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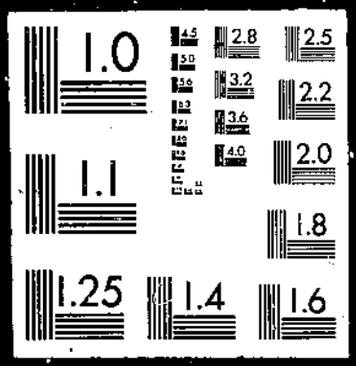

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South Korea: An Export Market Profile

(U.S.) Economic Research Service, Washington, DC

May 86

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United States Department of Agriculture

Economic Research Service

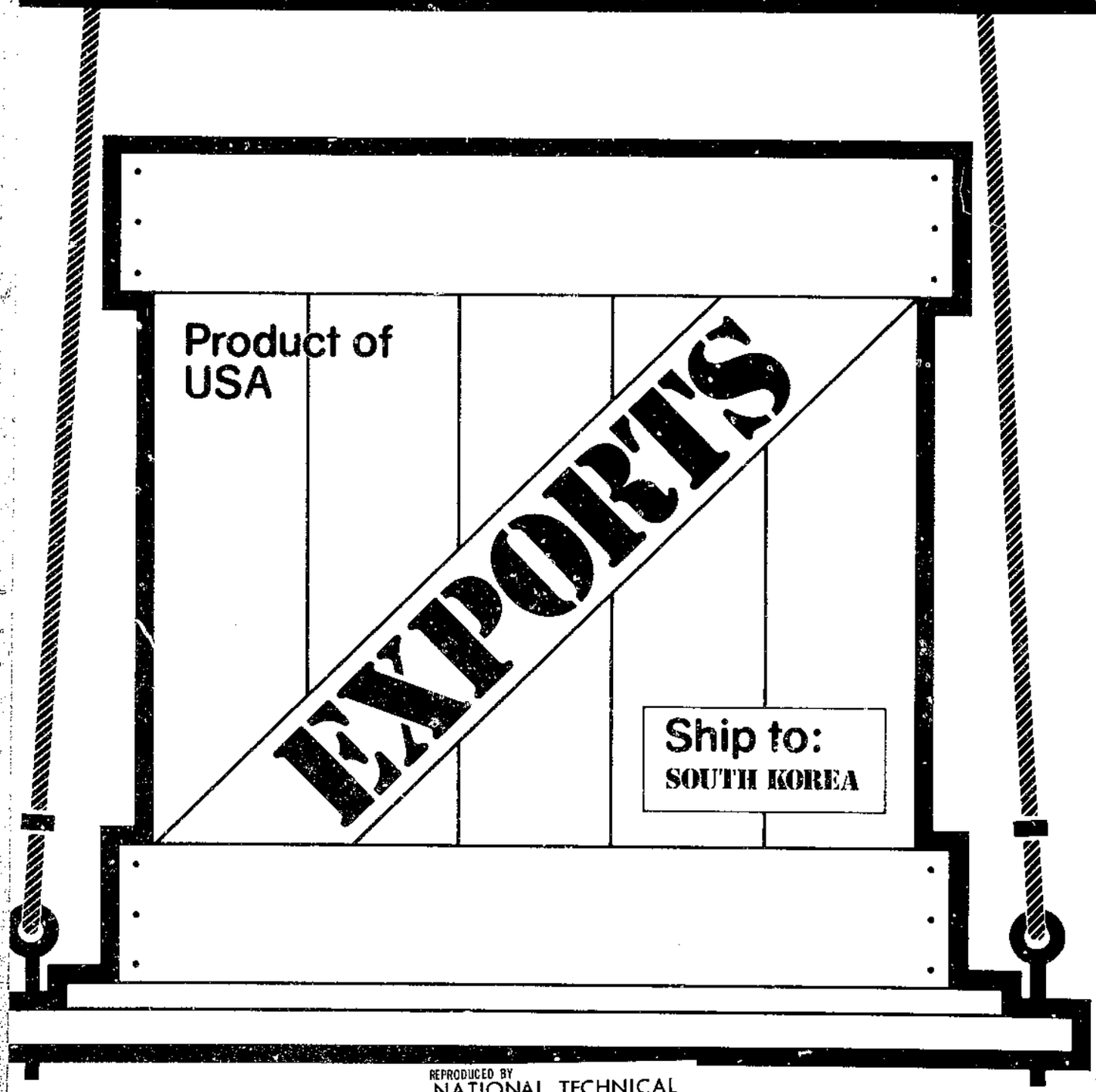
In cooperation with the Foreign Agricultural Service

Foreign Agricultural Economic Report Number 216

South Korea

An Export Market Profile

John H. Dyck and Donald A. Sillers



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Abstract

The United States exported $1.84 billion worth of agricultural products to South Korea in 1983, making South Korea the fifth leading market for U.S. agricultural products. Price competition from Chinese corn cut heavily into U.S. agricultural sales to South Korea in 1984-85. U.S. exports will grow to around $2.3 billion (1983 dollars) by 1990. Feed grains and soybeans will be largest sources of export growth; growth in wheat exports is doubtful. Korea is unlikely to import significant amounts of rice. U.S. sales of raw cotton to South Korea will grow slowly because of increased barriers to Korea's textile and garment exports in developed country markets, but sales of cattle hides should continue to grow rapidly. Horticultural products and processed foods will continue to face severe import barriers.

Keywords: South Korea, economic growth, agricultural imports, agricultural production, agricultural trade policies, trade shares, import projections

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May 1986

Preface

Expanding the markets for U.S. agricultural exports is a major goal of the U.S. Department of Agriculture. In support of this goal, the Economic Research Service (ERS), in cooperation with the Foreign Agricultural Service (FAS), is preparing export profiles for a number of high-potential markets for U.S. agricultural products. ERS is USDA's major source of agricultural and trade information on foreign countries and regions, while FAS has the key role in helping U.S. agriculture increase exports in world markets. Profiles are being prepared for selected markets in Africa, the Middle East, Asia, and Latin America.

This report presents information and analysis on the prospects for U.S. agricultural exports to South Korea. The study surveys the basic factors underlying agricultural supply and demand in South Korea and presents longrun projections of food and agricultural trade. The report is aimed at officials responsible for export market development programs, the agribusiness community, and the general public.

Conversion Chart

This report uses metric units throughout. Metric tons are referred to as "tons."

U.S. $1 = 776 won in mid-1983. Exchange rates for other years shown in table 1.
1 metric tons = 2,204 pounds.
1 hectare = 2.5 acres.
1 kilogram = 2.2 pounds.

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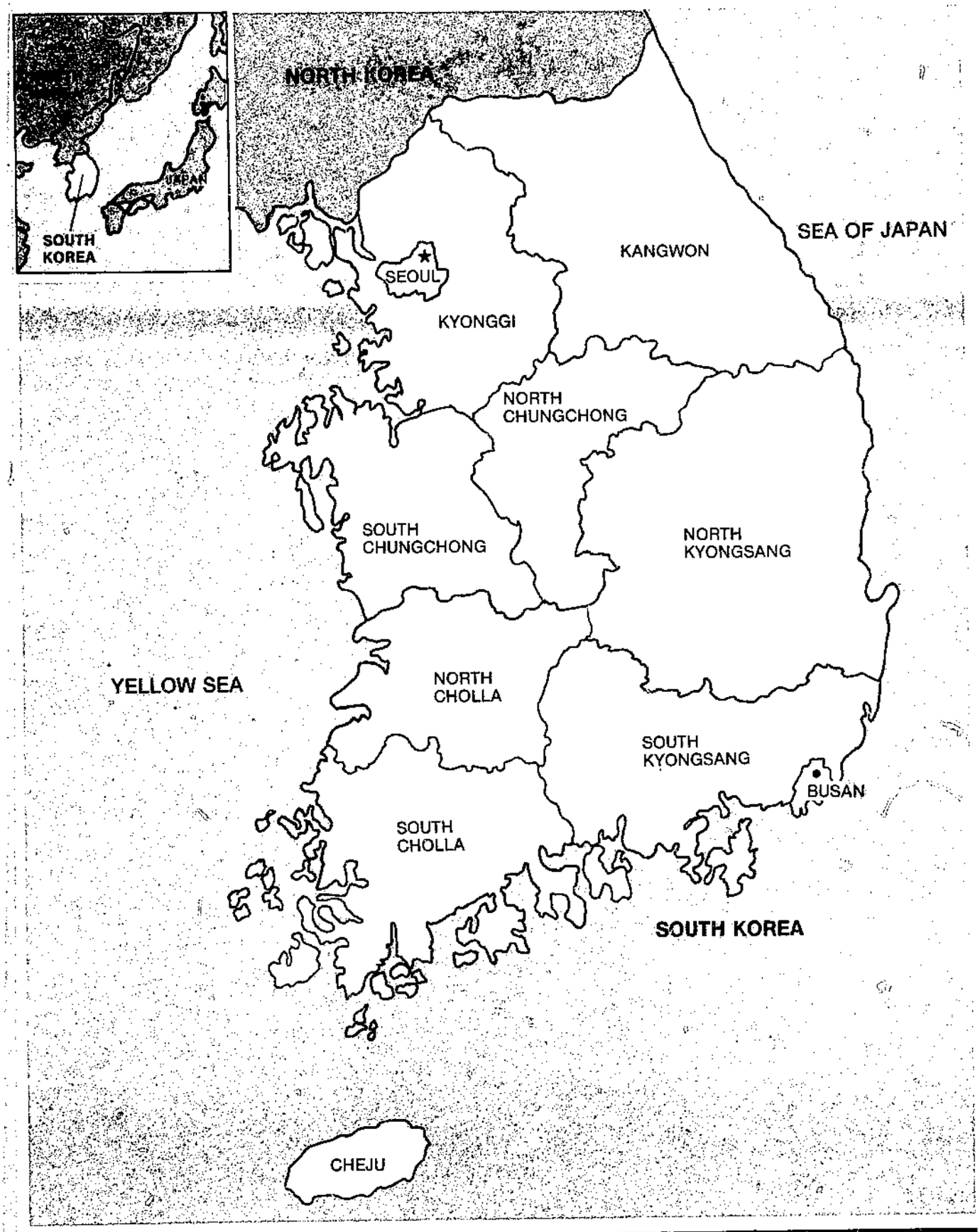
Summary

The United States exported $1.84 billion worth of agricultural products to South Korea in 1983, making South Korea the fifth leading market for U.S. agricultural products. Price competition from Chinese corn cut heavily into U.S. agricultural sales to South Korea in 1984-85. U.S. exports will grow to around $2.3 billion (1983 dollars) by 1990, with feed grains and soybeans the largest sources of export growth.

South Korea's imports of agricultural products have greatly increased since the nation began its program of rapid industralization in the early 1960's. Two factors largely explain this import growth. First, rising household incomes have led to increased demand for meats, grains, and other foods. The densely populated, mountainous nation has been unable to produce enough wheat or rice to meet consumer demand, or to produce enough feed grains and oilseeds to meet the demand for feedstuffs from domestic producers of meats, eggs, and milk. South Korea has turned to imports to fill the gap between domestic demand and supply of these products. Second, several of South Korea's leading categories of export products, including cotton textiles and leather goods, are based largely on imported raw materials.

Continued growth in population and in real income per person is likely to raise total South Korean agricultural imports from $3 billion in 1983 to $4 billion in 1990 (1983 dollars). U.S. agricultural sales to South Korea declined in 1984-85, chiefly because of strong price competition from Chinese corn and reduced U.S. market shares in Korea's wheat and cotton imports. The U.S. share of these imports should recover gradually in 1985-90, raising U.S. agricultural exports to $2.3 billion in 1990 (1983 dollars).

Feed grains and oilseeds will account for most of the growth in U.S. agricultural exports to South Korea in 1985-90. Wheat imports are unlikely to grow and may decline; significant rice imports are unlikely. Processed foods will face continuing trade barriers. Raw cotton imports are likely to grow slowly because of growing competition in world textile and garment markets and growing trade barriers to South Korea's exports of these products. Imports of cattle hides will grow steadily.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South Korea: An Export Market Profile

John H. Dyck
Donald A. Sillers

Introduction

South Korea (officially, the Republic of Korea) is one of the leading markets for U.S. agricultural products, ranking fifth among importers of such products in 1983. U.S. agricultural exports to South Korea reached $1.84 billion in 1983, more than 5 percent of total U.S. agricultural exports. Moreover, Korea promises to show higher rates of economic growth through 1990 than most other major U.S. agricultural markets. Because of its present importance and potential for further growth, the Korean market deserves close attention by U.S. agricultural interests. The United States held a 67-percent share of the Korean agricultural import market in 1983, up from 60 percent in 1982. This market share is matched in very few other markets and will not continue without intelligent market development efforts. This report examines the major factors behind South Korea's demand for agricultural imports (especially those sold by the United States) and suggests how changes in these factors will influence agricultural import growth through 1990.

Real economic growth in South Korea should average between 7 and 8 percent per year between 1984 and 1990, somewhat slower than in the past, but still very high by international standards. Although population growth may slow, real income per person will grow markedly. Korea is rapidly emerging as a major exporter of heavy industrial goods. It can, therefore, better afford to import foreign products than in the past, and will be forced to relax its protectionist import barriers in order to advance its own interest in minimizing barriers to its exports.

South Korea's agricultural imports may be divided into three groups: foods, feeds, and raw materials for industrial purposes. Growth prospects are best for imports of feedstuffs. South Koreans, historically limited to a diet very low in protein, are likely to increase substantially their consumption of meats, eggs, and milk through 1990. Meeting this demand growth through increased domestic livestock production is an important goal of government policy. Realizing this goal will require much larger inputs of feed grains and oilseeds than can be grown at home.

Food imports will grow slowly. Wheat and beef will remain Korea's major food import items, with processed food imports likely to face continuing barriers to entry and increasing Korean competition. South Korea appears to have achieved self-sufficiency in rice production, and significant rice imports are unlikely except following particularly poor harvests.

Imports of cotton, hides, tallow, wood, and other agricultural raw materials face mixed prospects. Except for leather goods, Korea's exports of light industrial goods made from these products appear to be losing competitiveness in world markets.

Korean agricultural imports, valued at $3 billion in 1983, will grow to $4 billion (1983 dollars) by 1990. However, U.S. agricultural sales to South Korea declined in 1984-85, chiefly because of strong price competition from Chinese corn and reduced U.S. market shares in Korea's wheat and cotton imports. The U.S. share of these imports should recover gradually during 1985-90, raising U.S. agricultural exports to $2.3 billion in 1990 (1983 dollars).

The report begins with a survey of the factors that will affect growth of consumer demand through 1990. Changes in dietary habits, mainly resulting from increasing real household income, will overshadow population growth in the growth of demand for food products. Economic growth and consumer buying power will depend heavily on Korea's success in expanding its exports. Agricultural production is briefly surveyed; except in the livestock industry, no fundamental change in the productivity of Korea's small-scale, high-cost farming system is foreseen. Korean food prices will remain quite high by world standards because of continuing barriers to food product imports. A final section

addresses growth prospects for imports of major foods, feeds, and agricultural raw materials.

Economic Structure and Performance

South Korea's 1983 gross national product (GNP) of $75.26 billion (in current dollars) amounted to an average of $1,884 per person, roughly similar to average income in Turkey, Malaysia, and Costa Rica. GNP per person was two-thirds that of Taiwan, one-fifth that of Japan, and one-seventh that of the United States.

City dwellers have higher average incomes than do rural area residents, but the gap has narrowed over time; by 1980, income per rural household had almost reached that of urban households. The wealthiest areas are Seoul and its surrounding province and the city of Busan (see map). Poorer areas include the especially hilly lands in the northeast and the southwestern provinces of North and South Cholla.

Macroeconomic Performance

Real income in South Korea has grown remarkably fast since the early 1960's, based largely on rapidly expanding exports of light manufactured goods, such as textiles, electronic products, and plywood. Real GNP growth averaged 8.4 percent per year in 1962-83, leading to growth in real GNP per person of about 6 percent per year (table 1). Growth was most rapid in 1972-78, averaging 11 percent per year. The world oil price shock of 1973 slowed Korea's economic advance, but the nation's only recession since 1962 came in 1979-80 in the wake of the second round of world oil price increases in late 1979-early 1980. Deliberate monetary restraint, intensified competition for trade in a stagnating world market, and an extraordinarily bad harvest in 1980 joined with increased energy costs to cause a substantial decline in real income. The simultaneous political crisis caused by the assassination of Park Chung-hee, President since 1962, led to doubts in-

Table 1—Major economic indicators, 1970-83 and 1984-90 projections

Year	Population		Real GNP[1]		Consumer price inflation	Exchange rate
	Level	Growth rate	Level	Growth rate		
	Millions	*Percent*	*Billion 1980 dollars*	*Percent*		*Won to U.S. $1*
1970	32.34	2.21	28.45	7.6	12.8	311
1971	32.88	1.99	30.95	8.8	12.1	348
1972	33.51	1.89	32.71	5.7	11.9	393
1973	34.10	1.78	37.33	14.1	3.1	398
1974	34.69	1.73	40.21	7.7	23.8	400
1975	35.28	1.70	42.99	6.9	26.3	484
1976	35.85	1.64	49.07	14.1	15.4	484
1977	36.41	1.61	55.30	12.7	10.2	484
1978	36.97	1.60	60.67	9.7	14.4	484
1979	37.53	1.58	64.62	6.5	18.1	484
1980	38.12	1.58	61.25	-5.2	28.6	607
1981	38.72	1.57	65.04	6.2	23.3	681
1982	39.33	1.57	68.71	5.6	10.8	731
1983	39.95	1.58	75.26	9.5	3.4	776
1984	40.55	1.50	80.90	7.5	NA	NA
1985	41.16	1.50	86.97	7.5	NA	NA
1986	41.78	1.50	93.50	7.5	NA	NA
1987	42.40	1.50	100.51	7.5	NA	NA
1988	43.04	1.50	108.05	7.5	NA	NA
1989	43.68	1.50	116.15	7.5	NA	NA
1990	44.34	1.50	124.84	7.5	NA	NA

NA = Not available.
[1]Converted to U.S. dollars at the 1980 average exchange rate of 607.43 won per dollar.

Source: (*20, 42*).

side and outside Korea about the stability of its political and economic systems and the viability of future growth.

Real income grew modestly in 1981 and 1982, then accelerated strongly in 1983. Surprisingly, in view of its past growth patterns, Korea achieved respectable income growth in 1982 and early 1983 on the basis of vigorous expansion in the domestic economy, and in spite of disappointing export growth. Although strong income growth will not be sustainable in the longer term without growth in exports, domestic demand has recently provided Korea with a welcome buffer in times of world economic slowdown.

Korean planners expect to maintain 7.5-percent real GNP increases from 1983-86 and thereafter, although the current (fifth) 5-year plan extends only through 1986 and firm plans for the late 1980's have not been developed (*41*).[1] The official target appears plausible, given the relatively rapid growth achieved in 1981 and 1982, despite adverse conditions in world markets, and prospects for 7.5- to 8-percent real income growth in 1984.

Sectoral Composition of the Economy. South Korea was developed as an agricultural area within the Japanese Empire, exporting rice and other foods to Japan and importing manufactured goods. Coercion by the colonial government and technical improvements introduced by Japanese farming and landholding interests helped increase Korean rice production. Coercion also limited rice consumption by Koreans, so that rice could be exported to Japan (North Korea, specializing in mining and manufacturing for Japan, remained a rice-deficit area) (*8*).

After the liberation from Japan in 1945 and the Korean War in 1950-53, Korean agriculture turned more toward meeting the needs of the Korean people, who were mostly farmers. Chronic food deficits emerged in the 1950's, as the grain consumption of the rural sector increased and as population growth outstripped growth in food production. The agricultural sector, which dominated the Korean economy in the 1950's, was so poor that it afforded little scope for generating either savings to support private investment or taxes to support public investment. Korea limped through the 1950's as one of the world's poorest countries, dependent on massive U.S. economic aid.

The political upheavals of 1960-62 ended with the rise to power of General Park Chung-hee and with the establishment of a new economic order that stressed exports as a means of stimulating national income growth (*62*). Helped by skillful planning by government agencies and private firms, the new trade regime achieved remarkable success in boosting manufactured exports. The manufacturing sector began to grow rapidly, doubling its share of GNP in the 1960's and again in the 1970's (table 2). Simultaneously, the share in national income of the transport, storage, and communi-

[1]Italicized numbers in parantheses refer to sources cited in References at the back of this report.

Table 2—Sectoral composition of GNP, selected years, 1965-83[1]

Sector	1965	1970	1975	1978	1979	1980	1981	1982	1983
					Percent				
Agriculture and forestry	34.3	27.0	22.4	16.1	16.2	13.0	15.4	15.2	15.0
Fishing	2.2	1.7	1.8	1.3	1.3	1.4	1.5	1.5	1.3
Mining	2.6	2.1	2.0	1.7	1.4	1.4	1.5	1.4	1.4
Manufacturing	8.8	14.2	21.5	26.6	27.6	28.8	29.1	28.6	29.0
Construction	4.0	7.0	6.9	8.4	8.1	8.5	7.5	8.6	9.4
Transport, storage, and communication	2.4	4.5	5.5	6.5	7.1	7.7	7.9	7.8	7.7
Wholesale and retail trade	13.0	15.5	17.8	17.2	16.8	17.0	17.1	16.9	17.0
Others[2]	32.7	28.0	22.1	22.2	21.5	22.2	20.0	20.0	19.2

[1]At 1980 prices.
[2]Electricity, gas, and water (2.2 percent of GNP in 1983); financial, insurance, real estate, and business services (5.2 percent); ownership of dwellings (2.6 percent); public adminstration and defense (3.8 percent); community, social, and personal services (7.6 percent).

