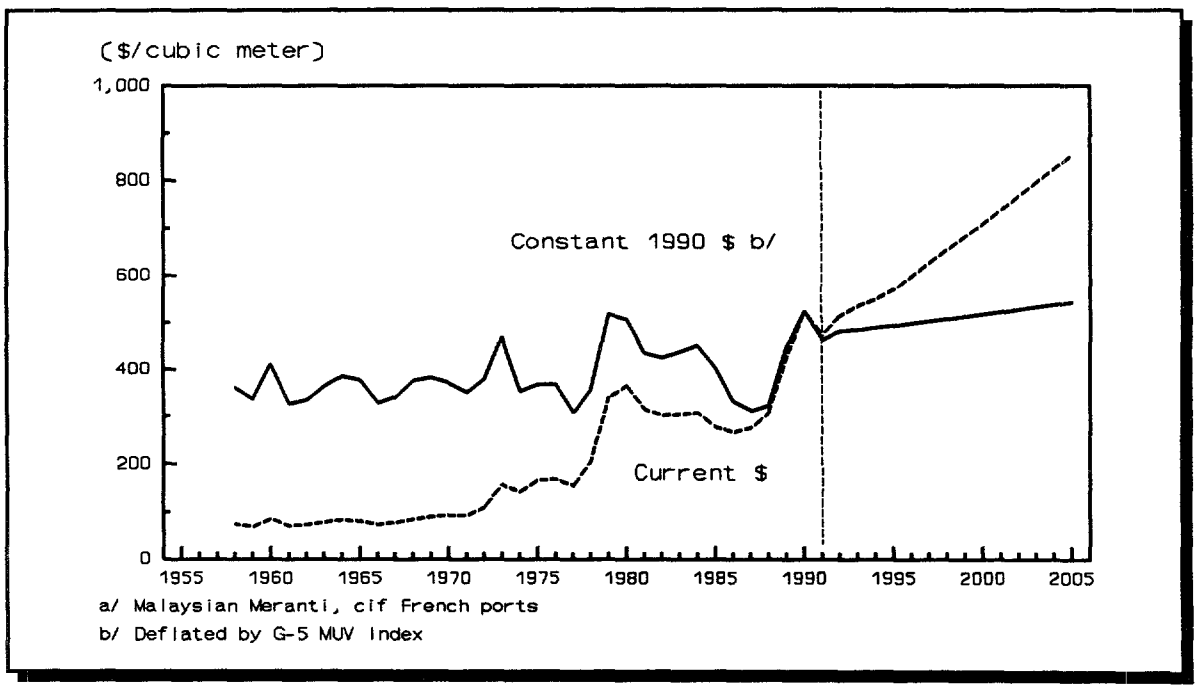
Tropical Timber

Summary

- Tropical log production and consumption are expected to decline in response to environmental concerns and the rising long-term trend in production costs. Consumers are expected to substitute for tropical hardwoods with temperate hardwoods and even softwoods.

- Tropical log and sawnwood prices are projected to experience a slow increase in real terms during the next three to four years but subsequently to increase at a somewhat faster rate under the pressure of increasing environmental concerns and with substitution for tropical timber reaching its limits.

Sawnwood Prices a/, 1955-2005



Consumption: Past Trends and Prospects

Recession and substitutes cause consumption to decline. Since 1990, imports and consumption of tropical logs and sawnwood have been declining in Europe and Japan, the two largest import markets for tropical timbers.[1] The timber market has been adversely affected by the economic recession and, in particular, by the reduced levels of housing construction in many countries.[2]

Table 1 shows tropical timber imports in Japan, Europe, and the FSU since 1979. Log imports have declined continuously in Japan since 1979 and a similar trend has been in effect in Europe and the FSU since the mid-1980s. Europe's and Japan's imports of tropical sawnwood increased up until the late 1980s but subsequently declined.