Source: (*42*).

cations sector shot up, while that of agriculture fell more than 50 percent in 20 years.

Employment and Wages. Employment in various sectors also shifted in the 1960's and 1970's, although less dramatically (table 3). Manufacturing's share of the labor force more than doubled from 1960-80. Construction's share doubled (partly reflecting the growth of overseas contracts), while that of agriculture and forestry shrank 24 points. The ratio of agriculture and forestry's share in total employment to its share in GNP rose from 1.5 in 1962 to 2 in 1982, indicating slower growth in labor productivity than in the rest of the economy. In contrast, the declining value of this ratio for the manufacturing sector (1.03 in 1965, 0.93 in 1970, and 0.74 in 1982) showed faster than average productivity growth in manufacturing, reflecting the effects of mechanization and advancing techniques of production.

Rising demand for labor by manufacturing and associated sectors led to declining unemployment in most years from 1963-79; the unemployment rate reached a minimum of 3.2 percent in 1978. However, unemployment jumped to 5.2 percent in 1980 in response to economic slowdown and remained about 4 percent through 1983. The agricultural sector, with nearly a third of the labor force, suffers from considerable seasonal underemployment, although farm labor is stretched thin at planting and harvest times. Because of continued growth in the labor force resulting from the higher birth rates of the past, the Government expects that even the 7.5-percent real GNP growth envisioned in the current 5-year plan (1982-86) will not bring unemployment below 4 percent by 1986 (*41*).

Women are active in the economy, making up 39 percent of the employed labor force in 1983, a figure that has been relatively stable since 1976. Women are represented disproportionately in agriculture (44 percent), retail sales (44 percent), and service industries (58 percent). On the other hand, women constitute 34 percent of the clerical work force and 24 percent of professional, technical, administrative, and managerial workers (*42*).

Nonagricultural monthly earnings averaged $352 in 1983. Lower earnings in the manufacturing sector, with its 30-percent share of nonagricultural employment, reduced the overall average. Wages in South Korea, though far below those of Japan or the United States, are close to those of Taiwan and Hong Kong, its main, supposedly higher cost, competitors. Wages in Southeast and South Asian countries, some of which have, like Korea, hard-working, mobile, literate work forces, range from 17 to 60 percent of those in the Korean textile industry. This suggests that South Korea's traditional niche in world trade, based on hard work and low wages, is becoming increasingly vulnerable as entrepreneurial ways of thinking spread in Southeast Asia, China, and South Asia.

Average nominal wages in South Korea rose 210 percent in 1975-79, while the urban consumer price index (CPI) rose 72 percent. A similar increase in real wages is not likely to recur in the near future because policymakers are aware of the problems this would pose for industries facing competition in the production of labor-intensive export goods. The Government is likely to intervene with wage controls when private management is unable or unwilling to prevent real wage increases larger than those of Korea's Asian trade rivals.

Prices and Inflation. Until very recently, rapid price inflation has been considered the norm in South Korea. Consumer price inflation averaged 16 percent per year in 1970-72, falling below 10 percent only in 1973 (table 1). Inflation exceeded 20 percent in 1974, 1975, 1980, and 1981. The Government placed higher priority on income growth than on price stability in 1962-78 and

Table 3—Employment by sector, selected years, 1965-83

Sector	1965	1970	1975	1980	1981	1982	1983
				Percent			
Agriculture and forestry	56.1	49.5	43.3	32.3	32.5	30.0	27.9
Fishing	2.5	.9	2.6	1.6	1.8	2.1	1.9
Mining	.9	1.1	.5	.9	.9	.8	.7
Manufacturing	9.4	13.2	18.6	21.7	20.4	21.1	22.6
Construction	2.9	2.9	4.3	6.1	6.2	5.8	5.6
Others	28.1	32.3	30.7	37.3	38.2	40.2	41.3

Sources: (*5, 43*).

allowed the money supply to increase rapidly to ensure steady growth in demand. The Government sharply cut back money growth in 1979, intentionally restraining demand growth to reduce inflation. The money supply was allowed to grow rapidly again in 1980-81 to stimulate economic growth in the wake of a recession partly induced by the tight monetary policy in 1979. However, money growth has again been reduced since 1981, leading to a rapid drop in inflation in 1982-83.

In marked contrast to the 1960's and 1970's, government policy now places considerable emphasis on price stability. Planners hope to keep inflation at levels no higher than those in the developed world and, thus, considerably lower than those in Korea in the 1960's and 1970's. The price of achieving lower inflation may be somewhat slower average growth in real GNP.

Internal prices of exported goods are allowed to follow world prices closely. Internal prices of imported goods and products for domestic consumption are often insulated from world price trends by tariffs, other trade barriers, and direct government intervention through price controls and subsidies. Government policies affecting agricultural and food prices are discussed under "Government Price and Trade Policies."

Investment. The share of investment in GNP rose until 1969 and has not fallen below 20 percent since then (table 4). The rate of gross domestic investment in the 1960's was among the highest in the world, and in the 1970's remained higher than in any country wealthier than Korea (*64*). While Korean households and businesses may have a high propensity to save and invest, the Government plays an important role in mobilizing and even forcing investment. Important business decisions have been made by the Government and presented to industry by fiat throughout Korea's development. Government policies have also sharply limited consumption, especially of luxury goods. Efforts to prevent speculation, notably in real estate, have met with less success.

The Government has carried out massive irrigation projects and other infrastructural improvements in agriculture, and has provided guidance to farmers making their own investments in farms, houses, and villages through its New Community Movement (Saemaul Undong). Highway and subway construction continues to absorb large amounts of funds, as does the construction of six nuclear powerplants by the government-owned Korea Electric Power Company. Housing supply lags well behind current demand, and construction will necessitate high levels of spending through the 1980's.

Other major areas of investment have been in private industry. The fertilizer, plywood, and cement industries grew rapidly in the 1970's but are now being scaled back. Investment in the large textile industry is likely to be limited to modernization rather than capacity expansion. The recent expansion of shipbuilding and steelmaking capacity is expected to slow, but major expansion in the automotive and electronic industries is planned. Not surprisingly, South Korea plans to place increasing emphasis on investment in high technology. Both the Asian Games in 1986 and the Olympics in 1988 will stimulate large amounts of construction in Seoul.

Sources of investment have varied since the early 1960's, with foreign sources gradually becoming less important in relation to domestic ones (table 4). Private domestic saving in particular grew in the 1960's and 1970's. Foreign investment has come largely from public or nonprofit sources: The U.S. Agency for International Development (USAID) until the mid-1970's, the World

Table 4—Sources of saving and investment as a percentage of GNP, 1962-83

Year	Gross domestic investment[1]	Foreign saving	Domestic saving	Government saving	Private saving
			Percent		
1962	12.8	10.7	3.3	-1.5	4.8
1963	18.1	10.4	8.7	-.4	9.1
1964	14.0	6.9	8.7	.5	8.3
1965	15.0	6.4	7.4	1.7	5.7
1966	21.6	8.5	11.8	2.8	9.1
1967	21.9	8.8	11.4	4.1	7.3
1968	25.9	11.2	15.1	6.1	9.0
1969	28.8	10.6	18.8	5.9	12.9
1970	26.8	9.3	17.3	6.5	10.8
1971	25.3	10.5	14.6	5.2	9.4
1972	22.2	5.1	16.5	3.5	13.1
1973	25.7	3.7	22.8	4.0	18.7
1974	31.7	12.1	19.9	2.6	17.3
1975	30.0	10.1	19.1	3.7	15.4
1976	25.6	2.3	23.9	5.8	18.0
1977	27.7	.6	27.5	5.2	22.3
1978	31.2	3.1	28.5	6.3	22.1
1979	35.6	7.1	28.1	6.9	21.2
1980	31.3	9.4	21.9	5.8	16.0
1981	29.1	7.7	21.7	6.2	15.4
1982	27.0	4.5	22.4	6.2	16.2
1983	27.6	2.9	24.5	7.1	17.4

[1]Equals gross domestic fixed capital formation plus increase in inventories.

Source: (*43*).

Bank, the Asian Development Bank, and the Japanese Government. The South Korean Government has taken some steps to open the economy to private foreign investment and has announced its intention to make such investment easier. Korea wants to control its own destiny, and a close working relationship is maintained between Government and industry. Korea's political leaders feel that heavy direct investment from abroad, especially from Japan, would jeopardize this relationship. Therefore, foreign direct investment may not be allowed to grow without some restraints.

Population Levels and Growth

South Korea's population, at 40 million, is the 22nd largest in the world, comparable with that of Spain, Iran, or Poland. Population growth peaked at about 3 percent per year in 1960 and has gradually declined since then (*42*). Growth has remained roughly stable since 1979 at 1.57 percent per year (table 1). Those women born in the peak growth years of 1959-70 are now entering their prime childbearing years, so the population growth rate could increase somewhat during the late 1980's. Although the number of births per mother continues to decline, the number of mothers is greater than before, a factor that may temporarily raise the rate of population increase.

Concerned that an increase in the birth rate would further strain the resources of the already crowded nation, the Government enacted a number of measures in the early 1980's aimed at sustaining the downward trend in population growth. The official goal is to make the two-child family the norm. Toward that end, the Government removed many of the remaining legal restrictions on female employment and inheritance rights in order to increase female labor force participation and reduce parents' preference for sons. Family planning efforts were strengthened and financial advantages given to farmers, fishermen, and low-wage earners who undergo sterilization. Income tax deductions for children's schooling expenses were eliminated in 1982 for families with more than two children. Social security assessments were also changed to favor families with fewer children (*56*). Using these and other measures, the Government hopes to lower the rate of population growth to 1.34 percent per year in 1990, 1 percent in 2000, and 0 in 2050, implying population levels of 44.3, 50, and 61.3 million people, respectively (*7*). The projections presented below assume a 1.5-percent rate of increase.

Growth from immigration was largely confined to the World War II and Korean War eras, with large inflows of ethnic Koreans from North Korea, Japan, and China. Up to 47,000 persons per year emigrated from Korea in the 1970's, but emigration stabilized at 32,000 per year in 1979-81, or about 0.1 percent of the total population (*42*). Most of the emigrants have left for North America (*42*). Emigration could increase in the 1980's, slowing the rate of domestic population growth slightly.

South Korea had a population density of 403 persons per square kilometer in 1983, a density somewhat greater than Japan's but only two-thirds that of Taiwan. However, the population is concentrated on only 20-25 percent of Korea's total land area, that which is level enough for family and residential use. Most of these areas lie parallel to the western and southern coasts.

South Korea is divided into nine provinces and two major cities. About 36 percent of the population lived in the city of Seoul and the surrounding Kyonggi Province in 1980, 22 percent (over 8 million people) in Seoul alone. The population of this northwestern corner of South Korea has grown strongly, as has that of the southeastern corner (Busan City and North and South Kyongsang Provinces), which had 31 percent of the total population in 1980. The population of the southwestern corner (North and South Cholla Provinces), with 16 percent of the total, has declined both in relative and absolute terms because of migration out of these poorer rural areas. The population of other areas has also dropped or remained relatively stable. Thus, Korea's population growth has become concentrated in the three provinces and two major cities of the northwest and southeast (*42*).

A profound change in the rural-urban population balance has accompanied the regional population shifts: The farm population, which was 57 percent of the total population in 1962, dropped to 25 percent by 1982 (*48*). An average of 438,000 people moved from farms to urban areas each year in 1970-82 (*39, 32*). One result of the rural-urban migration has been a chronic housing shortage within Korea's cities. Homeownership remains beyond the reach of many city dwellers. Sprawling suburbs have grown outside the major cities in recent years (*39*). Migration out of rural areas appears to reflect economic growth in the nonfarm sector and a desire by farm families to improve educational and economic opportunities for their children (*37*). Thus, higher rates of nonagricultural economic growth are likely to stimulate faster migration out of farming.

Women have traditionally been subservient to men in Korea but have recently shown signs of growing in-

dependence. The rising divorce rate is widely interpreted as one such sign (*56*). The Government's desire to limit family size has led to new measures to increase job opportunities for women. With fewer children, more hours away from home, and rising educational levels, women will be increasingly unwilling and unable to do housework, including cooking, thereby increasing the demand for convenience foods and for food eaten away from home.

Education has long enjoyed great popularity. The proportion of the population in school, 21 percent in 1963, rose to 29 percent by 1982 (*42, 43*). The Government attempts to provide educational opportunities for all, but demand for education outstrips supply. Schooling expenses are often substantial, amounting on average to 6.7 percent of total expenditures of urban households and 10.6 percent of those of farm households in 1982 (*42*). Six years of school is compulsory, and the Government plans to make 9 years compulsory beginning in 1985 in cities and in 1991 in rural areas (*57*).

Life expectancy has increased considerably in recent years. The average lifespan for men rose by a full 10 years to 62.7 years from 1960-65 to 1979; women's life expectancy grew by over 11 years to 69.1 years in the same period (*27*). Continuing improvements in sanitation, particularly in the water supply, are expected to produce further modest increases in longevity through 1990. On the other hand, environmental pollution, smoking, alcoholism, obesity, and stress may take a greater toll in the late 1980's than in earlier decades, slowing the advances in life expectancy. However, the average Korean citizen (and consumer) of the 1980's will be older than that of the 1970's because of the decline in birth and mortality rates since the 1960's.

Urbanization and other demographic trends may be expected to affect Korean food consumption patterns in several ways in the late 1980's:

- The Korean market for U.S. food products is mostly an urban one. Farm households still have strong subsistence aspects, living off the grain and other products that they and their neighbors produce. Surplus income above subsistence needs is spent on education to a greater extent than in urban areas. Access to processed foods is limited in rural areas because the distribution and transportation systems there are far weaker than in cities. Thus, the heavy rural-urban migration expected in the late 1980's will push the growth of the crucial urban market ahead of that of the population as a whole. This trend will expand the demand for processed foods, convenience foods, foods eaten away from home, and nongrain products faster than overall population growth suggests. The same trend, of course, has been evident for the past 15 years or more.

- The migration from rural to urban areas in the 1970's was largely a movement of younger people. If that trend continues, the different consumption patterns associated with different age groups will play a role in determining consumption trends.

- The changing role of women in Korean society may change food consumption patterns more strongly than in the 1970's. To help slow population growth, the Government is trying to shift women's time out of childbearing. This will also probably shift their time out of the home and away from cooking, thereby increasing demand for convenience foods and food away from home and weakening reliance on the staple, cooked rice.

- As Korea's present large number of teens reach adulthood and form families, the number of household heads who have acquired a taste for foods traditionally absent or rare in the Korean diet, including meats and dairy products, will increase. Education will accentuate this shift in the habits and tastes of household decisionmakers toward products that offer high potential for agricultural trade. Student life has been a center for the acquisition of new opinions and tastes throughout Korea's postwar history. The very active interest in Western life among students (often focused on Europe) may increase demand for wine, cheese, and other products perceived as part of sophisticated Western culture. This trend will intensify in the late 1980's as the number of secondary students peaks and the number of university students and graduates continues to increase.

- Korea's population is increasingly concentrated around the nation's two largest cities, Seoul in the northwest and Busan in the southeast. Although government planners consider this trend unhealthy, it will not be reversed in the near future. This geographical concentration offers some advantages for food distributors and for those introducing new products.

Balance of Payments, Foreign Debt, and Exchange Rate

South Korea ran substantial current account deficits through most of the 1970's and early 1980's, reflecting an excess of investment over domestic savings and relatively loose government fiscal policy (table 5). The

Table 5—Current account and trade balances, selected years, 1970-83

Account item	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983
					Million dollars					
Current account	-623	-1,887	-314	12	-1,085	-4,151	-5,531	-4,646	-2,650	-1,619
Merchandise trade balance	-922	-1,671	-591	-477	-1,781	-4,396	-4,384	-3,628	-2,594	-1,650
Exports[1]	882	5,003	7,814	10,047	12,711	14,705	17,214	20,671	20,879	23,103
Imports[1]	1,804	6,674	8,405	10,523	14,491	19,100	21,598	24,299	23,474	24,753
Services balance	119	-442	-72	266	224	-195	-1,386	-1,518	-554	-557
Shipment	NA	-195	-152	-62	-121	-197	-15	764	945	911
Other transportation	NA	-47	-115	-260	-383	-389	-715	-845	-544	-487
Travel	6	110	229	267	200	-79	20	9	-130	48
Investment income	-43	-404	-447	-594	-742	-1,181	-2,103	-2,938	-3,150	-2,842
Other goods, services, and income	NA	94	414	914	1,271	1,652	1,397	1,492	2,326	1,813
Unrequited transfers (net)	180	227	349	223	472	439	449	501	499	592

NA = Not available.
[1]Exports and imports both reported on an f.o.b., or free-on-board, basis (net of transportation and handling costs).

Sources: (*5, 42*).

desire to limit these deficits is one factor that discourages policymakers from reducing Korea's severe barriers to imported consumer goods. The largest deficits arose in 1974 and 1979-82, largely in response to world oil price shocks. The trade deficit has always been the largest factor in the current account deficit and is expected to continue through 1990.

The second most important component of the payments deficit has been the deficit on investment income, which has increased steadily since 1970. While income from Korean investment overseas has grown modestly, debt service on Korean obligations and the income of foreign firms in Korea have increased more rapidly.

The growing surplus on "other goods, services, and income" mainly reflects overseas construction work by Korean firms, which increased rapidly in the 1970's. South Korea has strengthened its political and economic ties with countries in the Middle East, where most of its construction activities are centered. The nation enjoys remarkably untroubled relations with the very diverse regimes of Saudi Arabia, Iraq, the United Arab Emirates, Iran, and Libya. Korean construction firms have steadily expanded their technical and managerial expertise in fulfilling Middle Eastern requirements, and seem able to compete well in future bidding. However, several factors will limit the growth of Korean contracting.

First, Korean labor is becoming increasingly more expensive than South and Southeast Asian labor, a trend which will reduce the competitiveness of Korean contractors. Second, Saudi Arabia's growing preference for local contractors puts Korean firms at a further disadvantage. Finally, reduced earnings by the major oil exporters have sharply reduced construction planned in the Middle East. Nevertheless, Korean firms are expected to continue large-scale work through the end of the decade because of their aggressive bidding and eagerness to undertake projects in areas not dependent on oil revenues, such as Southeast Asia. Growth such as that of the 1970's is unlikely to be repeated, however.

The rapid growth of Korea's foreign debt, from $15 billion in 1978 to $40 billion in 1983 (table 6), has concerned many inside and outside Korea. Growth in the nation's debt, together with increased interest rates in international financial markets since 1979, has led to a rising debt-service ratio (interest and principal payments as a proportion of exports). The debt-service ratio remains modest in international terms, although exclusion of payments on short-term debt (less than 1 year in maturity) from Korean statistics implies that the true burden of the debt is somewhat higher than shown. The rapid growth in Korean exports and the healthy prospects for continued export growth have convinced the international financial community that Korea can handle its current debt load. However, the Korean Government and the nation's foreign creditors agree that continued rapid growth in foreign borrowing would be undesirable. The original target in the fifth 5-year plan was for a total debt of $64.5 billion at the end of 1986. That target was revised, first to $50 billion, then to $49 billion, and finally to $47.4 billion

Table 6—External debt and debt-service ratio, selected years, 1971-86

Year	External debt by maturity			Foreign bank assets	Total external debt	Debt-service ratio[1]
	3 years or more	1-3 years	Less than 1 year			
	Million dollars					*Percent*
1971	NA	NA	NA	NA	NA	19.7
1978	10,533	483	2,593	1,262	14,871	12.3
1979	13,337	451	4,651	2,061	20,500	13.5
1980	16,137	617	7,575	3,036	27,365	13.3
1981	20,127	623	8,465	3,275	32,490	13.7
1982	NA	NA	10,200	NA	37,200	15.5
1983	NA	NA	NA	NA	40,100	15.3
1984	NA	NA	NA	NA	43,000	16.6
1986[2]	NA	NA	NA	NA	47,400	10.4

NA = Not available.
[1]Interest and principal repayment as proportion of value of exports.
[2]Targets.

Sources: (*25, 40, 59*).

in the revised version of the plan published in late 1983 (*23, 57*). The dramatic reduction in the current account deficit achieved in 1982 and 1983 lends credence to the Government's hopes that growth in the foreign debt can be strictly limited.

South Korea adopted a unitary exchange rate in the mid-1960's. Since then, its currency, the won, generally has been pegged to the U.S. dollar (table 1). The exchange rate was allowed to depreciate slowly against the dollar until December 1974, when it was devalued sharply in a successful effort to reduce the balance of payments deficit. Following 5 years of exchange-rate stability, the won was again devalued in December 1979 and has been allowed to depreciate since, which has helped achieve a gradual improvement in the payments balance (table 5). The won is now officially tied to a basket of foreign currencies, but the dollar dominates the basket. The dollar's strength against other major currencies since 1980 has hurt Korea's exports, for the dollar has risen faster than the won has depreciated against the dollar. Further depreciation is likely as long as the trade deficit remains sizable. Continued strength in the dollar would likely encourage Korea to look for alternative suppliers of some products now bought from the United States.

Foreign Commodity Trade

South Korea owes much of its economic growth to its ability to manufacture imported raw materials and components into finished or semifinished products for export. Reliance on international trade has allowed Korea's manufacturing sector to expand far beyond the limits that reliance on the domestic market would have imposed. The overall 1983 trade deficit of $1.7 billion included a $6.4-billion deficit on mineral fuels (mainly petroleum) and $2.6-billion deficit on agricultural products. Stated differently, Korea achieved a surplus of $7.3 billion on all other categories of merchandise trade. Given the size of the nation's oil bill and its desire to limit the growth of its foreign debt, Korea's ability to import agricultural products depends largely on its ability to generate a surplus on trade in manufactured goods. The following sections provide an overview of Korea's foreign trade pattern and suggest some of the problems and prospects associated with this pattern.

Trade Composition. Income growth from the early 1960's to the mid-1970's was based on rapidly expanding exports of light manufactured goods, chiefly textile products, footwear, plywood, and relatively unsophisticated electronic products. Light manufactures continue to account for a large share of total exports (table 7). Textiles (yarns, fabrics, and finished goods, mainly garments) have long made up the largest share of Korea's exports. Korea has a massive stake in its textile industry and will attempt to maintain its competitiveness by supporting plant modernization, but its exports face mounting competition from other producers and increasing protectionism in import markets. Footwear exports, including some leather shoes but mainly rubber and fabric sports shoes, continue to grow strongly. Protectionism poses less of an immediate threat to these exports, most of which are produced for and marketed by major sports shoe firms in the United States and Japan. However, these firms will eventually

shift their business to Southeast or South Asia to take advantage of lower labor costs. Plywood production and exports have suffered as Southeast Asia hardwood producers have begun producing and exporting plywood themselves rather than exporting logs.

Because of the growing problems confronting Korea's light manufactured exports, much of Korea's export growth since the mid-1970's has reflected increased sales of heavy industrial goods, especially steel products and ships, and of increasingly sophisticated electronic equipment such as televisions, audio equipment, and telecommunications products. Efficient production methods and low wage costs helped the steel industry grow from a small base in the early 1970's to the world's 12th largest producer by 1981 (*57*). Korea's cost advantage in steel gives it good prospects for continued export growth, although sales to the United States have recently been limited by "voluntary" export restraints. The shipbuilding industry, built from

Table 7—Commodity exports by type, selected years, 1970-83[1]

Product group	SITC divisions[2]	1970	1972	1974	1976	1978	1980	1982	1983
					Million dollars				
Food, feeds, beverages, and tobacco	00-19, 22, 40-49	79.7	121.3	349.0	588.1	1,058.7	1,290.3	1,217.7	1,222.9
Chemicals	50-59	11.4	35.9	91.5	114.5	328.8	754.7	669.6	677.2
Chemical fertilizers	56	0	11.6	0	11.5	162.1	343.6	208.2	194.2
Leather manufactures	61	.4	4.2	10.8	17.3	45.0	45.8	38.7	45.1
Rubber manufactures	62	3.7	11.3	66.8	139.3	226.5	499.2	305.9	393.1
Tires		2.9	10.3	59.8	128.9	213.8	477.1	282.4	362.4
Wood and paper products	63, 64	93.9	176.9	239.0	429.3	557.0	546.1	356.4	284.2
Plywood and veneers		91.7	165.8	168.3	339.0	414.7	353.8	202.8	109.8
Textile products	26, 65, 84	341.1	681.3	1,526.1	2,851.1	4,200.2	5,227.5	6,079.9	6,183.3
Footwear	85	17.3	55.4	179.5	398.5	686.2	874.5	1,154.4	1,234.8
Luggage and handbags	83	2.5	9.9	50.1	143.0	42.5	33.8	50.2	405.0
Nonmetallic manufactures	66	6.5	24.3	84.8	182.4	278.6	434.2	563.7	425.3
Cement		4.4	13.0	52.1	116.2	167.6	270.4	374.7	203.9
Metal products	67-69	31.4	120.9	582.2	614.4	1,135.2	2,516.4	3,134.7	3,396.2
Iron and steel	67	13.4	92.8	450.3	368.8	576.8	1,651.3	1,900.9	1,842.4
Metal manufactures	69	12.2	22.2	120.6	233.8	529.3	773.7	1,122.8	1,408.0
Industrial machinery	71-74	61.5	18.8	48.0	77.2	145.2	302.1	400.4	487.1
Electrical machinery and office equipment	75-77	0	148.0	554.5	962.5	1,438.8	2,098.9	2,387.6	3,303.9
Transportation equipment	78-79	0	14.4	121.1	342.8	1,126.0	1,153.4	3,364.8	4,190.3
Ships		0	.7	74.0	276.7	801.4	617.6	2,831.7	3,735.0
Other crude materials	21, 23-25, 27-29	57.4	56.8	121.9	157.7	248.4	262.7	221.8	238.3
Other	—	128.4	144.7	435.1	697.0	1,193.5	1,465.3	1,907.6	1,905.4
Total[3]	—	835.2	1,624.1	4,460.4	7,715.1	12,710.6	17,504.9	21,853.4	24,445.1

— = Not applicable.
[1]Export values are shown on an f.o.b. basis, excluding shipping and insurance costs.
[2]Standard International Trade Classification.
[3]Total exports shown in this table differ from those shown in balance of payments data (table 5) because of differences in accounting methods.

Sources: (*42, 49*).

scratch in the 1970's, grew into the world's second largest by 1982 (*3*). Growth in shipbuilding is difficult to forecast because of the highly cyclical nature of this industry. Exports of standardized industrial machinery have grown strongly and show continued promise.

However, Korea's brightest prospects for heavy industrial export growth in the late 1980's appear to lie in the automobile industry. Korea's two auto producers, currently serving a limited domestic market, recently signed joint production agreements with major U.S. and Japanese auto firms which will greatly boost their production and assure access to the U.S. market. This move will probably also lead to much greater exports of auto parts to the United States. As an added stimulus, the Korean Government has announced various policy changes intended to stimulate domestic auto sales, including reduced sales taxes.

Although heavy industry will continue to receive strong emphasis, Korean policymakers see electronics as the major source of export growth in the late 1980's and beyond. Most of the nation's present electronics exports consist of audio equipment, televisions, and other consumer products assembled with imported components. However, production and exports of semiconductors, integrated circuits, and electronic switching equipment have grown rapidly since 1983. Exports of video recorders are expected to take off in 1985. As a longrun goal, Korea hopes to build and market mini- and microcomputers and the associated software. Success in the highly competitive field of high technology is not at all assured. However, current research and development efforts are likely to stimulate technical change throughout Korean industry, raising productivity and enhancing export competitiveness.

The Korean Government has increasingly parceled out the task of creating heavy and high-technology industrial bases to 10 giant conglomerates, known as general trading companies (GTC's). The Government designates these companies on the basis of several criteria, including annual exports of 2 percent or more of the nation's total for 2 consecutive years, sound financial management, adequate capital base, trade in a variety of products, and extensive overseas branches. GTC status confers several privileges, including exemption from "showing letters of credit to banks when applying for credit and...distinct advantages in the area of trade administration, taxation and foreign exchange controls" (*4, 29*). The GTC's shipped over 48 percent of Korea's exports in 1982, and their share of imports was rising (*22, 29*). The GTC's work closely with the Government, while the relationship among the GTC's is marked by cooperation as well as competition.

Korea's import structure has shown somewhat greater stability than that of its exports, although increased world oil prices in 1973-74 and 1979-80 boosted the share of petroleum in total imports (table 8). Korea's imports consist largely of raw materials for the nation's manufacturing industries, plus heavy industrial goods and chemicals too sophisticated to be produced economically at home. Imported agricultural raw materials—cotton and wool for textile products; hides and skins for footwear, luggage, and other leather goods; crude rubber for tires and rubber footwear—serve as inputs to several of Korea's leading export industries. Together with wood and lumber (mainly for use in plywood), these raw materials made up 6.7 percent of total imports in 1983. Growth in imports of agricultural raw materials will largely mirror the growth of their associated exports. In contrast, foods, feeds, beverages, and tobacco make up one of the few major import categories that are largely unrelated to export production.

Other major imports include nonagricultural raw materials (metal ores and other crude materials), chemicals, and machinery (mainly capital goods and electronic components for local assembly). Finally, growing energy demand from Korea's industries and cities, together with increased import prices, has made petroleum and other fuels the largest single component of import spending. Korea turned increasingly to petroleum imports in the 1960's and early 1970's as a cheap alternative to domestically produced coal to power its electrical and manufacturing plants. The oil crisis of 1979 and the ensuing jump in world oil prices led to a large rise in Korea's balance of payments deficit and boosted inflation to nearly 30 percent, helping prompt a fundamental change in Korea's energy planning.

The new energy strategy initially involved heavy reliance on nuclear powerplants, but their costly and time-consuming construction has caused the Government to scale back nuclear energy plans (*35*). Korea now plans to boost anthracite coal production, increase imports on bituminous coal to power the cement and steel industries, import liquid natural gas for utilities, finish construction of six nuclear powerplants by 1986, and emphasize energy conservation. Korean manufacturing operations reportedly are more energy-intensive than those in the developed countries (*56*), and conservation may allow considerable energy savings.

Overall energy demand declined slightly in 1982, but the economic recovery in 1983 increased demand by over 5 percent (*24*). Increases of 7 percent a year are forecast through 1986 (*57*). Petroleum imports will rise somewhat through 1986, but coal, natural gas, and nuclear power will fill most of the nation's increased energy

needs. Petroleum's share of the energy supply is expected to decline from 54.7 percent in 1983 to 48.4 percent in 1986. However, coal and natural gas will also have to be imported, so dependence on foreign energy supplies will actually increase from 74.9 percent in 1983 to 78.9 percent in 1986 (*24, 57*).

Directions of Trade. A regional breakdown of Korea's exports reveals the nation's heavy dependence on developed-country markets, precisely the markets where protectionist trade barriers are increasing (table 9). Exports to the United States and Japan account for nearly half of total exports. The developed countries also supply most of South Korea's imports (table 10). Reliance on a few large export markets exposes Korea to protectionist measures, the vagaries of national economies, and developed-country business cycles. Similarly, reliance on a relatively small number of suppliers of key imports makes Korea's economy vulnerable to sudden price swings and embargoes. Korean leaders hope to reduce the nation's dependence on trade with the developed countries and have stepped up efforts to trade with developing and centrally planned economies.

Korea has made some progress in diversifying its export markets: the share of total exports sold to developed countries fell from 88 percent in 1970 to 68 percent in 1982. During the same period, the share of total imports furnished by developed countries declined from 84 to 64 percent. However, almost all of the drop in the developed-country share of Korean imports reflected the increased value of oil imports from the nations of

Table 8—Commodity imports by type, selected years, 1970-83[1]

Product group	SITC divisions	1970	1972	1974	1976	1978	1980	1982	1983
					Million dollars				
Food, feeds, beverages, and tobacco	00-19, 22, 40-49	341.7	392.8	905.6	765.3	1,164.6	2,189.4	1,884.1	2,081.5
Hides and skins	21	3.4	10.2	35.9	124.1	189.8	160.8	233.2	261.4
Crude rubber	23	17.6	22.5	75.5	90.3	163.1	276.8	182.8	217.8
Wood, pulp, and waste paper	24,25	158.9	178.4	478.3	546.3	840.5	1,203.2	913.9	899.0
Wood and lumber		125.3	140.0	341.7	416.5	654.1	860.3	611.3	591.6
Textile fibers	26	119.8	158.4	307.3	393.9	573.3	778.7	769.6	809.4
Cotton		62.7	85.6	190.3	307.9	447.5	604.4	529.2	533.6
Wool		14.7	21.8	35.1	57.8	89.8	124.9	159.4	149.7
Fuels	30-39	136.0	219.8	1,056.9	1,753.4	2,460.2	6,659.6	7,606.7	6,975.7
Crude petroleum		123.2	206.3	961.6	1,267.6	2,187.0	5,633.1	6,097.3	5,572.4
Chemicals	50-59	163.8	220.2	623.1	853.0	1,282.0	1,800.3	2,050.6	2,241.5
Metal ores and scrap	28	70.3	47.9	261.5	228.4	361.4	712.1	772.5	759.2
Other crude materials	20, 27, 29	29.1	31.4	75.6	121.4	192.2	303.3	313.3	317.2
Machinery	70-79	589.5	759.6	1,865.1	2,426.6	4,994.8	4,998.7	6,011.2	7,589.4
Other	—	353.7	480.8	1,167.0	1,470.9	2,750.0	3,208.8	3,512.9	4,040.1
Total[2]	—	1,984.0	2,522.0	6,851.8	8,773.6	14,971.6	22,291.7	24,250.8	26,192.2
					1,000 tons				
Crude petroleum	—	7,161	12,030	15,120	14,597	22,993	16,631	24,809	25,442

— = Not applicable.
[1]Import values are shown on a cost-insurance-freight (c.i.f.) basis, including shipping and insurance costs.
[2]Total imports shown in this table differ from those shown in balance of payments data (table 5) because of differences in accounting methods and because the latter are reported on an f.o.b. basis.

Sources: (*42, 49*).

Table 9—Export market shares of major trading partners, 1970-83

Trading partners	1970	1971	1972	1973	1974	1975	1976
				Percent[1]			
East Asia[2]	32.5	29.6	30.6	43.5	35.4	30.2	31.3
Japan	28.3	24.6	25.1	38.5	30.9	25.4	23.4
Hong Kong	3.3	3.9	4.5	3.7	3.4	3.6	4.2
ASEAN[3]	2.5	2.7	2.7	1.9	3.3	3.0	2.6
Saudi Arabia	0	.1	.3	.4	.6	.2	3.0
Africa	2.1	2.7	1.2	1.0	2.0	3.9	2.7
Liberia	0	0	0	0	.7	1.8	1.2
Latin America[4]	.6	.9	.9	1.6	1.9	1.0	.8
Industrialized nations[5]	87.8	86.0	86.5	87.0	83.8	79.6	79.0
United States	47.3	49.8	46.7	31.7	33.5	30.2	32.3
Canada	2.3	2.7	3.6	3.9	3.7	3.9	4.1
Europe	9.1	8.2	10.2	11.8	13.8	18.4	17.7
West Germany	3.3	2.9	3.2	3.7	5.4	6.1	5.2
Netherlands	1.6	1.5	2.0	1.8	2.4	2.5	2.6
Oceania	.8	.7	.9	1.1	1.9	1.7	1.5
Australia	.3	.5	.6	.8	1.6	1.2	1.3

	1977	1978	1979	1980	1981	1982	1983
				Percent[1]			
East Asia[2]	25.8	24.8	26.9	23.3	23.1	20.5	17.8
Japan	21.4	20.7	22.3	17.4	16.5	15.5	13.9
Hong Kong	3.4	3.0	3.5	4.7	5.4	4.1	3.3
ASEAN[3]	3.0	3.6	4.7	6.5	5.2	6.0	5.8
Saudi Arabia	6.7	5.6	4.7	5.4	5.3	5.1	5.9
Africa	2.9	2.5	3.3	4.3	6.1	4.8	3.1
Liberia	.8	.5	.3	1.1	1.5	2.0	1.1
Latin America[4]	1.8	1.9	2.3	2.8	3.8	2.6	2.2
Industrialized nations[5]	74.3	75.4	74.1	65.1	63.0	65.1	67.5
United States	31.0	31.9	29.1	26.3	26.6	28.6	33.7
Canada	3.0	2.6	2.6	2.0	2.3	2.0	2.6
Europe	17.5	18.7	18.8	17.8	15.9	17.1	15.6
West Germany	4.8	5.2	5.6	5.0	3.8	3.5	3.2
Netherlands	2.3	2.4	2.2	2.0	1.5	1.6	1.7
Oceania	1.4	1.5	1.3	1.6	1.7	1.9	1.7
Australia	1.2	1.2	1.0	1.3	1.4	1.4	1.4

[1]Percentage of total export value.
[2]Includes Japan, Hong Kong, and Taiwan.
[3]Association of Southeast Asian Nations (Indonesia, Thailand, the Philippines, Malaysia, and Singapore).
[4]Includes Mexico, the Caribbean, and Central and South America.
[5]United States, Canada, Europe, Japan, and Oceania.

Source: (*49*).

Table 10—Import market shares of major trading partners, 1970-83

Trading partners	1970	1971	1972	1973	1974	1975	1976
				Percent[1]			
East Asia[2]	43.7	43.4	44.2	42.7	40.2	36.0	36.6
Japan	41.0	40.2	40.9	40.7	38.2	33.5	35.3
Taiwan	1.7	1.6	1.9	1.3	1.6	2.2	.9
ASEAN[3]	6.8	6.9	6.4	8.2	5.7	4.9	5.9
Saudi Arabia	1.9	2.4	3.5	3.6	9.8	8.3	8.1
Kuwait	1.5	2.7	3.7	2.0	3.8	7.6	7.9
Africa	.3	.3	.5	.5	.5	.6	.8
Industrialized nations[4]	83.6	82.7	81.2	78.2	73.6	72.9	70.9
United States	29.5	28.3	25.7	28.3	24.8	25.9	22.4
Canada	1.2	1.6	1.4	1.9	1.7	2.1	1.3
Europe	11.0	10.9	11.1	8.3	6.7	8.3	9.1
West Germany	3.4	3.1	2.7	3.1	2.0	2.6	2.7
United Kingdom	1.7	2.3	2.9	1.6	1.3	1.7	2.0
Oceania	.9	1.7	2.1	2.5	2.2	3.1	2.8
Australia	.7	1.6	1.9	2.1	1.9	2.8	2.5
Latin America[5]	.3	.6	.3	.4	2.1	.8	1.9

	1977	1978	1979	1980	1981	1982	1983
				Percent[1]			
East Asia[2]	37.6	41.3	34.1	28.1	26.6	24.1	25.8
Japan	36.3	40.0	32.7	26.3	24.4	21.9	23.8
Taiwan	1.0	1.0	1.0	1.4	1.4	1.2	1.1
ASEAN[3]	6.2	5.3	6.4	6.6	6.2	7.2	7.0
Saudia Arabia	10.4	8.6	7.8	14.8	13.6	13.3	7.7
Kuwait	5.3	5.0	5.7	7.9	6.0	3.4	2.6
Africa	.7	.3	.6	.5	.8	2.0	2.4
Industrialized nations[4]	72.4	76.4	72.9	61.9	62.9	61.7	64.2
United States	22.6	20.3	22.6	21.9	23.2	24.6	24.0
Canada	1.4	1.4	1.6	1.7	2.0	2.0	1.7
Europe	9.1	11.0	12.5	8.5	9.4	8.8	10.5
West Germany	3.2	3.3	4.1	2.9	2.6	2.8	2.5
United Kingdom	1.4	1.4	2.5	1.4	1.5	1.7	1.8
Oceania	3.0	3.7	3.5	3.5	3.9	4.4	4.3
Australia	2.6	3.1	2.9	3.1	3.5	3.8	3.7
Latin America[5]	.9	1.1	1.5	1.7	2.8	4.1	3.8

[1]Percentage of total import value.
[2]Includes Japan, Hong Kong, and Taiwan.
[3]Association of Southeast Asian Nations (Indonesia, Thailand, the Philippines, Malaysia, and Singapore).
[4]United States, Canada, Europe, Japan, and Oceania.
[5]Includes Mexico, the Caribbean, and Central and South America.

Source: (*49*).

the Organization of Petroleum Exporting Countries (OPEC), not the kind of import diversification that Korea desires.

The refusal of the centrally planned countries to have political or open economic ties with South Korea has hampered efforts to increase trade with these countries. However, overtures to China, Eastern Europe, and the Soviet Union continue. Korea does conduct some trade with Eastern Europe and, increasingly, with China. This trade is usually disguised in official statistics. Normal trade relations with some or most of the centrally planned economies remains one of the leading goals of Korean commercial policy.

Korea's exports face no great political barriers in the developing countries, but it has yet to establish a product mix and marketing/distribution system that can maximize its access to these poor economies. However, the GTC's and the Government are working to overcome this problem. Korea is likely to provide increasing competition to North American and Japanese firms exporting goods and services to the developing countries.

The U.S.-Korean bilateral trade balance swung between small surpluses and small deficits before 1983; the strong dollar and U.S. economic recovery produced large U.S. bilateral deficits in 1983-84. Trade with Europe runs in Korea's favor, but Korea runs large annual trade deficits with Japan and the Middle East. Korea's attempt to free itself from Japan's economic power has old roots and was relatively successful in the 1970's. But the trade deficit persists and threatens to grow as a result of increasing Japanese protectionism.

Saudi Arabia and Kuwait supplied about 72 percent of South Korea's 1980-82 oil imports, down from 88 percent in 1975-77. The volatility of the political situation in the Middle East disturbs Korea, and it has tried to purchase more of its oil from Indonesia, Ecuador, and Mexico. Korea also plans to import more coal from Australia, Canada, the United States, and possibly China, as well as liquid natural gas from Indonesia.

Trade in Agricultural, Forestry, and Marine Products. South Korea's imports of individual agricultural products (plus timber) are examined individually elsewhere in this report. This section examines the overall balance and directions of Korean agricultural trade, and provides some extra detail about Korea's agricultural exports and trade in marine products.

Korea has run a large deficit on agricultural trade for many years. This deficit widened in the 1970's (table 11). Extraordinary rice imports in 1981 raised the agri-

Table 11—Trade in agricultural, wood, and marine products, 1970-83

Year	Agricultural products[1]		Wood products[2]		Marine products[3]		Total	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
				Million dollars				
1970	445.2	78.9	126.3	93.9	3.0	55.9	574.6	228.7
1971	560.7	91.4	154.3	129.7	2.8	52.5	717.7	273.6
1972	530.0	124.6	141.5	175.7	3.7	76.5	675.2	376.8
1973	857.7	229.5	313.4	334.8	16.2	160.4	1,187.3	724.7
1974	1,240.8	269.5	345.5	227.1	12.1	181.6	1,598.3	678.2
1975	1,412.7	363.3	270.3	243.8	12.8	374.6	1,695.7	981.7
1976	1,332.7	132.5	419.4	401.3	20.8	353.1	1,772.9	886.9
1977	1,589.9	245.4	536.8	481.0	21.7	741.6	2,148.3	1,468.0
1978	2,025.9	287.2	666.8	574.5	53.2	682.9	2,745.9	1,544.6
1979	2,768.1	510.0	985.9	612.5	85.0	792.0	3,839.0	1,914.5
1980	3,314.3	648.7	899.1	485.9	51.9	742.0	4,265.3	1,876.6
1981	4,180.9	637.0	706.2	490.4	72.9	920.9	4,960.0	2,048.3
1982	2,991.1	481.1	673.7	277.2	72.2	852.9	3,737.1	1,611.1
1983	2,895.4	538.8	670.6	179.8	71.5	816.9	3,637.5	1,535.5

[1]For 1970-75, SITC divisions 00-12 (except 0118.910 and 0548.900-.969), 21-22, 29 (except 2911.5, 2919.4, 2919.7, 2919.860, 2919.910, 2929.110-.119, and 2929.9), 41-43 (except 4111 and 4314.1), and categories 2311 and 2611-2658.9. For 1976-83, CCCN heading numbers 01-02 (except 02.0401-.0403), 04-24 (except 04.07, 05.05, 05.12-.14, 12.0801, 13.0304, 14.0502-.0504, 1504, 1604-1605, and 23.0102), and categories 33.01, 35.01, 40.01, 41.01, 43.01, 50.01-.03, 53.01-.05, 54.01-.02, 55.01-.04, and 57.01-.04.