Apart from the decline in consumption due to the reduced level of economic activity, there has been substitution away from tropical timber in favor of temperate timber, even softwood. Table 2 shows the increasing trend in the imports of temperate logs and sawnwood in Europe. As can be seen there, the share of temperate logs and sawnwood in total hardwood (temperate plus tropical) imports of logs and sawnwood, respectively, has been increasing. In Japan, the share of temperate hardwood imports increased from 6% in the mid-1980s to 11% in 1990/91. During the period 1987 to 1991, Japanese log imports (temperate, softwood) from Chile, the FSU, New Zealand, and the United States, increased by 12%, while imports from Southeast Asia (tropical) declined by 18%. Japanese consumption of tropical logs and sawnwood declined from 14.3 million cubic meters in 1987 (40% of total timber consumption) to 12.7 million cubic meters in 1991 (35% of total timber consumption).[3]

Environmental concerns to reduce consumption in industrial countries. One of the reasons for switching away from tropical timber is concern over the availability of tropical timber supplies. This concern is due to environmental pressures in importing countries for preservation of the tropical forests and the increasing use of restrictions on exports (mainly on logs and sawnwood) by producing countries. The latter restrictions aim at increasing domestic value added, by further processing, and at reducing the extent of tree felling.

While imports and consumption of tropical timber by industrial countries show a declining trend, tropical timber consumption may well increase in producing countries as a result of their economic growth. This is particularly true for Southeast Asia, where apparent consumption has been on the rise.

Over the next 10-15 years, we expect a continuation of the trend of substituting other timbers for tropical timber. However, the rate of substitution will taper off with time, as there are limits to how much can be substituted and also as sustainable levels of tropical timber consumption are realized. Overall, however, we project a declining trend in the consumption of tropical timber.

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[1] Europe refers to both Eastern and Western.

[2] Housing starts in Japan averaged about 1.7 million units in 1987-90, but declined to 1.37 million units in 1991 and are expected to decline to about 1.25 million units in 1992.

[3] The Japanese Plywood Manufacturers' Association (JPMA) is promoting the use of softwood logs for plywood production, with the aim of switching 30-50% of logs for plywood production from hardwood to softwood over the next five years. JPMA is also promoting processing technologies for tropical timber of lesser-known species.

Table 1: Imports of Tropical Logs and Tropical Sawnwood, 1979-92.

	1979	1984	1985	1987	1989	1990	1991	1992
				Tropical Logs				
Europe a/	N.A.	4,012	3,621	3,244	3,551	3,588	3,295	3,196
FSU	N.A.	193	207	164	156	143	100	100
Japan	22,715	12,943	13,283	13,516	12,420	11,320	10,280	9,60
				Tropical Sawnwood				
Europe a/	N.A.	2,837	2,974	3,841	3,757	3,166	2,660	2,610
Japan	436	553	968	1,255	1,736	1,374	1,322	N.A.

a/ Europe includes both Eastern and Western Europe.

Sources: For Europe and FSU, Timber Bulletin, United Nations Economic Commission for Europe, various issues; and for Japan, Japan Lumber Journal, various issues.

Production: Past Trends and Prospects

Log production to continue falling as environmental concern mounts. Over the past two to three years, production of tropical logs has fallen by about 5%. Figure 1 shows production developments in selected countries. For each country, the shaded area to the left is for 1988 and that to the right for 1991. Of the major producing countries, significant declines in log production were registered by Brazil, Colombia, Indonesia, the Philippines, and Thailand. Production increased in Cameroon, Gabon, and Malaysia.[4] For most West African timber producers, log production either increased or remained the same between 1988 and 1991. This was probably due to the dramatic declines in the prices of coffee and cocoa which increased pressure to export other commodities, timber among them, in order to obtain foreign exchange. In the major timber-producing countries, production of tropical sawnwood also declined by about 5% over this period, while that of plywood increased by 21%. Plywood production increased significantly in Indonesia (24%), Malaysia (19%), and Brazil (10%). Exports of both logs and sawnwood declined while plywood exports increased.

Many log-producing countries have become increasingly aware that their forest resources cannot be sustained under recent rates of deforestation, and have adopted policies to reduce log production. External pressures expressing environmental concerns have also pushed governments to reduce production. Governments as well as the local processing industries are looking into the question of the sustainable level of supply for the long run. According to the International Tropical Timber Organization (ITTO), less than one percent of the tropical forests are managed in such a way that tree harvests are sustainable.