[2]For 1970-75, SITC divisions 24 and 63. For 1976-83, CCCN heading number 44.

[3]For 1970-75, SITC division 03 and categories 0118.910, 0548.900-.960, 2911.5, 2919.4, 2919.7, 2919.860, 2919.910, 2929.110-119, 2929.9, 4111, and 4314.1, or their equivalents. For 1976-83, CCCN heading number 03 and categories 02.0401-.0403, 04.07, 05.05, 05.12-.14, 12.0801, 13.0304, 14.0504, 16.04-.05, and 23.0102.

Source: (*49*).

cultural import bill to $4.2 billion, but 1981 should be considered atypical; South Korea is currently a $3-billion market for farm products. Whereas Korea runs a heavy bilateral deficit in agricultural trade with the United States, it has long enjoyed a modest bilateral surplus on trade in marine products and, until 1982, on trade in wood products (table 12).

South Korea's agricultural imports consist mostly of bulk commodities, especially grains and fibers (tables 13 and 14).[2] With a few exceptions, the United States has held a dominant share in Korea's major agricultural imports, notably those of feed grains, wheat, soybeans, raw cotton, and cattle hides (table 13). In addition, the United States has played an important role in supplying cattle, inedible tallow, soybean meal, and until recently, tobacco.

The U.S. share of South Korea's total agricultural imports varied between 58 and 70 percent in 1970-83, declining from 70 percent in 1972 to 60 percent 10 years later. Two factors seem to account for the drop in the U.S. market share. First, the United States lost ground in the fats and oils category, mainly to Malaysian palm oil. Second, Australia captured almost all of the Korean import market for frozen beef, which grew to $158 million by 1982 (tables 15 and 16). Australia and Malaysia have become Korea's second and third

[2]Another key bulk commodity is natural rubber, which is not considered in this study because it is not produced by the United States. Imports of natural rubber increased from 43,000 tons in 1972 to 130,000 tons in 1982; most is used to manufacture products for export.

Table 12—Trade with the United States in agricultural, wood, and marine products, 1970-83

Year	Agricultural products[1]		Wood products[2]		Marine products[3]		Total	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
				Million dollars[4]				
1970	281.8	6.0	10.0	75.0	0.2	8.6	292.0	89.6
	(63.3)	(7.6)	(7.9)	(79.8)	(6.8)	(15.4)	(50.8)	(39.2)
1971	355.7	6.7	14.6	121.2	.1	3.7	370.4	131.6
	(63.4)	(7.3)	(9.5)	(93.5)	(2.9)	(14.7)	(51.6)	(48.1)
1972	373.1	11.2	11.2	145.1	.5	8.3	384.7	164.6
	(70.4)	(8.9)	(7.9)	(82.6)	(12.1)	(10.9)	(57.0)	(43.7)
1973	601.1	20.2	32.2	184.6	7.2	15.5	640.4	220.2
	(70.1)	(8.8)	(10.3)	(55.1)	(44.4)	(9.6)	(53.9)	(30.4)
1974	829.3	25.2	52.4	114.3	4.3	22.4	886.0	161.8
	(66.8)	(9.3)	(15.2)	(50.3)	(35.8)	(12.3)	(55.4)	(23.9)
1975	994.9	35.2	31.6	155.1	3.4	38.9	979.9	229.2
	(66.9)	(9.7)	(11.7)	(63.6)	(27.0)	(10.4)	(57.8)	(23.3)
1976	922.3	48.8	52.7	206.8	7.5	43.5	982.4	299.2
	(69.2)	(36.9)	(12.6)	(51.5)	(35.9)	(12.3)	(55.4)	(33.7)
1977	1,064.6	60.8	79.6	249.1	6.5	96.5	1,150.7	406.3
	(67.0)	(24.6)	(14.8)	(51.8)	(30.0)	(13.0)	(53.6)	(27.7)
1978	1,255.2	83.1	113.9	231.6	8.8	92.3	1,377.9	407.0
	(62.0)	(28.6)	(17.1)	(40.3)	(16.6)	(13.3)	(50.2)	(26.4)
1979	1,621.1	63.1	126.7	225.4	16.9	100.2	1,754.7	388.7
	(58.6)	(12.3)	(12.9)	(36.8)	(19.9)	(12.7)	(46.0)	(20.3)
1980	1,990.0	57.8	129.6	131.5	12.3	96.5	2,131.9	285.7
	(60.0)	(8.8)	(14.4)	(27.1)	(24.3)	(13.1)	(50.0)	(15.2)
1981	2,417.4	66.3	108.9	133.0	31.7	113.8	2,558.0	313.0
	(57.8)	(10.4)	(15.4)	(27.1)	(43.5)	(12.4)	(51.6)	(15.3)
1982	1,785.9	46.8	125.9	69.6	27.0	98.2	1,938.8	214.7
	(59.7)	(9.6)	(18.7)	(25.2)	(37.9)	(11.6)	(51.9)	(13.3)
1983	1,929.4	44.9	158.2	39.0	22.9	110.0	2,110.5	193.9
	(66.6)	(8.3)	(23.6)	(21.7)	(32.0)	(13.4)	(58.0)	(12.6)

[1]See table 11, footnote 1.
[2]See table 11, footnote 2.
[3]See table 11, footnote 3.
[4]Numbers in parentheses show percentage of total trade value.

Source: (*49*).

Table 13—Major agricultural imports from all sources, with U.S. market share, 1978-83

Item	1978	1979	1980	1981	1982	1983
			1,000 tons[1]			
Cattle	50.4	38.1	5.4	15.9	46.3	73.4
(1,000 head)	(69.1)	(69.7)	(59.7)	(13.3)	(27.3)	(50.2)
Beef	41.4	57.3	2.0	247.0	70.7	67.0
	(3.5)	(3.0)	(35.8)	(4.6)	(3.3)	(3.1)
Wheat	1,636.8	1,695.3	1,868.2	1,956.6	1,927.6	1,853.9
	(99.7)	(100.0)	(99.0)	(99.7)	(99.1)	(99.1)
Corn	1,877.9	2,728.4	2,351.3	2,650.5	2,854.0	4,057.4
	(100.0)	(100.0)	(99.9)	(95.9)	(95.2)	(97.2)
Rice	1.9	292.0	906.8	2,587.5	311.9	200.0
	(0)	(21.8)	(42.2)	(53.1)	(84.0)	(99.8)
Sorghum	0	113.3	12.2	92.0	388.5	159.1
	(—)	(35.8)	(2.6)	(100.0)	(100.0)	(30.5)
Soybeans	238.6	428.0	543.3	494.3	582.8	658.3
	(100.0)	(97.0)	(99.8)	(99.0)	(99.7)	(99.9)
Tallow	163.9	176.9	142.4	154.5	138.1	138.1
	(49.2)	(60.1)	(77.8)	(67.1)	(49.5)	(57.8)
Palm oil	15.4	11.9	33.4	53.7	88.7	103.9
	(0)	(0)	(0)	(0)	(0)	(0)
Soybean meal	39.5	152.2	5.0	51.6	125.5	279.1
	(38.1)	(58.5)	(20.2)	(31.6)	(53.3)	(35.1)
Tobacco	10.1	12.9	14.4	11.2	1.4	3.9
	(60.2)	(61.7)	(61.0)	(57.9)	(53.3)	(0)
Natural rubber	116.9	108.2	124.3	129.4	129.7	138.5
	(0)	(.1)	(0)	(0)	(0)	(0)
Cattle hides	148.9	174.9	89.8	192.1	125.7	153.2
	(75.6)	(78.0)	(83.7)	(81.1)	(88.2)	(88.1)
Wool	21.6	24.0	22.8	29.2	28.8	29.9
	(0)	(.1)	(0)	(.1)	(0)	(0)
Cotton	310.8	307.6	333.7	322.2	340.3	336.8
(excluding linters)	(96.1)	(97.0)	(94.2)	(86.5)	(95.0)	(82.1)

— = Not applicable.
[1]Numbers in parentheses show U.S. value share.

Source: (*49*).

Table 14—Major agricultural imports from the United States, 1978-83

Item	1978	1979	1980	1981	1982	1983
			1,000 tons			
Cattle						
(1,000 head)	18.1	13.2	2.6	1.9	10.2	31.0
Beef	.3	.6	.3	.5	4.7	.8
Wheat	1,631.8	1,695.3	1,854.0	1,951.5	1,907.7	1,835.1
Corn	1,877.9	2,728.4	2,347.8	2,535.6	2,360.7	3,944.3
Rice	0	50.6	672.1	1,191.2	265.9	199.8
Sorghum	0	41.1	.3	92.0	388.5	56.1
Soybeans	238.6	416.6	541.3	487.1	581.6	658.0
Tobacco	5.3	6.7	6.1	4.3	.5	0
Cattle hides	110.9	76.2	75.1	168.2	108.9	136.0
Cotton						
(excluding linters)	299.6	299.9	317.2	278.2	318.6	278.8

Source: (*49*).

leading agricultural suppliers, respectively. Their combined market share rose to 17.5 percent in 1982, up from 6.5 percent a decade earlier. Besides becoming the leading supplier of fats and oils (excluding soybeans), Malaysia has also drawn rubber exports away from Singapore and now supplies the bulk of Korea's natural rubber. Australia supplies wool, sugar, beef tallow, and beef. Korea also imports mutton from Australia, wholly for re-export after processing.

Other suppliers and their specialties in 1982 included Taiwan (sugar, spices, fresh and canned vegetables); Thailand (sugar, rubber, corn, cassava chips); New Zealand (wool, beef tallow, hides and skins, milk powder, casein); Canada (live cattle, beef tallow, wheat flour); Japan (rice, fatty acids, essential oils); the Philippines (sugar, coconut oil); and Brazil (soybean meal). Much the same list of countries comprised the 10 leading suppliers in 1972, although Malaysia and Brazil replaced Singapore and Indonesia in 1982 (table 16). Only Japan's market share seems reasonably sure to erode because further large-scale Korean rice imports appear unlikely. Europe has never been a significant agricultural supplier to Korea. The only notable agricultural import from Europe now is furskins. Of $88 million in imported furskins in 1983, $66 million worth were imported from Europe.

Korea's agricultural exports grew quickly in 1970-80 but have since declined. Meanwhile, they have become concentrated in a small number of specialty items. The leading export in recent years has been flue-cured and burley tobacco, sold to Europe, the United States, and a variety of other areas. Korea enjoyed a temporarily flourishing trade in importing raw sugar and mutton for further processing and re-export. The mutton trade has declined for several years, and the value of sugar exports dropped sharply in 1982. Canned mushrooms showed promise as an export item in the late 1970's but have since faded due to competition from China. Exports of ginseng and its products, however, have increased.

Korea's agricultural exports, besides tobacco and ginseng, apparently will have to depend increasingly on

Table 15—Agricultural import market shares of 10 leading suppliers by trade category, 1972[1]

Country/region	Trade category (SITC)				
	Division 0: Food and live animals[2]	Division 1: Beverages and tobacco	Divisions 2: Crude materials, inedible[3]	Divisions 4: Animal and vegetable oils and fats	Total
			Percent		
United States	73.0	4.2	66.9	88.3	70.3
Taiwan	10.1	.1	.6	0	6.9
Australia	4.5	.1	12.6	0	6.4
Japan	5.2	.6	6.8	10.0	5.7
Singapore	.1	0	10.0	0	2.8
Thailand	1.3	31.2	.4	0	.9
Canada	.5	.1	.8	0	.6
New Zealand	.8	0	.2	.1	.6
Philippines	.6	.1	.6	0	.5
Indonesia	.3	0	0	0	.2
Total	96.4	36.4	98.9	98.4	94.9
			Million dollars		
Total value of imports in category	355.5	7.9	143.7	19.6	526.7
			Percent		
Imports in category as percentage of total agricultural import value	67.5	1.5	27.3	3.7	100.0

[1]Only agricultural goods in the trade categories were used in calculating market shares; fishery and other items were excluded.
[2]Principally cereals, sugar, and food preparations.
[3]Principally cotton, wool, hides, and rubber.

the country's advantages in processing. Korea's high-cost, small-scale agricultural sector seems incapable of producing unprocessed goods for sale in the world market at competitive prices. The largest agricultural export markets in 1982 were Japan ($113 million, principally ginseng, chestnuts, earthworms, mutton, mushrooms, frozen fruits, and tobacco); Hong Kong (sugar and ginseng); the United States (tobacco, ginseng, and mushrooms); Taiwan (ginseng and fresh fruit); Europe (tobacco); Indonesia (sugar); and the Middle East (sugar and chewing gum).

Exports of marine products grew strongly in 1970-81 but have dropped off somewhat since then (table 17). Still, Korea enjoyed a $745-million surplus in marine products trade in 1983 (table 11). Besides its off-shore waters in the Sea of Japan, Korea has important fishing rights in U.S. waters and has negotiated fishing rights as far away as Mauritania. Japan buys most of Korea's marine exports, but Korea sends its products to many other countries as well. Korea's expertise in freezing, canning, and trading marine products may spill over to help expand its agricultural products processing. Although Korea still has a trade surplus in fish, it imported 56,000 tons of frozen fish in 1983, mostly from the United States, Canada, and Japan.

Expected Economic Growth

Growth in South Korean agricultural imports through 1990 will depend heavily on growth in real income. The Government forecasts average income growth of 7.5 percent in 1983-86. Current trends suggest that the nation should have little difficulty in reaching this goal.

Growth trends beyond 1986 are much less certain. Spurred by competition from low-wage producers of

Table 16—Agricultural import market shares of 10 leading suppliers by trade category, 1982

Country/region	Trade category (CCCN section)								Total
	Section 1: Live animals and animal products[1]	Section 2: Vegetable products[1]	Section 3: Fats and oils[1]	Section 4: Prepared foods, beverages, tobacco, and oilseed meal[1]	Section 6: Essential oils and casein	Section 7: Natural rubber	Section 8: Hides and skins	Section 11: Natural fibers	
					Percent				
United States	16.2	86.5	27.1	10.3	7.8	0	68.9	67.0	59.7
Australia	64.6	.7	6.1	21.4	3.5	0	2.8	18.1	13.1
Malaysia	0	.2	29.1	.1	0	79.6	0	.3	4.4
Taiwan	1.5	2.0	1.1	13.0	1.5	.1	0	2.9	3.1
Thailand	.1	1.6	0	17.6	0	9.7	0	0	3.0
New Zealand	3.7	0	11.6	.1	26.1	0	2.9	3.6	2.1
Canada	5.9	1.1	5.9	1.0	0	0	5.3	0	1.7
Japan	2.4	1.6	6.1	.9	20.4	.1	.1	1.0	1.5
Philippines	0	.2	6.2	10.1	0	.1	0	.1	1.5
Brazil	.1	.6	.1	4.5	1.3	0	0	.2	.8
Total	94.5	94.5	93.3	79.0	60.6	89.6	80.0	93.2	90.9
					Million dollars				
Total value of imports in category	254.2	1,177.4	141.6	331.5	10.7	108.1	233.2	735.1	2,991.8
					Percent				
Imports in category as percentage of total agricultural import value	8.5	39.4	4.7	11.1	.4	3.6	7.8	24.5	100.0

[1]Excludes marine products.

Source: (*49*).

Table 17—Exports of fish, shellfish, and other marine products by volume, 1977-83

Year	Fish[1]	Shellfish[2]	Other marine products[3]	Total
		Metric tons[4]		
1977	421,972	86,778	43,474	552,224
1978	397,045	71,084	26,780	494,909
1979	367,825	68,378	29,755	465,958
1980	282,794	66,341	39,306	388,441
1981	329,850	69,408	50,289	449,547
1982	229,422	109,380	34,283	373,085
1983	333,313	107,915	36,287	477,515

[1]CCCN categories 03.01, 03.02, and 16.04.
[2]CCCN categories 03.03 and 16.05 (crustaceans and mollusks).
[3]CCCN categories 02.0401, 04.07, 05.05, 05.12-.14, 12.0801, 14.0304, 14.0502-.0504, 15.04, and 23.0102 (edible seaweeds, fishmeal, and certain inedible products).
[4]Gross weight; no conversions have been made from tradebook data.

textiles and other light manufactures, Korea is shifting toward an export mix with greater emphasis on heavy industrial goods and electronics. This shift will increase Korean vulnerability to income and investment cycles in the developed countries. Moreover, Korea's past success in aggressively enlarging its share of the world market in selected product lines has increasingly exposed it to protectionist pressure from major importers, which may well intensify later in the 1980's.

However, longrun forecasts suggest that world trade is likely to expand at least as fast in 1987-90 as in 1983-86, giving Korea a good chance to continue its 1983-86 performance through the end of the decade. The demand forecasts developed in this study are, therefore, based on the assumption that South Korea will achieve average real income growth of 7.5 percent per year during 1984-90.

The Agricultural Sector

South Korea's farm sector is characterized by small-scale, high-cost family operations, especially in food grain production. Rice has long been the leading crop, with a 35-percent share of total agricultural production by value in 1983, down slightly from 39 percent in 1971. Korea's rapid income growth has induced changing patterns of food demand, which have led in turn to strong shifts in the output mix. Animal products rose from 13 to 30 percent of total output value from 1971 to 1983,[3] while barley fell from 9 to 3 percent (table 18). Other leading agricultural products include vegetables, with a 13-percent value share in 1983, and fruits with 5 percent (*48*). The following brief sketch of the Korean agricultural sector outlines some of its more important features and suggests changes likely to take place in the farm sector in the late 1980's.

Production Resources

Korea's arable land resources are severely limited. Nearly two-thirds of total land area in 1983 was classified as forest land (generally mountainous or very hilly land not suitable even for small-scale, terraced cultivation) (table 19). "Other" nonagricultural land, including urban areas, roads, and wasteland, accounted for another 12 percent. Cultivated area occupied the remaining 2.167 million ha (21.9 percent of total land area). These proportions changed slightly in 1973-83, with 75,000 ha of cultivated land and 39,000 ha of forested land converted to other uses (*48*). Urbanization and road building will probably continue their gradual encroachment upon cultivated land.

Paddyland (level fields with raised borders for water retention, suitable for irrigated rice cultivation) makes up roughly 60 percent of total cultivated area. Paddyland comprised 1.316 million ha in 1983, up from 1.263 million ha in 1973 (*48*). Essentially all paddyland is used for one crop of rice, while about two-thirds is also used for a second crop, usually barley or vegetables. Nonpaddy or upland crop area is generally sloping or otherwise less desirable than paddyland. Upland area includes orchards and pastureland as well as land planted to a variety of unirrigated row crops.[4] The Government, because it has long placed high priority on self-sufficiency in rice, has invested heavily in converting upland area to paddyland and providing irrigation to paddyland wherever feasible. Conversion to paddyland accounted for much of the 128,000-ha decline in upland crop area in 1973-83, the remainder mainly reflecting conversion to nonagricultural uses.

The scope for expanding planted area is quite limited. Land reclamation in the shallow Yellow Sea, once regarded as a potential source of 300,000 ha of added paddyland, has been little discussed recently, probably because of the extraordinary costs involved in such development. Likewise, little additional farmland can be converted from forested areas because of their steep grade; level forest areas have already been cleared and converted to farmland or other uses. Because of Korea's cold winters and increasingly expensive labor, double-

[3]Including cattle (13 percent), swine (10 percent), poultry meat (3 percent), eggs (2 percent), and milk (2 percent).

[4]Irrigation serves only paddyland.

cropping is likely to continue declining gradually, leading to a similar decline in total planted area.

Expanding the irrigation network, on the other hand, may allow some intensification of rice production. Fully irrigated paddyland, with enough water stored to get a rice crop through its season, made up 71 percent of all paddyland in 1983. Other paddy areas had only partial irrigation, with rainfall necessary for a crop to reach normal yields. The severe drought of 1982 strained even the fully irrigated system, although the irrigation network was able to provide enough water for a normal harvest. In years of less severe drought, Korea's system is quite adequate for the fully irrigated areas. The Government has announced plans to extend full irrigation to 90 percent of all paddyland by 1991 (*55*). However, with growth in rice consumption slowing steadily, the expansion of full irrigation may be scaled back.

Pastureland occupied 58,000 ha in 1982. At that time, the Government launched an ambitious program to convert 67,000 ha of forested land into pastureland by 1986 and an additional 135,000 ha during 1987-91. However, the expansion in pastureland has been slower and more difficult than originally projected, and USDA's Foreign Agricultural Service (FAS) in Seoul feels that pastureland is unlikely to reach 120,000 ha in 1991, let alone the target of 260,000 ha (*55*).

Number, Size, and Distribution of Farms. Korea's 1.95 million farms are small even by Asian standards, averaging 0.9 ha in 1983. Farm size is relatively uniform: 37 percent of all farms are between 0.5 and 1 ha, 29 percent are smaller than 0.5 ha, and 33 percent are between 1 and 3 ha. The small size and uniform distribution of farms reflect the effects of a thorough land reform carried out by the Government after the Korean

Table 18—Agricultural production, 1971-83

Year	Milled rice	Polished barley[1]	Wheat	All food grains[2]	Soybeans	Vegetables[3]	Beef	Pork	Poultry	Eggs	Milk
					1,000 tons						
1971	3,998	1,507	196	5,710	232	2,708	37	81	50	127	62
1972	3,957	1,598	149	5,711	229	2,740	40	90	54	140	80
1973	4,212	1,438	100	5,756	224	2,612	45	90	92	125	104
1974	4,445	1,383	74	5,908	246	2,975	71	56	99	138	127
1975	4,669	1,694	97	6,469	319	4,576	70	107	56	145	163
1976	5,215	1,736	82	7,038	311	6,012	102	114	61	152	200
1977	6,006	793	45	6,847	295	6,115	106	141	73	178	264
1978	5,797	1,302	36	6,642	319	7,736	102	172	82	187	324
1979	5,136	1,436	42	7,001	293	8,044	118	219	90	212	385
1980	4,000	724	42	4,371	257	7,190	127	235	90	227	458
1981	5,063	770	92	5,833	216	7,435	94	209	91	222	518
1982	5,175	670	57	5,916	257	8,291	83	238	100	227	580
1983	5,404	736	66	6,210	233	8,273	98	294	113	247	716

[1]Includes both common and naked barley but excludes malting barley.
[2]Includes rice, common and naked barley, wheat, and rye.
[3]Includes melons and strawberries but not pulses or mushrooms.

Sources: (*33, 48*), and FAS and ERS estimates.

Table 19—Use of national land area, selected years, 1968-83

Year	Cultivated land			Forest	Other	Total
	Paddy	Upland	Subtotal			
			1,000 ha			
1968	1,289.4	1,029.5	2,318.8	6,631.1	897.8	9,847.7
1973	1,262.6	978.6	2,241.3	6,586.2	1,048.3	9,875.8
1978	1,312.0	910.0	2,221.9	6,578.3	1,096.1	9,896.3
1983	1,315.9	850.7	2,166.6	6,546.8	1,195.3	9,908.7

Source: (*48*).

War. Although the land reform legislation, which mandates a 3-ha maximum farm size, is a barrier to increasing area per farm, other factors are also important. These factors include the reluctance of farm families to sell their land and the country's hilly terrain, which limits the area suitable for large-scale, mechanized farming.

The number of farm households declined 18 percent in 1973-83, resulting in a similar increase in cultivated land per farm household (table 20). However, average farm household size fell from 6 persons in 1973 to 4.7 in 1983, so that the total farm population fell by 35 percent and cultivated area per person increased almost 50 percent.

Table 20—Farm population, selected years, 1963-83

Year	Farm population	Number of households	Cultivated land per household	Persons per household	Farm population as proportion of total population
	1,000 persons	*1,000 households*	*Ha*	*Number*	*Percent*
1963	15,266	2,416	0.868	6.33	51.5
1968	15,908	2,579	.899	6.17	49.3
1973	14,645	2,450	.915	5.98	42.9
1978	11,527	2,224	1.000	5.18	31.1
1983	9,475	2,000	1.083	4.74	23.7

Source: (*48*).

These changes were accompanied by a marked shift in the age structure of the farm population. The number of "prime-age" farmers, aged 20-49, declined by 1.4 million, but their share in total farm population rose from 31 to 33 percent (*48*). The farm population over 50 years old fell only slightly in absolute terms in 1973-83, but its proportion of the total farm population rose from 17 to 24 percent. Finally, the proportion aged 19 and under dropped from 52 to 42 percent.

Many farm households have one or more family members working outside of agriculture, but part-time farming, in which the major part of household income is derived from nonfarming activities, is less common than elsewhere in East Asia. Some 215,000 farm households (11 percent) were classified as engaged in part-time farming in 1983.

In 1980, 77 percent of all farm households were engaged primarily in paddy rice cultivation; 13 percent in upland farming; 2 percent each in fruits, vegetables, and "special" crops (tobacco and ginseng); and 1 percent in livestock. Three percent of farm households drew their income primarily from wage labor for other farmers. The number of farms specializing in upland crops dropped by 200,000 in 1971-81, accounting for 60 percent of the drop in the total number of farm households since 1971, with most of the decrease since 1974.

Korea has a very rugged terrain with few large plains. Many farmers own and farm both paddy and upland fields. Most animal raising is still dispersed among the small farms, and farmers cultivate fruits, vegetables, and specialty crops even on very small plots. Korean agriculture thus claims a large number of mixed-enterprise farms, despite their small size.

Yields and Production Costs. A high degree of self-sufficiency in major food products and parity between farm and urban household incomes are the two major goals of government agricultural policy. Because of the scarcity of South Korea's arable land in relation to its population, the Government has been able to achieve these goals only through the use of strong producer price incentives (reinforced by tariffs and other trade barriers) to encourage intensive cultivation and to transfer real income from urban consumers to farmers. These policies have led to generally high yields but have also resulted in production costs far above the prices prevailing in international markets. This section examines the components of production costs for major grains and assesses the scope for increased yields. The next section turns to the government policies that encourage Korea's intensive, high-cost production. However, because production costs, yields, and government price policies are interrelated, any discussion of them in sequence is somewhat artificial.

South Korea enjoyed a revolution in rice yields in the 1970's. Average yields rose rapidly as farmers adopted new, fertilizer-responsive rice varieties (known as high-yielding varieties, or HYV's). By 1977, South Korea claimed the world's highest average rice yields. Since then, HYV yields have proved to be quite volatile, dropping precipitously in 1980 in response to bad weather (table 21). Meanwhile, consumer preference for traditional varieties has caused HYV rice to sell at a discount. From a high of 76 percent of paddy rice area in 1978, HYV area fell to 27 percent in 1981. Although the share of riceland under HYV's recovered to 34 percent by 1983, it is unlikely to approach the 1978 level again. Thus, increased planting of new varieties should not be counted on as a major source of increased yields.

Likewise, changes in input levels are not likely to cause rapid changes in yields through 1990. Fertilizer use is relatively heavy and has shown no upward trend since 1974 (table 22). Pesticide use grew quickly through

1976 but has declined since. Barley yields were slightly higher in 1976-83 than in 1971-75, but the difference mainly reflected the lower quality of the land taken out of barley production. The Government's Office of Rural Development operates well-staffed agricultural research institutes that seek to develop higher yielding seeds of rice, barley, and wheat, often in conjunction with international agricultural research institutes. However, these efforts can, at best, hope to narrow the gap between the cost of growing grain domestically and the much lower cost of imported grain.

Production costs were estimated at $662 (513,000 won) per ton for rice and $490 (380,000 won) per ton for

Table 21—Grain yields, 1971-83[1]

Year	All rice	HYV rice	Traditional rice	Common barley	Naked barley	Wheat
			Tons per ha			
1971	3.36	NA	NA	1.96	2.46	2.27
1972	3.32	NA	NA	2.08	2.38	2.38
1973	3.56	NA	NA	1.92	2.35	2.31
1974	3.69	4.73	3.53	1.76	2.15	2.03
1975	3.83	5.03	3.51	2.16	2.58	2.22
1976	4.29	4.79	3.96	2.27	2.64	2.22
1977	4.88	5.53	4.23	1.45	1.66	1.69
1978	4.71	4.86	4.36	2.07	2.72	2.09
1979	4.16[2]	4.29[3]	4.04[3]	2.97	3.34	3.21
1980	3.24[2]	3.22[3]	3.28[3]	2.41	2.46	3.30
1981	4.14	4.37	4.08	1.97	2.68	2.90
1982	4.36	4.89	4.13	1.99	2.52	3.34
1983	4.40	4.83	4.20	2.69	2.47	4.23

NA = Not available.
[1]Milled basis.
[2]USDA estimate.
[3]ERS estimate.

Source: (*48*).

Table 22—Fertilizer and pesticide use, 1970-83

Year	Fertilizer elements				Pesticides			
	Nitrogen	Phosphorus	Potassium	Total	Fungicides	Insecticides	Herbicides	Total
				1,000 tons				
1970	356	124	83	563	2	6	1	9
1971	347	165	93	605	3	12	9	24
1972	373	171	104	648	5	18	10	33
1973	411	232	150	793	7	30	14	51
1974	449	232	155	836	5	31	15	51
1975	481	238	167	886	14	46	28	88
1976	361	142	140	643	30	113	27	170
1977	388	210	138	736	24	61	31	116
1978	462	231	174	867	24	86	29	139
1979	444	227	192	862	60	101	38	199
1980	448	196	184	828	38	65	47	150
1981	433	199	200	832	31	57	44	132
1982	311	149	157	617	19	53	43	115
1983	363	167	179	709	NA	NA	NA	NA

NA = Not available.

Source: (*44*).

common barley in 1983. Labor is the major variable cost for both, with farm implements and fertilizer far behind (table 23); the situation is broadly similar for other grains. Land and capital are the major fixed-cost components. Although rice costs are higher on a per ha basis than those of barley, the higher yields of rice bring the cost per ton closer to that of barley. Barley taxes are low, one of several incentives that the Government uses to promote barley production.

Production costs of naked barley are generally lower than those of common barley, although high common barley yields reversed the situation in 1983 (table 24). Wheat production costs are the lowest among the four major food grains; the cost structures of wheat and naked barley generally resemble that of common barley. Average production costs of rice rose faster than wholesale prices in 1975-80 but have increased at about the same average rate since 1980. The less stable yields of other grains make trends in real average production costs less clear.

Labor costs accounted for 27 percent of total costs for rice in 1983 compared with 32 percent for common barley and 33 percent for naked barley and wheat (*48*). Farm wages rose much faster than other input prices through 1980 (table 25), causing the labor share of total rice production costs to rise despite increased mechanization. Slower wage growth and continued farm mechanization have led to a declining labor share since 1980. Urban wages are expected to continue growing in the late 1980's, pulling up farm wages faster than other input prices for grain farming; whether this will lead to rising labor costs or be outweighed by mechanization is not clear.

Table 23—Production costs of rice and common barley, 1983[1]

Cost item	Rice	Common barley	Rice	Common barley
	Dollars per ha[2]		*Dollars per ton*[2, 3, 4]	
Seed	40.92	50.57	9.30	18.80
Chemical fertilizer	139.01	128.93	31.59	47.93
Farm manure	54.73	81.65	12.44	30.35
Disease prevention	116.74	17.87	26.53	6.64
Other materials	62.04	19.90	14.10	7.40
Implements	197.25	144.10	44.83	53.57
Farm buildings	17.52	17.21	3.98	6.40
Irrigation fees	73.36	0	16.67	0
Taxes and other charges	121.25	8.07	27.56	3.00
Animals	29.26	18.12	6.65	6.74
Labor	783.23	420.83	178.01	156.44
Land service	1,306.17	388.28	296.86	144.34
Capital service	114.06	81.02	25.92	30.12
Total	3,055.53	1,376.56	694.44	511.73
Value of byproducts	143.18	57.74	32.54	21.46
Net production cost[5]	2,912.36	1,318.83	661.90	490.27

[1]Average-sized farm.
[2]U.S. $1 = 775.75 won (1983).
[3]Milled basis.
[4]Cost per ton calculated as cost per ha divided by average yield (4.4 tons per ha for rice and 2.69 tons per ha for barley).
[5]Total cost minus value of byproducts.

Source: (*48*).

Farm households reacted to rapidly rising farm wages by sharply reducing the use of hired labor in 1977-80 while increasing the use of family labor and exchanging labor with neighbors (table 26). However, the use of farm labor has recovered gradually since 1980. Even though the cost of family labor is an imputed cost rather than a direct one in grain production, the availability of higher returns to labor in other activities will not be ignored in the long run. Younger farm family members, as well as hired farmworkers, will continue to shift to the nonagricultural sector and to more profitable agricultural activities, slowing the growth of grain production.

The Government provides credit for the purchase of farm machines, the use of which has increased rapidly (*55*). For example, the number of power tillers in use increased from 16,800 in 1971 to 154,700 in 1977 and to 489,300 in 1983 (*48*). Land consolidation and cooperative farming programs, designed to allow the use of larger machines, have been pursued since the early 1970's, but the pace of change has been quite slow.

Government Price and Trade Policies

Government policies play an important role in South Korean food grain markets by raising producer prices to promote self-sufficiency and to raise farm incomes. This is accomplished through large-scale government crop procurement of grains (especially rice and barley) reinforced by tight official control over imports. Tariffs, quotas, and other trade barriers are used to influence prices of most other crops, livestock products, and processed foods.

Domestic Price Policies. The Government influences rice and barley prices through the Grain Management Fund (GMF), which finances the purchase of a significant share of total output by the National Agricultural

Table 24—Production costs of grains, 1975-83[1]

Type	1975	1976	1977	1978	1979	1980	1981	1982	1983
				1,000 won per ton					
Rice	130	154	172	207	286	415	408	437	513
Barley, common	89	122	228	216	219	279	391	463	380
Barley, naked	81	117	211	177	195	275	320	396	412
Wheat	86	125	182	206	193	207	284	277	240
				Index (1975 = 100)					
Rice	100	119	133	160	221	320	315	338	396
Barley, common	100	136	255	242	245	313	439	519	426
Barley, naked	100	144	260	218	240	339	394	488	507
Wheat	100	145	213	241	225	241	332	323	279
Wholesale price index	100	112	122	137	162	225	271	285	286
Consumer price index	100	115	127	145	172	221	268	278	287

[1]Milled basis.

Sources: (*48*).

Table 25—Indices of production costs and producer prices, 1971-83

Year	Cost components			Total production costs	Producer prices			
	Farm wages	Farm implements	Feed		Rice	Vegetables	Livestock and poultry	All farm products
				1975 = 100				
1971	46.8	50.1	39.4	49.8	41.1	50.1	52.8	45.7
1972	54.3	52.9	44.7	56.4	52.2	51.4	62.3	55.5
1973	60.1	59.4	51.5	61.4	57.9	53.2	73.1	62.2
1974	77.4	85.5	87.4	80.9	79.4	68.7	82.7	81.1
1975	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1976	129.7	107.2	107.6	127.9	121.6	125.9	144.6	124.0
1977	161.1	116.7	112.1	146.2	132.3	144.5	181.3	144.6
1978	235.0	130.8	120.8	190.1	154.8	276.0	254.7	188.5
1979	356.6	158.3	127.4	216.2	201.0	249.3	236.2	209.1
1980	452.0	199.6	156.5	269.5	262.2	244.5	276.6	254.8
1981	513.0	222.8	197.8	346.6	306.3	323.2	434.8	326.7
1982	572.2	258.1	192.3	389.7	317.3	291.4	533.6	349.3
1983	605.2	258.1	204.7	421.8	319.7	242.0	598.6	357.5

Sources: (*25, 32*).

Cooperative Federation (NACF).[5,6] The share of the total rice crop purchased under this program has risen steadily, from 9 percent in 1971 to 20 percent in 1983. Purchase prices for rice have exceeded estimated average production costs by a substantial margin in recent years (tables 24 and 27).[7] The Government normally purchases only HYV rice; traditional varieties must be sold on the open market.[8] However, together with the limits on rice imports imposed by the Office of Supply (the only legal importer of rice), these purchases bid up the farmgate price of the entire rice crop, including traditional varieties.

Official purchases play an even larger role in the barley market; the GMF purchased 62 percent of common and naked barley production in 1983. Nevertheless, producer barley prices seem to lie much closer to production costs than in the case of rice. Farmgate prices for common barley fell below production costs in 4 of 9 years in 1975-83, and below government purchase prices in 3 years. Naked barley production costs exceeded prices in only one of the years 1975-83.

Producers of common barley appear to have lost money in several years, covering variable, but not total, costs. Given alternative production or wage-earning opportunities, producers are likely to continue reducing the area planted to common barley. Returns for naked barley appear to be more favorable, but naked barley

[5]The NACF is a government-controlled federation of local cooperatives for producers of grains and horticultural crops. In addition to its role in carrying out government grain price policies, the NACF distributes inputs to farmers, provides farmers with credit and insurance, carries out other price support programs, and markets farm products through its own wholesale network.

[6]Until recently, wheat was also purchased under this program but in relatively minor quantities compared with rice and barley. Official wheat purchases were discontinued at the beginning of 1984.

[7]These comparisons must be treated with caution. Producer prices corresponding exactly to the crop years used for the production cost tables are not available. Also, the conversions made in assembling the price data may have been inappropriate, making difficult any direct, year-by-year comparison of prices and costs.

[8]Most HYV rice not sold to the Government is consumed on the farm; the remainder is sold in the open market.

Table 26—Labor supply and allocation on an average-sized farm, 1975-83

Item	1975	1976	1977	1978	1979	1980	1981	1982	1983
				Hours per month					
Labor supply by type of labor:									
Human labor—									
Family	1,310	1,305	1,261	1,307	1,389	1,441	1,500	1,398	1,580
Exchange	103	111	111	106	169	171	181	165	173
Hired	295	308	322	287	225	202	204	213	265
Total	1,708	1,724	1,694	1,700	1,783	1,814	1,884	1,776	2,018
Draft animal labor	83	79	67	61	49	47	41	37	36
Allocation of human labor by activity:									
Crop cultivation—									
Rice	564	588	633	608	598	596	626	601	616
Barley	225	235	133	151	138	101	100	90	88
Pulses	91	86	78	78	82	77	86	77	80
Potatoes	81	75	56	49	48	48	49	41	41
Vegetables	156	186	198	191	247	286	321	300	388
Other crops	166	167	176	177	174	185	191	179	264
Total	1,283	1,337	1,274	1,254	1,287	1,293	1,373	1,288	1,477
Other agriculture	247	266	296	330	367	360	331	325	427
Nonagricultural work	178	121	125	115	128	160	181	133	114

Source: (*48*).

cannot be grown in most of the common barley areas, which are too far north and, thus, have too short a growing season.

Rice and barley are sold to consumers out of government stocks (held by the NACF) at prices substantially below purchase prices (*19*). This has led to steadily mounting deficits for the GMF, as the share of total production purchased and the gap between producer and consumer prices have grown. Moreover, although rice and barley are released to consumers at prices below the Government's cost of acquisition, consumer prices of these grains have risen to among the highest in the world. In an effort to limit GMF deficits, the Government began slowing the growth of purchase prices in 1981 and, in 1983, froze purchase prices while allowing consumer prices to rise slightly. The appropriate degree of government support for grain prices remains a point of contention between agricultural interests and economic policymakers. Because of a declining farm population and a gradual loss of political influence by farmers, a slow decline in real rice and barley producer prices through 1990 is possible. Consumer rice prices are less likely to fall. The Government still aims for self-sufficiency in rice and evidently will continue to try to limit consumption through high consumer prices in order to achieve its goal. Retail barley prices will increasingly be expected to cover production costs, thereby accentuating the ongoing shift in consumer demand from barley to other grains.

The Government tries to stabilize the prices of some other domestically produced agricultural commodities, intervening by stockpiling when prices fall below targets and releasing stocks when prices rise. It occasionally imports agricultural products in the interest of price stabilization (*19*). Flavor vegetables (garlic, onions, and red pepper) and meats are the goods most often imported under this program. Beef imports have become a special case because of their large volume. The National Livestock Cooperative Federation (NLCF), a government-supervised cooperative organization, handles beef imports. The Government sets retail prices of the imported meat to influence consumer prices for

Table 27—Producer prices for grains, 1975-83

Type	Average farmgate price								
	1975	1976	1977	1978	1979	1980	1981	1982	1983
	1,000 won per ton								
Rice:									
HYV	NA	239	255	301	384	514	619	646	638
Traditional	233	281	310	364	472	611	695	718	735
Barley:									
Common	136	139	189	215	248	318	368	418	430
Naked	129	131	196	225	252	316	367	417	428
Wheat[1]	114	125	149	173	179	361	409	464	466

	Government purchase price								
	1975	1976	1977	1978	1979	1980	1981	1982	1983
	1,000 won per ton								
HYV rice[1, 2]	246	292	328	378	461	577	657	705	705
Barley:[1]									
Common	145	170	203	242	288	345	389	442	442
Naked	137	164	202	241	286	344	387	440	440
Wheat[1]	132	NA	198	258	306	368	414	471	471

NA = Not available.
[1]Prices converted from price per ton, unmilled, to price per ton, milled, by dividing by 0.715, 0.67, 0.77, and 0.72 for rice, common barley, naked barley, and wheat, respectively.
[2]The Government purchases only HVY rice.

Source: (*32, 48*).

beef and pork while allowing the NLCF a profit on its transactions (see "Food Marketing and Processing" for more detail on the NLCF). Both the ongoing intervention in the beef market and occasional intervention in the markets for other foods are expected to continue through the 1980's.

The Government is empowered to set retail beef and pork prices. As of mid-1983, it was relying instead on controlling the quantity of permitted beef imports and their release price to wholesalers to influence the prices of domestically produced meats. The Government watches retail-to-wholesale price margins closely and can intervene to limit them. Producer milk prices remain fixed at levels determined by the Ministry of Agriculture and Fisheries (MAF), resulting in wholesale and retail milk prices that show little seasonal variation (*19*).

Wheat flour prices are stabilized through the Flour Price Stabilization Fund, formed jointly by the Korean Flour Mills Association (KOFMIA) and the MAF in 1976. A "break point" price is established and revised when conditions warrant. When import prices fall below the break point, importers pay into the fund the difference between the break point price and the import price. Import prices above the break point price entitle importers to collect the difference between the import price and the break point price from the fund. This mechanism stabilizes the price paid by flour mills for imported wheat. A similar scheme stabilized the domestic price of imported corn from its establishment in 1975 until its abolition in 1984. The Feed Corn Price Stabilization Fund, administered by the Korea Feed Association and the MAF, was also tapped to subsidize Korean corn production.