[4] In 1991, Malaysia announced plans to reduce logging in Peninsular Malaysia by 26% over the next five years in order to sustain timber resources. Production of logs will be reduced from about 12.4 million cubic meters annually to about 9.1 million cubic meters by 1996.

Table 2: Imports of Temperate Timber into Europe a/, 1984-92.

	1984	1985	1987	1989	1990	1991	1992
	('000)						
Logs	2,727	2,803	2,930	3,385	4,365	4,195	4,200
Sawnwood	2,521	2,412	2,724	3,001	4,023	3,884	3,903
Share of World Imports (%)							
Logs b/	40	44	47	49	55	56	57
Sawnwood c/	47	49	43	47	58	61	62

a/ Europe includes both Eastern and Western.
b/ Temperate log imports as a percent of total hardwood log imports.
c/ Temperate sawnwood imports as a percent of total hardwood sawnwood imports.

Source: Timber Bulletin, op. cit. and World Bank, International Economics Department.

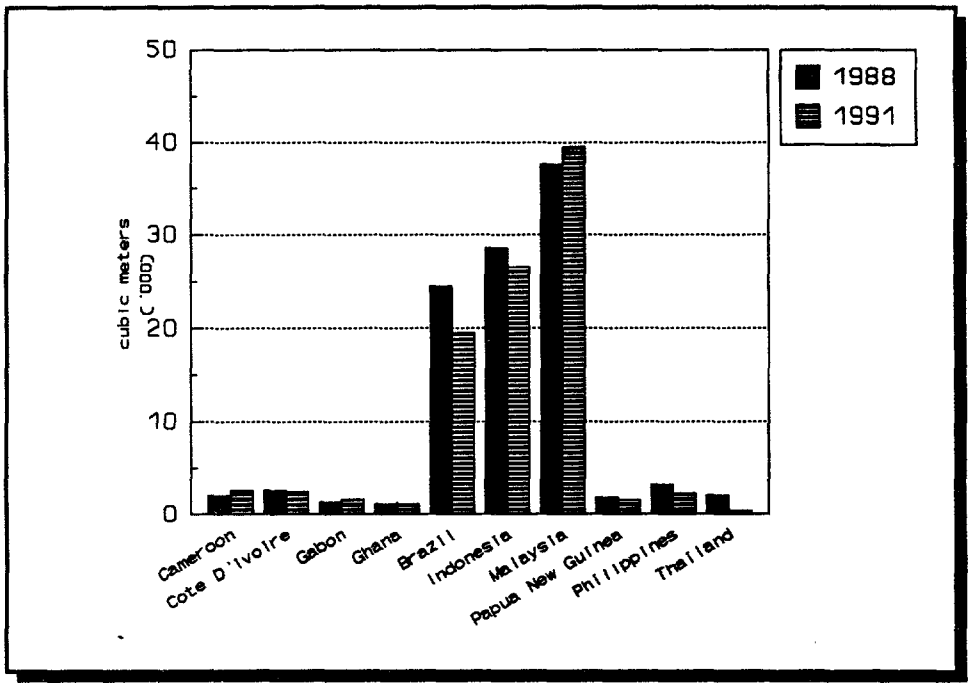
However, the timber industry is just one of the causes of deforestation. Perhaps the more critical and more difficult to address are the broader social and economic forces behind deforestation. These include rapid population growth, rural poverty, inequitable land distribution systems, and the indebtedness of economies. A study by the Overseas Development Council[5] states that sustainable development in tropical areas may be possible, given low population growth and the right mix of skills, inputs, and incentives. It concludes that there is a need for policies to reduce land clearing, to improve management of existing tree stocks, to encourage tree planting, and improve the end-use efficiency of woodfuel.

Production and export of processed logs increase. While production and export of tropical logs and sawnwood have declined in the past two to three years, production and export of processed tropical timber products (such as plywood, decorative panels, veneers, and furniture, among others) have increased. Most of this increase is accounted for by Indonesia and Malaysia; further processing in Africa has been rather small and not growing. Increases in processing capacity in Indonesia and Malaysia are increasing pressure for higher log production in these two countries. As can be seen in Figure 1, these two countries produce most of the tropical logs.