Tariffs. Tariffs and other trade policies are set under the official Trade Plan, which is revised every 6 months. The Government must balance several interests in setting its Trade Plans. The desire to restrain trade deficits and conserve foreign exchange partly shapes the thinking of the Ministry of Commerce and Industry and the Ministry of Finance, both of which also see the need to make raw material imports for export industries as cheap as possible. The Ministry of Finance also has an interest in revenues from tariffs. MAF favors imports of agricultural products that are inputs to Korean agriculture (for example, feed grains) but opposes imports of competing goods. The Economic Planning Board desires to keep food costs low but also fears overdependence on imported products whose prices might be dangerously volatile.

Korean tariffs are, on the whole, similar to those of neighboring countries (table 28). Tariff rates tend to be lower for agricultural commodities, such as semen, feed grains, and natural fibers, that serve as inputs to agricultural or industrial processes (table 29). Rates are higher for processed and/or packaged final products, such as cheese; canned meats, fruits, and vegetables; leather; and articles of wood. Rates are also high for goods considered luxury products, such as alcoholic beverages, cigarettes, confections, and tropical fruits. In principle, the maximum tariff in 1983 was 100 percent. Some tariffs, however, remained at 150 percent (the maximum before 1982) under the "temporary" tariff system. Temporary tariffs, set higher or lower than the basic duties, are supposed to be eliminated at some indeterminate time. The basic, or general, duty is supposed to prevail thereafter. Temporary tariffs currently discourage imports of alcoholic beverages (150-percent duty) and tropical fruits and nuts, citrus fruits, and raisins (60 percent each). Temporary tariff rates on imports of frozen fish and sawn tropical wood (10 percent each) are lower than the corresponding general rates.

In addition to the general and temporary tariffs described above, Korea has maintained a so-called "flexible tariff system" since 1974. Under this system, tariffs can be increased through the application of emergency tariffs or reduced through the tariff quota mechanism. Emergency tariffs are imposed to protect infant industries from foreign competition and apply to all quantities of certain goods. These currently include no agricultural products (*55*). The tariff quota system aids certain industries, or consumers, depending on the economic goals of the Government. Tariff quotas are quantities that receive a reduced tariff rate. Import volumes in excess of the quotas are subject to the general or temporary rates of duty. Quotas are generally set at expected import levels for a given 6-month period, and imports in excess of the quotas have not been common.

Until recently, a number of key agricultural imports were subject to the tariff quota system: Wheat, feed grains, soybeans, corn for industrial use, palm oil, beef tallow, tapioca chips for alcohol manufacture, and cotton for domestically sold products (*55*). However, these items were removed from the tariff quota system in 1984, and new general tariff rates were applied to most of them: Wheat (5 percent), soybeans (10 percent), beef tallow and palm oil (12 percent each), and tapioca chips (20 percent). Feed grains and cotton for domestic use, on the other hand, were assigned temporary tariff rates lower than the general rates. Feed grains now enter at 7 percent rather than 10 percent and cotton at 3 percent rather than 5 percent.

The Government allows some export industries to defer tariff payments on imported raw materials. The tariff is waived if the raw materials are shipped abroad in processed form within a certain interval. Cotton is one such commodity, with a 3-month moratorium (*55*).

The Government levies tariffs to protect Korean industries and to discourage imports, thus conserving foreign exchange. As Korea's industries mature and its citizens' real incomes rise, the Government is likely to reduce tariff levels gradually, feeling that domestic producers need less tariff protection and realizing that foreigners will require opening of the Korean market in exchange for opening their own markets to Korean exports. However, a countervailing trend may stem from the revenue-raising function of tariffs. Customs duties contributed an increasing share of total government revenues from 1973 to 1978, rising from 10.8 to 19.8 percent of the total. The recession of 1979-80 caused a drop in this share, as the Government tried to give industries some relief in a time of cost-cutting pressures. But the contribution of tariffs to total revenues rose again from 12.1 in 1979 to 14.4 percent in 1983 (*42*), reflecting the Government's determination to tax aggregate imports somewhat more heavily. Pressure to raise tariff revenues may lead to small increases in rates on feed grains, fibers, and other agricultural commodities imported in large quantities if the Korean Government feels that the industries using them are financially sound.

Table 28—Tariffs and other trade regulations for selected agricultural products in East Asia, 1983

Commodity	Japan		Taiwan		South Korea	
	Tariff rate	Non-tariff regulations	Tariff rate	Non-tariff regulations	Tariff rate	Non-tariff regulation
	Percent		*Percent*		*Percent*	
Rice	0	G	0	c	5	G
Wheat	0	G	6.5	i	3.5	i,tq
Wheat flour	25	G	30	c	30	
Barley	0	G,tq	5		5	G,c
Corn for feed	0		3	i	5	i,tq
Corn for non-feed use	0	tq[1]	3	i	12	tq
Sorghum	0		3		5	
Soybeans	0		7	i	14	tq
Beef	25	q			22.5	G
Pork	7	v	75	c	25	c
Chicken meat	20[2]		65		22.5	c
Eggs, fresh	20[3]		39		30	c
Powdered milk (for food)	25-35	tq	25		25	G
Apples	20	p	75		40	c
Oranges	20-40s	q	25-75s		60	c
Garlic	5	p	52		30	c
Tallow, inedible	0		10		10	tq
Palm oil	8		20		10	tq

G = Government or quasi-government agency the only legal importer.
c = Government-controlled; normally not allowed.
i = Import price stabilization scheme.
tq = Quota on imports admitted at the tariff rate shown.
q = Absolute quota limit.
v = Variable levy.
s = Rate depends on season.
p = Phytosanitary barriers.
[1]15,000 yen per ton ($63 per ton) assessed on imports in excess of quota.
[2]Chicken legs, 15 percent; tariff will be reduced to 10 percent by 1987.
[3]Eggs for hatching enter free.

Table 29—General tariff rates for food and agricultural commodities, 1982

Commodity	CCCN code	Rate of duty	Exceptions	Temporary rates
		Percent		
Live animals	01	20	—	—
Meats and edible offals	02	25	Ham, bacon, 0206—40%	—
Fish, crustaceans, and mollusks	03	25	Frozen products, 0301.06, 0303.03—10%	—
Dairy products, eggs, and honey	04	25	—	—
Other animal products	05	20-40	Animal semen, 0515.02—free	Antlers and horns, 0509.01-.02—60%
Vegetables, roots, and tubers,	07	30	Cassava and sweet potatoes, 0706—40%	—
Fruits and nuts	08	40-50	—	Tropical fruits and nuts, citrus fruits, raisins, 0801, 0802, 0804.02—60%
Coffee, tea, and spices	09	30-50	—	Unroasted coffee, 0901.01—40%; roasted coffee, 0901.02—60%
Cereals	10	5-20	Malting barley, 1003.01—40%	—
Flours, malts, starches, etc.	11	30-40	Malt, 1107—50%	—
Oilseeds, seeds, beets, hops, fodder, etc.	12	20-40	—	—
Lacs, gum, resins, extracts	13	30-40	—	—
Other vegetable materials	14	20	—	—
Fats and oils, waxes	15	20-50	—	—
Meat and fish preparations	16	50	—	—
Sugar and preparations	17	40-50	Bulk molasses, 1703.0102—20%	—
Cocoa and preparations	18	30-50	—	Chocolate, 1806.01—60%
Cereal preparations	19	50	—	—

See footnotes at end of table.

Continued—

Table 29—General tariff rates for food and agricultural commodities, 1982—continued

Commodity	CCCN code	Rate of duty	Exceptions	Temporary rates
		Percent		
Vegetable and fruit preparations	20	50	Tomato paste, 2002.0106—40%	All categories except fruit preserved by sugar, 2004—60%
Miscellaneous preparations	21	50	—	Coffee and tea extracts, 2102—80%
Beverages, spirits, vinegar	22	20-100	—	Flavored water, 2202—60%; beer, wine, other fermented beverages, and spirits, 2203-07, 2209—150%, ethyl alcohol, 2208—50%
Protein and other meals	23	20	—	—
Tobacco and tobacco sheets	2401-2402.04	50	—	All items—60%
Tobacco products	2402.01-.03	100	—	—
Essential oils	3301	30	—	—
Casein	3501-03	40	—	—
Natural rubber	4001	20	—	—
Hides and skins	4101	20	Reptile skins, 4101.06—30%	—
Leather	4102	30	Reptile leather, 4105.01—40%; leather waste, 4109—20%	—
Furskins	4301	30	—	—
Wood and wood products	44	5-50	—	Sawn tropical wood, 4405.02, 4414.02—10%
Silk	5001-03	10-30	—	—
Wool and animal hair	5301-05	20-30	—	Greasy or fleece-washed wool, other animal hair, 5301.01, 5302—30%
Cotton	5501-04	5	Linters, 5502—10%; combed or carded cotton, 5504—30%	—

— = Not applicable.

Source: (*51*).

Nontariff Barriers. South Korea imposes a number of nontariff trade barriers pertinent to U.S. agricultural exports (table 28). Such barriers effectively block imports of many items, while placing others under the control of various government agencies. The semiannual Trade Plan assigns imports to one of three categories: Import-prohibited, import-restricted, and automatic approval. Automatic approval items are subject only to the various types of tariffs just described. On the other hand, import prohibitions may in principle be applied to products produced by small-scale domestic farms or industries, to products in "surplus domestic production," or to nonessential or luxury items (*47*). However, no items of significant interest to U.S. agriculture are currently on the prohibited list.

The import-restricted category is considerably broader (table 28). Oversight over imports of products on the restricted list is assigned to specific government ministries or agencies, which recommend import levels after considering the domestic demand and supply situation. MAF supervises imports of breeding cattle, breeding swine, breeding poultry, fresh eggs, and fresh and frozen poultry and animal meats. While large quantities of beef are regularly imported (under the supervision of the NLCF), the restrictions on eggs, poultry meat, and pork are generally used to exclude imports of these products. Many foods and agricultural items are assigned to the Ministry of Commerce and Industry (MCI), including most fruits, nuts, and a wide variety of processed foods. Again, many of these restrictions serve, in practice, as import prohibitions.[9]

Another important form of nontariff barrier is the assignment to government or quasi-government agencies of exclusive authority to import certain key products. Rice and barley may only be imported by the Office of Supply, which has allowed no barley imports in recent years. Likewise, only the NLCF may import beef.

Korean Agricultural and Food Prices in an International Context

South Korea's tariff and nontariff barriers to agricultural trade substantially raise the internal prices of most agricultural products, whether imported or domestically produced. The extent of this price increase may be appreciated by comparing internal prices (table 30, columns 1 and 2) with border unit values (columns 3 and 5).[10] The results (columns 7 and 9) suggest that Korea's trade policies raise the prices of grains, oilseeds, and beef well above international trade prices. Domestic rice producers sold their output for 2.6 times world prices in 1982. Producer prices of barley, wheat, corn, soybeans, and peanuts were likewise all far above border prices. Retail prices are similarly affected, although consumers buy barley below producer prices because of GMF subsidies and buy flour made from imported wheat at prices below those suggested by high producer wheat prices.

Data on producer prices for animal products are available only for live animals, so estimates of the effects of government policies must be based on a comparison of retail meat prices with border prices. The results suggest that beef and pork producers receive protection comparable with that enjoyed by grain producers. Poultry meat producers are less strongly protected, reflecting the relatively high efficiency of the poultry industry. Eggs receive relatively little protection. The degree of protection given to milk is probably quite high but can only be estimated because the milk moving in international trade generally differs in processing or packaging from locally produced milk.

Korean prices for a number of products, including apples, pears, and many vegetables, are competitive with world prices, allowing Korea to export these products. One reason appears to be that fruits are grown on hillsides with few alternative uses, while vegetables are grown on paddyland between rice crops, again at low opportunity cost.

The goal of increased self-sufficiency in grains and meats has already been cited as one reason for the maintenance of high producer prices through official purchases and trade barriers. A second goal—achieved with more success than the first—is to support farm incomes by transferring real incomes from consumers to agricultural producers. A typical urban household spent $492, 12.1 percent of its total consumption expenditure, on rice in 1982 (*42*). If prices had equaled the import unit value of that year, consumers would have paid about a third as much for an equal quantity of preferred-quality (Calrose) imported rice (*5, 49*). This would have freed $322 per household per year for other goods, equivalent to 8 percent of total expenditures for the average urban household (*42*).

Anderson estimates that agricultural protection cost consumers $5.2 billion per year in 1977-79, of which $3

[9]The section, "Food Marketing and Processing," notes special provision made for items imported by tourist hotels and restaurants.

[10]In cases where no Korean trade took place or where imports were solely for tourist hotels, import prices for Japan or Hong Kong are used to approximate the trade prices available to Korea.

billion reflected the effects of increased rice prices, $800 million the protection of beef production, and $733 million the protection of other livestock production (*2*). Most of this loss to consumers is transferred to farmers through higher product prices. Anderson estimates the benefits of protection to farmers at $4 billion per year in 1977-79. These calculations highlight the inherent conflict of interest between Korean consumers and farm producers over the issue of agricultural protection. The high stakes involved in this conflict suggest that, as the farm sector's relative contribution to national income declines, the interest of consumers in reduced food costs may lead to a gradual reduction in the degree of agricultural protectionism in South Korea.

Food Marketing and Processing

Korea has three, essentially separate markets for imported agricultural products: The domestic Korean market, which forms the basis of this study; U.S. military forces in South Korea, whose purchases from the United States are regarded as domestic U.S. commerce rather than as Korean imports; and the tourist hotel market, which is designed to serve foreign visitors.

Although influenced by government regulation and occasional direct involvement, Korean food markets are largely in private hands. The major exception is the participation in wholesale and retail businesses of the NACF. The NACF is an important assembler and wholesaler of farm products and has an extensive network of appointed retailers who sell NACF-distributed or -processed products. These products include many of the food products of interest to U.S. exporters, except for wheat flour and its products. Grain purchased by the Government, either from Korean farmers or from abroad, is distributed exclusively through the NACF and its retailers. The NACF also sells some commodities to any retailer, appointed or not (*54*). The NLCF is an important livestock wholesaler and is the exclusive importer of livestock products for the domes-

Table 30—Domestic prices for agricultural goods compared with border prices, 1982

Commodity	Producer price	Retail price	Korean border price[1]		Alternative border price	Ratio of Korean producer price to border price		Ratio of Korean retail price to border price	
			Imports	Exports		Ratio used	Value	Ratio used	Value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Dollars per ton								
Rice[2]	959[3]	1,104[3]	376[4]	NA	—	(1)/(3)	2.55	(2)/(3)	2.94
Barley[2]	558	420	NA	NA	161[5,6]	(1)/(5)	3.47	(2)/(5)	2.61
Wheat[7]	447	237[8]	181	NA	—	(1)/(3)	2.47	(2)/(3)	1.31
Corn	281	—	135	NA	—	(1)/(3)	2.08	—	—
Soybeans	971[8]	1,247[9,10]	269[9]	NA	—	(1)/(3)	3.61	(2)/(3)	4.64
Peanuts	2,613	—	950	NA	—	(1)/(3)	2.75	—	—
Dried peas	795[11]	—	446	NA	—	(1)/(3)	1.78	—	—
Spinach	309	—	NA	NA	801[12]	(1)/(5)	.39	—	—
Red peppers	4,202	5,197[10]	NA	2,108	—	(1)/(4)	1.99	(2)/(4)	2.47
Onions	189	—	NA	538	—	(1)/(4)	.35	—	—
Tomatoes	213	—	589	555	—	(1)/(3)	.36	—	—
Apples, fresh	467[13]	—	NA	511	—	(1)/(4)	.91	—	—
Grapes, fresh	1,025	—	NA	NA	1,740[6]	(1)/(5)	.59	—	—
Pears, fresh	409	—	2,304	714	—	(1)/(4)	.57	—	—
Oranges[14]	4[illegible]	—	277	NA	—	(1)/(3)	1.54	—	—
Beef	—[15]	10,013	2,523	NA	—	—	—	(2)/(3)	3.97
Pork	—[15]	4,868	4,599[17]	NA	1,866[12]	—	—	(2)/(5)	2.61
Chicken meat	—[15]	1,951[16]	1,947[17]	NA	1,127[12]	—	—	(2)/(5)	1.73
Eggs, fresh	1,036	1,221	NA	NA	876[12]	(1)/(5)	1.18	(2)/(5)	1.39
Milk, whole, fresh	427	727[16]	231[18]	NA	597[12,19]	(1)/(5)	.72	(2)/(5)	1.22

NA = Not available.
— = Not applicable.
[1]Import or export unit values. [2]Milled basis. [3]Native rice. [4]Nonglutinous rice, imported as brown rice. Price converted to milled basis. [5]Barley not for feeding. [6]Japanese import unit value. [7]Flour price converted to whole grain basis; retail price estimated from wholesale price. [8]White. [9]Yellow. [10]Price data missing for 1982; reported price is average of 1982 and 1983. [11]Dried garden pea. [12]Hong Kong import unit value. [13]Gookgwang variety. [14]Mandarin orange. [15]Producer prices available only for live animals. [16]Wholesale price. [17]Imports for tourist hotel market only. [18]Whole milk equivalent of powder price. [19]Fresh, in containers.

Sources: (*1, 2, 5, 17, 21, 25, 49*).

tic market (overseas purchases for the NLCF are sometimes made by GTC's) (*14*). The fisheries cooperative is also very active in wholesale trade.

Korea's private food distribution system has traditionally involved large numbers of small intermediaries and retailers. Markets with vendor stalls and small groceries are very common, although the supermarket has won an increasing share of the retail market, especially in Seoul. Korea's rapid urbanization and the serious lack of space for housing has led to the construction of vast highrise apartment complexes, and builders frequently include and operate supermarkets in the developments for the convenience of residents (*14*). This trend is likely to intensify through 1990.

Large companies are increasingly active in supermarkets and are also becoming more active in the processing and packaging of foods. The growing role of large firms in meat processing is likely to create pressure for relaxation of retail price controls, other government regulations, and institutional constraints that have so far kept the market for processed meats small. A Danish study points out that meat processors, who expect quick growth in the 1980's, prefer to deal with large, reliable swine operations, and may eventually press for permission to import raw meats directly (*14*).

The NLCF operates one large slaughterhouse and a number of feedmills. The NACF is involved in the processing of several agricultural products for export and domestic use, mostly specialty items. With these exceptions, Korea's processing industry (including grain milling and livestock slaughter) is privately owned.

The tourist hotel market accounts for a relatively small share of South Korea's total agricultural imports, but it is the major importer of many processed foods and so deserves separate attention. The Ministry of Transportation (MOT) assigns limits on the value of certain (import-restricted) items, which may be imported only for use in tourist hotels and restaurants. This trade amounted to $4.7 million in 1980 but appeared to have grown substantially in 1981. The leading import for tourist hotel use is fresh, chilled, or frozen beef. The United States has captured this market with its high-quality beef, and for the foreseeable future, this is likely to be the only significant Korean market for U.S. beef.

Tourist hotels import a wide variety of other food products. The most important are fruit juices, condiments and seasonings (including ketchup, mayonnaise, and salad dressings), fruits, and unspecified food preparations. Some Koreans do eat in tourist hotels, and the trade, although limited in total value, has the result of advertising a variety of high-value agricultural products. Tourist food use is expected to increase in 1986 and 1988, the years of the Asian and Olympic Games, respectively, in Seoul. The MOT is likely to increase its value quotas to accommodate hotel demand. Tariffs on goods for hotel use are the same as those otherwise applied (*55*).

Commodity Demand, Supply, and Trade Projections

This section examines demand and supply conditions for a number of important agricultural and forestry products, including food grains, livestock products, feeds, and cotton. The balance between demand and supply growth is used to project import demand for these commodities through 1990.

Food Grains

South Korean grain consumption per person has long been among the highest in the world and is substantially higher than in other East Asian countries (table 31).[11,12] Grain consumption per person continued to rise until 1978, peaking at 259 kg, although real incomes had earlier reached a level that would normally have been expected to stimulate a shift away from grain toward animal products. The unusually prominent role of grain in the Korean diet has partly resulted from trade barriers that have restricted supplies of other foods.

Increased total grain consumption in the 1970's mainly reflected growing rice consumption. During the colonial period (1910-45), poverty and colonial government policy forced Koreans to sell rice and to eat cheaper grains, apparently creating a pent-up demand for rice that finally found its outlet in the 1970's despite sharply rising rice prices. Rice consumption per person finally peaked at 183 kg in 1978 and has declined steadily since. Barley consumption per person began declining in 1974, while that of wheat started falling after 1980. Millet, sorghum, and other coarse grains have all but disappeared from the diet as incomes have risen, and barley seems to be following a similar course.

[11]Analysis of food grain consumption in South Korea poses special problems. Official production data contain apparent errors, and the Korean Government has frequently and vigorously intervened in consumption decisions, even at the household level, so that free market conditions are difficult or impossible to estimate.

[12]These comparisons are based on food balance methods, in which human consumption is calculated as a residual after estimated feed use, waste, stock accumulation, and other nonfood uses are deducted from available supplies (domestic production plus net imports). Errors in any of these estimates will lead to errors in food consumption figures.

Rice. Because of the vital role rice plays in the Korean diet, self-sufficiency in rice has long been a major goal of government agricultural policy. The Government has created strong price incentives for intensive rice production through its procurement program, has undertaken extensive investment in irrigation, and has supported the planting of high-yielding varieties to boost yields. Meanwhile, the Government has attempted to limit consumption by mandating the mixing of up to 30 percent barley into rice served in public places. At times, this rice-barley mixture has also been offered for sale to households at discount prices. Despite these efforts to achieve self-sufficiency, Korea had to import substantial amounts of rice throughout most of the 1970's, as consumption growth outpaced production growth (table 32). The great majority of this imported rice was supplied by the United States.

Table 31—Food consumption in East Asia, 1981

Type of food	South Korea	Taiwan	Hong Kong	Japan
	Kg per person per year			
Grains[1]	213.6	137.8	96.2	111.9
Wheat	51.4	20.6	22.2	31.8
Rice	141.1	104.2	71.4	77.8
Coarse grains[2]	21.1	13.0	2.5	2.3
Roots and tubers	9.5	7.0	7.9	17.4
Sugar products	8.8	25.4	19.5	22.4
Pulses	9.8	17.1	3.5	8.4
Soybeans	8.2	10.7	3.5	5.3
Other vegetables	182.2	99.4	51.3	101.8
Melons	11.0	21.7	9.5	10.9
Fruits	24.8	77.0	72.3	48.1
Citrus	5.4	18.3	31.5	25.4
Tropical	t	35.5	10.0	7.3
Temperate	19.4	23.2	31.6	15.4
Meats[3]	11.0	40.1	64.1	22.4
Beef	3.3	1.3	6.8	3.5
Lamb and mutton	t	.2	t	1.6
Pork	5.4	25.4	32.5	9.6
Poultry	2.3	13.3	24.8	7.7
Eggs	4.9	7.9	12.0	14.7
Marine products	35.6	37.9	35.0	36.5
Fish	23.0	37.9	35.0	34.8
Seaweed	4.6	NA	NA	1.3
Other	8.0	NA	NA	.4
Whole milk	13.2	28.8	20.7	33.9
Fats and oils	4.5	11.7	15.3	14.6
Vegetable oils	3.2	8.6	13.0	11.2
Animal fats	1.3	3.1	2.3	2.6
Butter	t	.2	1.0	.6
	Millions			
Population	38.723	18.132	5.200	117.197
	Dollars			
GNP per person[4]	1,607	2,477	4,268	8,645

t = Less than 0.1 kg.
NA = Not available.
[1]Milled basis.
[2]Excludes corn for processing.
[3]Product weight basis.
[4]At 1981 exchange rates.

Source: ERS estimates.

However, recent trends in consumption and production suggest that Korea is unlikely to remain a significant export market for rice, except following particularly bad harvests. Rice consumption per person dropped 14 percent in market years (MY's) 1979-82, before rising slightly in MY's 1983-84 in response to very low consumer prices. These changes suggest that the income elasticity for rice has declined and become negative.[13,14] Meanwhile, rice production has grown strongly since MY 1981. As a result of these shifts, Korea imported no rice in MY 1984. Moreover, rice imports in the previous 2 market years were largely unneeded from a supply-demand standpoint. South Korea imported a modest quantity from the United States in MY 1982 solely to fulfill an earlier purchase commitment. The token imports of MY 1983, donated by North Korea to aid South Korean flood victims, were offered and accepted for purely political reasons.

The assertion that Korea has attained self-sufficiency in rice must be treated cautiously. The gap between production and consumption is so small that small errors in forecasting the trend in either supply or demand can lead to large errors in the resulting import forecast. Unfortunately, the available data do not provide much help in generating accurate consumption and production forecasts. Official data on production and stock changes contain obvious errors, which in turn introduce errors into consumption estimates. As a result, projected trends in consumption and production must be based largely on judgment.

Following Anderson (*2*), the income elasticity of demand for rice is set at −0.1 for projection purposes. This assumption leads to a gradual decline in consumption per person, which is slightly outweighed by population growth. Production is projected to grow 2 percent per year to 5.96 million tons in MY 1990, mainly reflecting increasing yield and gradual expansion in irrigated area and in area sown to HYV's.

[13]The income elasticity of demand for a product is the percentage change in demand resulting from a 1-percent increase in real income.
[14]Econometric studies based on data including the 1960's find a strong positive income elasticity of demand for rice. For example, Chu estimated an income elasticity of 0.5 for the period 1962-78 (*12*).

These assumptions imply that production will gradually overtake consumption by MY 1988, eliminating any need for subsequent imports. The small import quantities shown for MY's 1986-87 reflect an assumption that the Korean authorities will not allow stocks to fall below 1 million tons. However, the Government would probably choose to eliminate such a small consumption-production gap by allowing consumer prices to rise slightly, a move that would have the added benefit of reducing the deficit of the GMF. Meanwhile, the income elasticity of demand is likely to continue falling, implying even slower growth in consumption than shown in table 32.

On the other hand, bad weather like that suffered in MY 1980 could stimulate temporary rice imports. The United States would almost certainly supply the bulk of any such imports. Koreans strongly prefer the medium-grain, low-amylose rice varieties traditionally grown in Korea and Japan, and California medium-grain (Calrose) rice is an excellent substitute for these varieties. Besides the United States, only Australia and Japan produce the kinds of rice preferred by Korean consumers. Japan is likely to be restrained by international pressure from selling rice below its very high cost of acquisition. On the other hand, the United States has a significantly larger capacity for producing the type of rice in question than Australia and so may be regarded as a more reliable supplier. Taiwan produces a somewhat less desirable rice from the Korean standpoint and cannot trade without large subsidies, which would subject it to the same pressures as Japan.

If the likelihood of further large-scale rice imports continues to recede, government efforts to limit consumption will probably be gradually reduced. In particular, the requirement that barley be mixed into rice is likely to be suspended in 1986 and 1988 for the Asian and Olympic Games.

Barley. Consumption per person of food barley has declined rapidly with increasing real income in recent years (*12, 55*). Anderson suggests an income elasticity of demand of −1.1 (*2*). Although consumers accept barley as a healthy and palatable grain, they evidently associate it with the hardships of the past and with in-

Table 32—Rice supply and demand, 1970-84 and 1985-90 projections[1,2]

Year	Opening stocks	Production	Imports	Exports	Consumption	Consumption per person
	1,000 tons					*Kg*
1970	73	3,939	937	0	4,945	153.4
1971	4	3,998	584	0	3,973	120.8
1972	613	3,957	437	0	4,296	128.2
1973	711	4,212	206	0	4,641	136.
1974	488	4,445	489	0	4,707	135.7
1975	715	4,669	168	0	4,646	131.7
1976	906	5,215	55	0	5,100	142.3
1977	1,076	6,006	0	80	5,784	158.9
1978	1,218	5,797	501	0	6,764	183.0
1979	752	5,136	580	0	5,786	154.2
1980	682	4,000	2,245	0	5,432	142.5
1981	1,495	5,063	269	0	5,463	141.1
1982	1,423	5,175	216	0	5,303	134.8
1983	1,511	5,404	7	135	5,526	138.3
1984	1,261	5,682	0	0	5,650	139.3
1985	1,293	5,400	0	0	5,600	136.1
1986	1,093	5,508	93	0	5,644	135.1
1987	1,050	5,618	18	0	5,686	134.1
1988	1,000	5,731	0	0	5,729	133.1
1989	1,002	5,845	0	0	5,770	132.1
1990	1,077	5,962	0	0	5,813	131.1

NA = Not available.
[1]Milled basis.
[2]The data apply to market years, which begin in November of the same calendar year.

Source: (*48*) and FAS records.

voluntary consumption. Besides blending barley with rice, Koreans use it to make a variety of traditional foods. Some of these, such as barley tea, are likely to remain popular, but these uses could be satisfied with very limited production. In contrast to the decline in demand for food barley, demand for malting barley for use in brewing has grown strongly in recent years. In addition, the Government released substantial amounts of barley for use in feed mixing and alcohol production in MY 1984, but this reflected a desire to reduce swollen official stocks rather than increased demand. Feed use is expected to drop off after this reduction is accomplished (table 33).

Three types of barley are produced in Korea: Common, naked, and malting barley. All three types are winter crops, typically grown on land used for rice in the summer. Common barley, grown across the middle of the country, has sustained the steepest decline in area and seems destined to die out. Naked barley, a barley without awns that requires less milling, is grown across the southern third of the country, where the growing season is the longest. Barley is planted soon after the rice harvest and harvested just before rice transplanting, periods when labor supplies are stretched thin. The rising cost of farm labor has accelerated the decline in barley area, especially in recent years when the real price received by barley producers has declined. The Government intends to reduce the GMF deficit in the late 1980's, so real producer prices are expected to decline. Barley's supply elasticity is estimated at 0.8, so this would imply a substantial drop in barley production.

Also significant is the growth of malting barley area at the expense of other barley types. Korea's breweries provide a growing demand for malting barley, and the contract system under which it is grown, with government prices and quotas announced before planting, evidently has proved popular among farmers. Information on deficits, if any, incurred by the Government in this scheme is not available.

The projections (table 33) assume a steady decline in production of barley for food in response to falling real producer prices and rising opportunity costs of land and labor. Production of malting barley will continue to grow, surpassing food barley production late in the 1980's. As in the case of rice, the consumption projections are more likely to be too high than too low for three reasons. First, the income elasticity of demand for food barley will probably continue to decline as real incomes rise, leading to an even faster drop in demand. Second, a likely reduction in government sub-

Table 33—Barley supply and demand, 1974-84 and 1985-90 projections[1,2]

Year	Opening stocks	Production	Imports	Food use	Food use per person	Feed use	Brewing	Other[3]
	1,000 tons				*Kg*	*1,000 tons*		
1974	417	1,388	429	1,948	56.2	200	5	0
1975	81	1,700	0	1,447	41.0	100	6	0
1976	228	1,759	0	1,736	48.4	100	24	0
1977	127	814	408	998	27.4	100	20	0
1978	231	1,348	0	854	23.1	100	46	0
1979	579	1,508	0	1,175	31.3	150	72	0
1980	690	811	0	1,172	30.7	104	87	0
1981	138	859	0	816	21.1	45	88	0
1982	48	749	0	575	14.6	50	79	0
1983	93	815	0	490	12.3	70	79	23
1984	246	804	0	431	10.6	300	132	67
1985	120	696	0	401	9.7	150	155	0
1986	110	597	0	374	9.0	50	183	0
1987	100	598	0	348	8.2	45	215	0
1988	90	606	0	324	7.5	40	252	0
1989	80	623	0	302	6.9	35	296	0
1990	70	650	0	281	6.3	30	349	0

[1]Polished basis.
[2]The data shown apply to market years, which begin in July of the same calendar year.
[3]Primarily alcohol production.

Source: (48) and FAS records.

sidies for barley consumption will raise the price of barley in relation to other grains and cause an additional drop in consumption not taken into account in the projections. Finally, as production declines, the Government will probably re ce its efforts to promote barley consumption, for example, by easing the requirement that barley be mixed with rice served in restaurants. If consumption should decline faster than production, the Government is likely to dispose of excess barley by pressuring feed millers to buy it, thus displacing a modest amount of feed grain imports.

Wheat. Stimulated by rapid income growth and reinforced by large Public Law (PL) 480 shipments, Korean consumption of wheat food products grew rapidly in the 1960's. However, per capita consumption followed no clear trend during the 1970's and has declined steadily since MY 1980 (table 34). Hodges estimated an income elasticity of demand of −0.25 using time-series data covering the 1970's (*18*). Domestic production has always been very limited, so consumption changes have been closely followed by changes in imports. Essentially all of Korea's imported food wheat has been supplied by the United States.

Wheat is used in a number of ways in South Korea. Most is milled into flour for use in noodles, bread, and pastries, while a limited amount is used in processed foods, such as sausage, syrup, molasses, hot dogs, and fried foods (*31, 55*). Unfortunately, time-series data on production and sales of individual wheat food products are not available.

Some flour is used to produce alcoholic beverages, especially makkolli (also known as rice wine, although brewers are now legally prohibited from using rice in its manufacture). Wheat use in makkolli and other traditional beverages will probably fall through 1990 because these drinks are declining in popularity with urbanization and modernization.

The Government has at times mandated that steamed and pressed whole wheat (supercereal) be used in place of barley in mixing with rice. If rice consumption were to grow faster than production in the late 1980's while barley production continued to decline rapidly, South Korea might choose to mix rice with wheat instead of with barley to help limit rice consumption. However, rice production is expected soon to overtake consumption, so use of wheat as a rice substitute is unlikely. Use of wheat in industrial products should remain roughly constant through 1990. Declining use in mak-

Table 34—Wheat supply and demand, 1970-84 and 1985-90 projections[1]

Year	Opening stocks	Production	Imports	Food use	Food use per person	Feed use	Other use[2]
	1,000 tons				*Kg*	*1,000 tons*	
1974	319	319	1,577	1,675	48.3	80	40
1975	209	97	1,445	1,610	45.6	30	40
1976	71	82	1,993	1,866	52.1	30	50
1977	200	45	1,806	1,796	49.3	10	51
1978	194	36	1,600	1,627	44.0	10	51
1979	142	42	1,829	1,795	47.8	10	51
1980	208	92	2,025	2,064	54.1	10	51
1981	200	57	2,000	1,990	51.4	7	51
1982	202	66	1,880	1,923	48.9	5	52
1983	168	112	2,351	1,938	48.6	404	52
1984	237	17	2,950	1,948	48.0	950	52
1985	254	20	2,300	1,963	47.7	350	52
1986	209	18	1,998	1,963	47.0	10	52
1987	200	17	1,998	1,963	46.3	10	52
1988	190	16	1,999	1,963	45.6	10	52
1989	180	15	2,000	1,963	44.9	10	52
1990	180	14	2,001	1,963	44.2	10	52

[1]The data shown apply to market years, which begin in July of the same calendar year.
[2]Mainly glue and starch.

Source: FAS records.

ing glue for the plywood industry should offset slowly increasing production of starch for the textile and shoe industries.

Finally, unusually high international corn prices and low wheat prices stimulated large-scale Korean imports and use of feed wheat (mostly from Australia, some from the United States) in MY's 1983-84. However, a return to a more normal corn-wheat price relationship is expected to eliminate feed wheat imports after MY 1985.

Using Hodges' elasticity estimate to forecast demand trends in 1986-90 leads to per capita consumption falling 1.5 percent per year. Population growth just offsets this decline, leaving total consumption and imports roughly constant (table 34). Moreover, Canada and Australia have recently made strong efforts to gain a foothold in the Korean import market for food wheat. This suggests that U.S. wheat exporters will face two challenges in the late 1980's: Trying to limit the decline in per capita wheat flour consumption by popularizing new uses for flour, and trying to retain 100 percent of the food wheat market. Meeting these challenges will require vigorous market development efforts.

Domestic wheat production dropped sharply in 1984, following the Government's announcement that it would discontinue purchasing the domestic wheat crop as a budget-reducing measure. With domestic production less than 1 percent of total use, South Korea is now completely dependent on imports for its supply of wheat.

Corn for Food and Industrial Use. Small amounts of corn are consumed directly as food in South Korea. MY 1983 (November 1983-October 1984) food consumption was a mere 43,000 tons (less than half the domestic crop), and most of this was consumed on the farm. However, a significant share of corn imports represent "industrial" corn, used to manufacture sweeteners, starch, and meal. Except for a small amount of starch used in the textile and paper industries, all of this industrial corn is ultimately consumed as food.

The chief growth factor in industrial corn use has been wet milling for corn sweeteners (syrups, glucose, and fructose). The amount of corn used in sweetener production grew from 56,000 tons in MY 1976 to 667,000 tons in MY 1982, accounting for 61 percent of industrial corn use in MY 1982. Production of high-fructose corn syrup began in 1980 and has grown rapidly since, with widespread use as a sweetener for soft drinks.

However, corn use in sweetener production fell 6 percent (40,000 tons) in MY 1983, when low world sugar prices allowed imported sugar to compete with corn sweeteners in spite of Korea's substantial import barriers. The planned liberalization of sugar imports in mid-1985 seriously clouds prospects for industrial corn imports. A model of the world sweetener market is beyond the scope of this study. Therefore, it is assumed that corn use in sweetener production will fall from 382,000 tons in MY 1983 to 282,000 tons in MY 1985, and then resume growth of 10 percent a year through 1991. In contrast, starch and meal use are assumed to grow 3 percent a year. Finally, direct food use will decline gradually to 23,000 tons in 1990. These assumed trends lead to forecast growth in total consumption of corn for food and industrial use from a low point of 578,000 tons in MY 1985 to 778,000 tons in MY 1990.

Livestock Food Products

Poverty has long constrained the Korean diet. In particular, per capita consumption of meats and other animal products was very low through the 1960's, and remains low despite rapid growth since the early 1970's (tables 31 and 35-40).[15] Korea's livestock economy is important to the United States primarily because of its bearing on Korea's feedstuff imports. Growth in livestock production will strongly affect the amounts of feed grains and soybeans the United States ships to Korea. Domestic beef and milk production is unlikely to keep pace with the growth in demand in the late 1980's, so imports will satisfy an increasing share of consumption. In contrast, increased domestic production of pork and poultry will keep pace with growth in demand, using feeds made from imported feed grains, oilseeds, and protein meals. Korea's feed imports will grow more slowly if consumers turn increasingly to beef and/or dairy products than if they choose to consume more pork and poultry.

In the following sections, growth in domestic production of livestock products through 1990 is estimated on the basis of Korea's resource constraints and technical capabilities. Growth in demand is based on assumed

[15]Fish consumption per person in South Korea is considerably higher than that of meats but remains lower than fish consumption in other East Asian countries (table 31). A full treatment of livestock demand trends would have to consider the relationship between the demand for fish and the demand for various livestock products. This is not done here because the data required for an adequate analysis of this relationship are not available. Instead, based on a comparison of South Korean consumption patterns with those in higher income East Asian countries, Korean fish consumption per person is implicitly assumed to continue to grow with real income along with that of livestock products.

rates of growth in real income and population, together with estimated income elasticities of demand as reported by Anderson (*1*).[16]

Beef. Beef production in South Korea comes mainly from breeds that, until recently, were used for draft power, although imported feeder cattle, progeny from imported beef breeder cattle, and culled dairy cattle supply increasing amounts of beef. About 45 percent of all farm households raise cattle, the great majority raising one or two head as a sideline to grain production. Data on production and consumption of beef are approximate at best (table 35). FAS production estimates have exceeded those published by the NLCF by wide margins in recent years. As a result, forecasts of Korean beef demand are subject to considerable uncertainty.

Beef production stagnated during the 1970's, increased strongly in 1979-80, and then fell sharply in 1981-82. Government financial support for cattle imports helped fuel a strong buildup in cattle inventories from 1982 through mid-1985, which was finally reversed by declining cattle prices. Increased slaughter in 1985 led to temporarily increased beef production, which is expected to decline in 1986. Meanwhile, the Government tried to prop up cattle prices in 1984-85 by sharply reducing beef imports, which led to stagnant consumption.

Anderson's estimate of the income elasticity of demand for beef (1.2) implies growth in beef consumption to 5.33 kg per person in 1990 (41 percent higher than in 1985), or 236,000 tons in total (*1*). Limited pasture area and roughage supplies are likely to keep domestic production from growing quickly enough to keep pace with demand growth (see "Feed Demand and Import Projections" for further discussion). Production is assumed to grow from 144,000 tons in 1986 to 156,000 tons in 1990. If imports are allowed to fill the gap between consumption demand and domestic production, these projections imply a decline in Korean self-sufficiency in beef production from 87 percent in 1986 to 66 percent in 1990, rather than heading toward the Government's self-sufficiency goals of 90 percent by 1991 and 100 percent by 1995. Although most outside observers are convinced that the constraints on roughage supply make these goals unattainable without placing a massive drain on the rest of the economy, the Government might try to repress imports and consumption rather than to fall short of its self-sufficiency targets.

[16]We would like to base these projections on econometric estimates of product demand. Using this approach, consumption per person of each member of the livestock product group (beef, pork, chicken meat, eggs, and milk) would be estimated as a function of real income per person, own price, and the prices of the other members of the group plus fish. Unfortunately, published Korean data do not lend themselves to this purpose. Most give only slaughter estimates, while the meat production figures published by the NLCF differ sharply from the estimates of FAS in Seoul. The FAS series, on the other hand, covers too brief a period to be used for econometric work. Anderson's income elasticity estimates represent "best guesses" based on the advice of a number of Korean and foreign economists familiar with the Korean livestock economy.

Table 35—Beef supply and demand, 1976-84 and 1985-90 projections

Year	Beginning stocks	Production	Imports	Consumption	Ending stocks	Consumption per person
	1,000 tons					*Kg*
1976	0	102	1	103	0	2.87
1977	0	106	8	111	3	3.05
1978	3	102	45	141	8	3.81
1979	8	118	60	172	14	4.58
1980	14	127	2	138	5	3.62
1981	5	94	34	127	6	3.28
1982	6	83	73	148	14	3.76
1983	14	90	67	160	11	4.00
1984	11	122	28	149	12	3.67
1985	12	155	2	155	12	3.77
1986	14	144	22	169	11	4.04
1987	11	148	34	183	10	4.33
1988	10	152	49	200	11	4.64
1989	11	154	64	217	12	4.97
1990	12	156	80	236	12	5.33

Sources: (*33*) and FAS records.

The outcome of this political conflict between bureaucratic and farmer interests and consumers is unclear. However, even the sharply increasing beef prices that would result from a determined policy of import restriction would probably not raise production levels much above those shown. The implied growth in demand for feedstuffs from domestic beef production should, therefore, remain relatively insensitive to the outcome of this issue. Although Korea will continue to purchase the bulk of its beef imports from Australia, imports of U.S. grain-fed beef may grow in the late 1980's (perhaps to 10,000 tons), especially in 1986 and 1988, when major increases in tourism are expected for the Asian and Olympic games.