Log production is expected to continue declining for most tropical timber-producing countries. Environmental concerns and concerns over the sustainablility of supply will only increase with time. The rate of world production decline during the past three years was about 1.7% p.a. and this rate of decline will most likely increase over the period of our projections. Tropical timber production is expected to come increasingly from less accessible, higher-cost areas and to include lesser-known species.

[5] Tropical Forests: Conservation with Development? Overseas Development Council, 1990, No. 4, Washington, D.C.

Figure 1: Production of Tropical Logs Selected Countries, 1988 and 1991



Prices: Past Trends and Prospects

Real prices for Asian logs continue to rise. Among the primary commodity prices monitored by the World Bank, the only ones that did better than world inflation, as measured by the MUV, over the past 20-30 years were gold, petroleum, and timber. If one were to look for prices that rose faster than inflation during the 1980s, a decade of falling real and nominal commodity prices, timber is the only one. In real terms, timber prices today are at least as high as they were in the late 1970s, a period of high real commodity prices.

Log prices in East Asia peaked in 1987/88 as a result of a very high rate of housing starts in Japan and also because Japanese log importers stepped up their imports out of fear of log export restrictions. As housing starts in Japan declined and the feared export restrictions did not materialize, log prices declined in real terms up to 1990. During this late 1980s period, the Japanese industry began gradually shifting into temperate hardwoods and softwoods as substitutes for tropical logs in order to preempt imminent export restrictions in tropical log-producing countries. In 1991, the expected increases in export restrictions and production cutbacks took effect, and log prices in East Asia increased in response to the tighter supplies. During the past two years, the upward pressure on log prices has been increased by processors in log-producing countries expanding their demand for logs, and an increased demand for logs by the Republic of Korea and Taiwan, China. The Asian indicator log price in real

terms increased between 1990 and 1991 by about 4% despite the reduction in Japanese housing starts. We expect prices to increase by 9% between 1991 and 1992, mainly due to the recovery in housing starts in Japan and strong economic growth in the East Asian economies.[6]

European timber prices less buoyant. African log prices in the European market had a 4.9% p.a. increase in real terms between 1984 and 1990. The price increase reflected favorable demand conditions in Europe and a slowdown in log production by African producers. With the decline in economic activity in Europe, and, in particular, housing starts, African log prices in Europe fell by about 10% between 1990 and 1991. Log prices in Europe were also adversely affected by supplies coming from timber felled by storms in Northern and Eastern European countries. Preliminary indications show African log prices in Europe in real terms to increase by about 2% between 1991 and 1992, mainly reflecting a weaker dollar vis-a-vis the French franc.[7]

Malaysian sawnwood prices in the European market showed a similar trend to African log prices, increasing in real terms by 2.5% p.a. between 1984 and 1990--also in response to favorable demand conditions in Europe. In 1991, sawnwood prices, in real terms, declined by 12%. The main reasons were the slowdown of economic activity in Europe, as well as the Gulf War (prices started declining during the third quarter of 1990). A number of countries in the Gulf region are sawnwood importers, particularly from Malaysia. During the Gulf War, more sawnwood was available to other importers and that contributed to the price decline. Preliminary indications for 1992 give a price increase in real terms of about 4%.

Real prices to rise in the long term. Under the projected demand and supply scenarios, real tropical timber prices are forecast to show small increases over the period 1992 to 1995. A higher increase is projected in East Asia than in Europe because the demand pressures are expected to be greater, given the projected high rates of growth of the countries in that region and the demands of the local processing industries. Furthermore, the Asian region is, in general, a region with a large population and relatively small forest area where meeting demand from sustainable supply is most threatened.

For the period 1995 to 2005, timber prices are forecast to increase at a somewhat higher rate than in the period 1992 to 1995. This is mainly because the substitution for tropical timber on the consumption side is expected to be reaching its limits and because environmental pressures and demands to guarantee sustainable supplies will be increasing with time. Log production costs will also increase with time, as logging will be moving to less accessible areas.

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[6] Since April 1992, housing starts in Japan has shown its biggest increases for 18 months.

[7] The African log prices mentioned in this report are reported in French francs.

Table A1: Cameroon Logs - Prices, a/ 1956-91 (Actual), 1992-2005 (Projected)

	($/cubic meter)		
	Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/
Actual			
1956	36	182	239
1957	33	164	216
1958	33	161	212
1959	30	146	189
1960	35	168	218
1961	39	187	241
1962	38	175	224
1963	39	186	226
1964	40	184	223
1965	40	183	216
1966	38	170	201
1967	38	166	193
1968	42	188	210
1969	50	210	238
1970	43	171	194
1971	45	168	189
1972	53	182	202
1973	134	400	449
1974	121	296	366
1975	127	280	342
1976	142	311	372
1977	159	315	376
1978	191	330	369
1979	212	322	386
1980	252	350	410
1981	213	294	344
1982	176	247	288
1983	161	231	259
1984	176	258	284
1985	174	254	276
1986	222	274	291
1987	259	291	301
1988	271	285	293
1989	274	289	297
1990	344	344	344
1991	316	310	301
Projected			
1992	337	316	302
1993	356	322	308
1994	365	324	308
1995	378	327	310
2000	475	346	324
2005	580	368	330

a/ Cameroon Sapelli, high quality (Loyal et Marchand), f.o.b. Cameroon.
b/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.
c/ Deflated by G-7 Consumer Price Index (CPI).

Sources: Marches Tropicaux et Mediterraneens (actual); World Bank, International Economics Department (projected)

Table A2: Malaysian Logs - Prices, a/ 1977-91 (Actual), 1992-2005 (Projected)

	($/cubic meter)		
	Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/
Actual			
1977	93	184	219
1978	97	168	188
1979	170	259	310
1980	195	271	318
1981	156	215	252
1982	156	219	255
1983	145	209	234
1984	167	246	270
1985	136	199	216
1986	151	187	199
1987	221	249	257
1988	233	245	252
1989	225	237	244
1990	210	210	210
1991	222	217	211
Projected			
1992	251	236	225
1993	263	238	227
1994	271	241	229
1995	281	243	231
2000	354	258	241
2005	435	276	248

a/ Malaysian Meranti, Sabah SQ Best Quality, sale price charged by importers, Japan.
b/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.
c/ Deflated by G-7 Consumer Price Index (CPI).

Sources: Mokuzai Shikyo Geppo (actual); World Bank, International Economics Department (projected).

Table A3: Sawnwood - Prices, a/ 1958-91 (Actual), 1992-2005 (Projected)

	($/cubic meter)		
	Current $	1990 Constant $	
		G-5 MUV b/	G-7 CPI c/
Actual			
1958	74	361	474
1959	68	335	435
1960	85	410	533
1961	69	326	421
1962	72	334	428
1963	77	363	442
1964	83	385	465
1965	81	377	444
1966	73	327	386
1967	77	340	396
1968	84	376	421
1969	90	382	433
1970	93	370	420
1971	93	350	392
1972	110	380	421
1973	156	468	525
1974	143	352	434
1975	166	368	449
1976	168	367	439
1977	154	306	364
1978	205	355	396
1979	339	517	618
1980	365	507	595
1981	314	435	508
1982	302	424	495
1983	304	438	491
1984	307	451	496
1985	276	403	438
1986	267	330	351
1987	276	311	321
1988	307	322	331
1989	422	446	458
1990	524	524	524
1991	472	462	449
Projected			
1992	514	482	460
1993	535	484	463
1994	550	489	465
1995	570	493	468
2000	710	517	484
2005	855	543	487

a/ Malaysian Dark Red Meranti, select and better quality, standard density, c.i.f. French ports.
b/ Deflated by G-5 Manufacturing Unit Value (MUV) Index.
c/ Deflated by G-7 Consumer Price Index (CPI).

Sources: Marches Tropicaux et Mediterraneens (actual); World Bank, International Economics Department (projected).