Pork. Koreans eat substantially more pork per person than beef (table 36), largely because retail beef prices are typically double or more those of pork. However, pork is less preferred than beef, in the sense of having a lower income elasticity of demand. Anderson (*1*) uses an estimated elasticity of 1.1, which is adopted in making projections here. This assumption leads to estimated pork consumption of 11.94 kg per person in 1990, a 62-percent increase over 1983. Total consumption would be 529,000 tons, 80 percent above the 1983 level. These projections could understate actual growth in consumption, for they do not incorporate a shift in consumer preferences for pork, which the Korean Government and, to a degree, the United States Feed Grain Council are trying to promote.

Most pork operations in Korea are reported to be housed in temporary vinyl houses or other low-cost structures, with poor ventilation and labor-intensive production methods. However, the industry is reported to be moving toward vertical integration and is increasing in scale. The number of households raising swine declined sharply in 1979-82 (table 37), implying an increase in the size of operation of the remaining producers. The industry is improving technically, and by 1990 Korean production costs should be competitive with world trade prices, except for the transportation and handling costs of relying on imported feedstuffs. Therefore, the Government is likely to stick to its policy of enforcing self-sufficiency by excluding imports, so that Korean pork consumption will continue to rely solely on domestic production.

Chicken Meat. Consumption of chicken meat is relatively low, at 3.08 kg per person in 1983 (table 38).[17] This appears to be largely the result of a traditionally negative image of chicken among consumers. However, consumption growth in recent years suggests that more favorable attitudes toward chicken meat may be emerging among consumers. Anderson (*1*) reports an income elasticity of demand of 1.0, only slightly less than those for pork and beef. Adopting this elasticity leads to projected consumption of 4.16 kg per person in 1990, 35 percent greater than in 1983.

[17]Production and consumption of poultry meat other than chicken meat is negligible.

Table 36—Pork supply and demand, 1977-84 and 1985-90 projections

Year	Opening stocks	Production	Imports	Consumption	Ending stocks	Consumption per person
	1,000 tons					*Kg*
1977	0	146	5	142	0	3.88
1978	0	172	8	177	2	4.81
1979	2	223	11	229	7	6.00
1980	7	235	0	241	1	6.32
1981	1	210	0	210	0	5.42
1982	0	238	0	238	0	6.05
1983	0	295	0	294	1	7.36
1984	1	339	0	340	0	8.38
1985	0	357	0	357	0	8.67
1986	0	386	0	386	0	9.25
1987	0	418	0	418	0	9.86
1988	0	452	0	452	0	10.51
1989	0	489	0	489	0	11.20
1990	0	529	0	529	0	11.94

Sources: (*33*) and FAS records.

Table 37—Livestock and poultry numbers and households raising livestock and poultry, 1971-83[1]

Year	Native cattle	Households raising native cattle	Dairy cattle	Households raising dairy cattle	Beef cattle	Households raising beef cattle	Swine	Households raising swine	Chickens	Households raising chickens
	1,000 head	*Thousands*	*1,000 head*	*Thousands*	*1,000 head*	*Thousands*	*1,000 head*	*Thousands*	*1,000 head*	*Thousands*
1971	1,247	1,048	30	3	3	1	1,333	925	25,903	1,110
1972	1,333	1,106	36	4	5	1	1,248	861	24,537	1,045
1973	1,486	1,190	52	5	7	1	1,595	817	23,071	1,004
1974	1,778	1,358	73	7	7	1	1,818	890	18,814	1,002
1975	1,546	1,275	86	9	10	2	1,247	654	20,939	1,094
1976	1,451	1,193	90	10	12	2	1,953	910	26,325	1,237
1977	1,492	1,169	109	14	16	4	1,482	689	30,224	1,179
1978	1,624	1,170	136	16	27	6	1,719	658	40,753	1,172
1979	1,563	1,082	163	17	36	10	2,843	758	41,121	923
1980	1,390	989	194	22	38	8	1,784	503	40,130	692
1981	1,283	851	194	18	29	7	1,832	425	42,999	628
1982	1,526	896	228	23	NA	NA	2,183	444	46,592	618
1983	1,940	971	275	30	NA	NA	3,649	539	49,239	538

NA = Not available.
[1]Figures for year's end.

Source: (*44*).

Table 38—Chicken meat supply and demand, 1970-84 and 1985-90 projections

Year	Beginning stocks	Production	Imports	Consumption	Ending stocks	Consumption per person
	1,000 tons					*Kg*
1970	NA	45	0	45	NA	1.40
1971	NA	50	0	50	NA	1.52
1972	NA	54	0	54	NA	1.62
1973	NA	52	0	52	NA	1.52
1974	NA	53	0	53	NA	1.54
1975	NA	56	0	56	NA	1.58
1976	NA	61	0	61	NA	1.70
1977	NA	73	0	73	NA	2.01
1978	NA	82	0	82	NA	2.22
1979	0	90	0	89	1	2.39
1980	1	90	0	91	0	2.36
1981	0	91	0	90	1	2.32
1982	1	99	0	100	0	2.54
1983	0	123	0	123	0	3.08
1984	0	121	0	121	0	2.98
1985	0	128	0	128	0	3.11
1986	0	138	0	138	0	3.30
1987	0	148	0	148	0	3.49
1988	0	159	0	159	0	3.70
1989	0	171	0	171	0	3.93
1990	0	185	0	185	0	4.16

NA = Not available.

Sources: (*33*) and FAS records.

A number of problems reportedly affect the marketing of chicken meat. The U.S. Feed Grains Council reported that, as of 1981, there were "no standards for dressing, cutting, packing, and pricing of poultry meat." The council pointed out that, as incomes rise, not only will the demand for meat rise, but also the demand for sanitary processing and delivery (*58*). The chicken market remains relatively free of government regulation and has failed to develop an orderly market system. This suggests that convenience to consumers, who are increasingly unable to buy and cook meat in traditional ways because of limited time, has received little attention. The number of traditional Korean recipes using chicken is apparently limited. One bright spot in recent years has been the ready acceptance of fried chicken products from specialized restaurants that are proliferating in Korea.

The Korean Government, the Korean poultry industry, and U.S. feedstuff growers all have an interest in increasing Korean consumption of broiler meat. Government and/or private measures could overcome many of the marketing problems and help remove the image of chicken meat as a cheap, inferior meat. With this kind of change, consumption could grow quickly because production of much greater quantities of chicken meat in a relatively short time would be possible with little pressure on costs. The broiler industry is at much the same stage of technical development as the pork industry. Makeshift buildings and inefficient handling procedures are giving way to larger scale, integrated operations, which should raise efficiency and may lead to improved marketing practices (table 37).

Eggs. Growth in egg consumption, like that of poultry meat, has been limited by a negative image of the product among consumers (table 39). Marketing is somewhat chaotic, unregulated, and not attuned to changing consumer desires for sanitation and convenience, let alone promoting increased desire for eggs. Most eggs are sold at the retail level uncleaned and unpacked. However, overhauling the marketing system is possible, and the Government and parts of the industry would be likely to favor this. Modernized marketing practices, together with promotional efforts to remind people of the positive aspects of eggs, might well boost consumption significantly.

FAS/Seoul estimates that South Koreans will consume 5.07 billion eggs as food and use 180 million eggs for hatching in 1985. Anderson's income elasticity estimate of 1.0 leads to consumption of 7.31 billion eggs as food (total consumption 7.58 billion) in 1990 (*1*). Production has responded quickly to increased demand in the past and should be able to handle this demand growth. These projections assume substantial changes in consumer attitudes, aided by improved marketing practices.

Milk. Growth in per capita milk consumption averaged over 25 percent per year in 1965-83. If this pace were to continue through 1990, per capita consumption would reach 90 kg (nearly 5 times actual consumption in 1983) and total consumption would grow to almost 4 million tons. Forecasting such an increase seems rash. Korea's roughage shortage will constrain the growth of milk production at least as strongly as that of beef, and the Government is unlikely to allow imports to grow without limit. Moreover, at least part of the rapid growth in average consumption so far has reflected the spread of milk consumption to new consumers rather than growth in the consumption of those already drinking milk. Demand growth will ease as the number of potential converts to milk consumption declines. However, consumption growth has been so rapid that further substantial increases seem likely. Assuming 12-percent annual growth in per capita consumption in 1984-86 followed by 7.2-percent growth through 1990 (reflecting Anderson's estimated income elasticity of 1.2) implies per capita consumption of 33.9 kg in 1990, 86 percent above that of 1983 (*1*).[18] Total consumption would then be 1.63 million tons, or 124 percent greater than in 1983 (table 40).

As in the case of beef, however, Korea's shortage of pasture and roughage supplies is likely to prevent production from growing as rapidly as demand growth. How available pasture would be split between beef and dairy cattle is unclear. The supply projections assume 5.7-percent annual growth in milk production in 1985-90 (table 40). This assumption leads to rapidly growing imports, which might be distasteful to policymakers.

However, a generation of children has already been raised on milk and will regard it as an integral part of the diet. Moreover, the Government itself has played a major role in promoting milk consumption and, thus, may be reluctant to reverse itself and restrict consumption to the level of domestic production. Only fluid milk is consumed in any quantity at present, so Korea remains a potential market for other dairy products. Market development of these products should be considered in the late 1980's.

Soy milk is already consumed in Korea, and many consumers probably regard it as a reasonable substitute for cow's milk. Expanded consumption of soy milk in

[18]Under these assumptions, Korean consumption per person in 1990 rises to the level of Japanese consumption in 1980.

Table 39—Egg supply and demand, 1970-84 and 1985-90 projections

Year	Beginning stocks	Production	Imports	Hatch use	Food use	Total use	Food use per person	
	1,000 tons						*Kg*[1]	*Eggs*
1970	NA	2,456	NA	88	2,368	2,456	4.04	73
1971	NA	2,536	NA	91	2,445	2,536	4.09	74
1972	NA	2,790	NA	100	2,690	2,790	4.41	80
1973	NA	2,500	NA	90	2,410	2,500	3.89	71
1974	NA	2,755	NA	99	2,656	2,755	4.21	77
1975	NA	2,896	NA	104	2,792	2,896	4.35	79
1976	NA	3,049	NA	110	2,939	3,049	4.51	82
1977	NA	3,552	NA	128	3,424	3,552	5.17	94
1978	NA	3,743	NA	135	3,608	3,743	5.37	98
1979	0	4,231	138	152	4,209	4,361	6.17	112
1980	8	4,573	312	165	4,709	4,874	6.79	124
1981	19	4,431	15	158	4,288	4,446	6.09	111
1982	19	4,505	0	162	4,347	4,509	6.08	111
1983	15	4,936	0	170	4,764	4,934	6.56	119
1984	17	5,089	0	175	4,911	5,086	6.66	121
1985	20	5,250	0	180	5,072	5,252	6.78	123
1986	18	5,662	0	203	5,457	5,661	7.18	131
1987	19	6,090	0	219	5,871	6,089	7.62	138
1988	20	6,553	0	235	6,317	6,552	8.07	147
1989	21	7,050	0	253	6,795	7,049	8.56	156
1990	22	7,585	0	273	7,312	7,584	9.07	165

NA = Not available.
[1]Egg numbers have been converted to weights by using a rate of 0.055 kg per egg.

Sources: (*33*) and FAS records.

Table 40—Milk supply and demand, 1975-83 and 1984-90 projections

Year	Beginnning stocks	Production	Waste	Imports	Consumption	Consumption per person
	1,000 tons					*Kg*
1975	5	163	3	0	162	4.59
1976	3	200	2	0	199	5.55
1977	2	264	3	0	261	7.17
1978	8	324	3	0	326	8.82
1979	3	385	4	13	375	9.99
1980	22	458	5	0	413	10.83
1981	62	518	5	0	557	14.39
1982	18	580	4	13	592	15.05
1983	15	716	4	10	729	18.25
1984	8	840	5	0	829	20.44
1985	29	977	6	0	971	22.89
1986	58	1,033	6	20	1,071	25.64
1987	34	1,092	6	74	1,165	27.48
1988	28	1,154	7	114	1,268	29.46
1989	22	1,220	7	160	1,380	31.58
1990	12	1,290	8	213	1,501	33.86

Source: (*45*).

place of cow's milk could serve the interest of the United States by encouraging Korea to import U.S. soybeans rather than Brazilian soy meal.

Feed Demand and Import Projections

The livestock production projections made in the previous section are used here to project demand for feed concentrates.[19] Detailed data on Korean feed-livestock conversion rates (that is, the amount of feed needed to produce 1 kg of each livestock product) are not available. Data are available showing production of feed concentrates by animal type from 1970 on. However, the amounts of corn, soybean meal, and other components used to produce feed for each type of animal cannot be established with the available data. Instead, we are forced to project feed demand assuming a single aggregate feed composition for the whole livestock sector.[20]

Data on livestock product output (table 41) and on the amount of concentrates produced for each type of animal (table 42) are used to estimate feed conversion rates for different livestock activities (table 43). The feed conversion rate for beef refers to feed produced for the imported-breed beef herd and the native cattle herd. The rate of milk production includes all concentrates going to dairy animals, although dairy culls are an increasingly important source of beef. Thus, some feed that actually went to meat production from culls is counted as going to milk, but the beef conversion rate shown is the ratio of feed production for beef animals to all beef produced, including that from culls. Poultry meat and eggs are lumped together, as is the feed used to produce them.

[19]Concentrates, compounded from feed grains and protein meals plus small amounts of additives, fully meet the nutritional needs of swine, broilers, and layers. Korean production of concentrate feeds is based almost entirely on imported components. Efficient production of beef and milk, on the other hand, require substantial intake of roughage, which is in short supply in Korea and expensive to import. The constraints on beef and dairy production imposed by limited roughage availability are examined in "Feed Grains."

[20]The Korean data show only the production of each type of feed, not the amount actually consumed. We assume that production and consumption are equal and use the two terms interchangeably.

Table 41—Livestock product output, 1970-84 and 1985-90 projections

Year	Beef	Pork	Poultry meat	Eggs[1]	Poultry and eggs	Milk
			1,000 tons			
1970	NA	NA	45	135	180	50
1971	NA	NA	50	140	190	62
1972	NA	NA	54	154	208	80
1973	NA	NA	52	138	190	104
1974	NA	NA	53	152	205	127
1975	NA	NA	56	159	215	163
1976	102	NA	61	168	229	200
1977	126	146	73	196	269	264
1978	102	172	82	206	288	324
1979	118	223	90	233	323	385
1980	127	235	90	250	340	458
1981	94	210	91	243	334	518
1982	83	238	99	248	347	580
1983	90	295	123	271	394	716
1984	122	339	121	280	401	814
1985	155	357	128	289	417	977
1986	144	386	138	311	449	1,033
1987	148	418	148	335	483	1,092
1988	152	452	159	360	519	1,154
1989	154	489	171	388	559	1,220
1990	156	529	185	417	602	1,290

NA = Not available.
[1]Egg numbers have been converted to weights by using a rate of 0.055 kg per egg.

Sources: (*33*) and FAS records.

The results show that the pattern of feed use in Korea has been changing, as more farmers have begun using concentrates and as feed rations have changed among those operations using grain-based feeds. Only the dairy sector exhibited relatively stable behavior in 1980-84. In the absence of better information, Japanese feed conversion rates are used as points of reference in projecting future trends in Korean conversion rates.

Conversion rates for pork rose through the late 1970's as farmers turned to concentrate feeding.[21] In 1984, the rate reached 5.86 kg of feed per kg of pork, 35 percent higher than the rate calculated by Coyle for Japan in 1980 (*19*). Higher Korean feed conversion rates are not surprising in that Korea's pork industry is not as technically efficient as Japan's and contains more small operations. The conversion rate for pork has shown no clear trend in recent years, so it is assumed to remain constant through 1990 at its 1984 level of 5.86 (table 43).

The poultry and egg sector led in the early use of concentrate feeding in Korea and remains the largest user of feeds, although its lead has been narrowed by faster growth in pork production and increased pork conversion rates. The poultry and egg sector, characterized by some medium and many small operations, is likely to be volatile and somewhat inefficient in feeding during the 1980's. The conversion rate for poultry meat and eggs peaked in 1979 and has gradually declined since. The projection made here assumes that the conversion rate will drop through 1990 to 4 kg of feed per kg of output, roughly a third higher than Coyle's predicted rate for Japan in 1990.

Beef feed conversion rates jumped sharply in 1981-83, apparently because of a large-scale shift to concentrate feeding (*55*). This trend is assumed to continue, with conversion rates rising by 1990 to 11. Dairy production is characterized by relatively large and modern operations, and feed conversion rates have been fairly stable since 1977. The average rate for 1977-84, 1.03, is assumed to apply through 1990.

Based on the assumed changes in feed conversion rates, total production of concentrates is projected to increase 43 percent from 1984 to 1990 (tables 42 and 44). The rapid gain in feeding efficiency assumed in the poultry and egg sector implies relatively little growth in feed production for that sector despite rapid growth in poultry meat and egg production. The impact of the assumed decline in the feed conversion rate for poultry and eggs outweighs the effect of the increased conversion rate for beef, so that growth in total feed production lags behind the 54-percent increase in total livestock production (49 percent excluding milk). If the feed conversion

[21]The very high rates in 1979 and 1983 reflected unusually large hog numbers in those years and fell after these excess numbers were worked off.

Table 42—Feed concentrate production by livestock activity, 1970-84

Year	Beef	Pork	Poultry and eggs	Milk	Other	Total
			1,000 tons			
1970	NA	10	460	19	19	508
1971	7	20	613	33	29	702
1972	6	48	646	53	23	776
1973	5	122	685	83	15	910
1974	45	189	554	122	17	927
1975	33	136	569	151	12	901
1976	44	207	868	174	89	1,382
1977	96	350	1,155	266	32	1,899
1978	233	498	1,638	321	3	2,693
1979	266	1,130	2,044	438	2	3,880
1980	306	769	1,872	514	1	3,462
1981	415	761	1,842	471	2	3,491
1982	693	1,151	1,980	592	4	4,420
1983	871	2,013	2,246	710	12	5,852
1984	1,072	1,987	2,065	853	8	5,985

NA = Not available.

Sources: (*46*) and FAS records.

rate for poultry and eggs were to remain at its 1984 level, this would imply an additional 693,000 tons of feed production by 1990, based on the projected increase in poultry and egg output. Alternatively, a constant conversion rate of beef would reduce 1990 feed production by 345,000 tons.

Feed Grains. Total grain consumption in feed production rose from 471,000 tons in 1972 to 3.88 million tons in 1983, while feed use of vegetable protein meals underwent a similarly dramatic increase (table 45). Assuming that the share of grain in feed production remains constant through 1990 at 66.5 percent, the aggregate feed production forecast (table 46) implies growth in feed use of grain to 5.69 million tons in 1990. This projection takes into account only the use of concentrates, which already dominate Korea's feed-livestock economy and are increasingly displacing other forms of feeding. The important problem of roughage supply is discussed under "Roughage."

The availability of domestically produced feed grains is unlikely to exceed 100,000 tons because of the general grain supply constraints discussed under "Food Grains." Therefore, essentially all of the projected increase in feed grain consumption will come from increased imports (table 47).

Table 43—Feed conversion rates, 1970-84 and 1985-90 projections

Year	Beef	Pork	Poultry and eggs[1]	Milk
	Kg of feed per kg of product			
1970	NA	NA	2.55	0.32
1971	NA	NA	3.23	.53
1972	NA	NA	3.11	.66
1973	NA	NA	3.61	.80
1974	NA	NA	2.70	.96
1975	NA	NA	2.65	.93
1976	0.43	NA	3.79	.87
1977	.76	2.40	4.29	1.05
1978	2.28	2.90	5.69	.99
1979	2.25	5.07	6.33	1.14
1980	2.41	3.27	5.51	1.12
1981	4.41	3.62	5.49	.91
1982	8.35	4.84	5.71	1.02
1983	9.68	6.82	5.70	.99
1984	8.79	5.86	5.15	1.05
1985	9.12	5.86	4.94	1.03
1986	9.47	5.86	4.73	1.03
1987	9.83	5.86	4.54	1.03
1988	10.21	5.86	4.35	1.03
1989	10.60	5.86	4.17	1.03
1990	11.00	5.86	4.00	1.03

NA = Not available.
[1]Egg numbers have been converted to tons using a rate of 0.055 kg per egg.

Sources: (*33*) and FAS records.

Prior to 1983, 88 percent or more of South Korea's feed grain imports consisted of corn, while 95 percent or more of this corn was supplied by the United States (table 13). Competitive pricing occasionally allowed Thailand to gain a small percentage of the corn market, but recurrent quality problems prevented Thai corn from making significant inroads in the U.S. market share. Depending on relative prices, Korea would sometimes supplement its corn imports with modest amounts of sorghum purchased from a variety of suppliers, including the United States.

This pattern began changing in mid-1983. Unusually high world corn prices and low wheat prices stimulated heavy substitution of feed wheat and other feed grains for corn. Crop damage to the 1983/84 wheat crop in Australia and New Zealand led to large stocks of feed-quality wheat, which soon captured most of Korea's feed wheat import market. These excess stocks were depleted by early 1985, eliminating this source of competition to U.S. corn. However, by then a new, more serious threat to U.S. dominance of the Korean feed grain market had arisen: Chinese corn. Agricultural policy reforms in China have stimulated extraordinary growth in farm output in recent years, giving rise to greater corn output that can be consumed domestically. Beginning in June 1984, China began shipping corn to South Korea on a large scale. By October 1984-June 1985, China had gained a 56-percent share of the Korean corn market, squeezing the U.S. share to 43 percent.

The rapid growth in the Chinese market share has been based on competitive pricing, reinforced by a strong advantage in shipping costs from the production area in Northeast and North China. Quality is reported to be adequate. The limited information available suggests that the availability of Chinese corn for export is likely to decline gradually through 1990 as domestic demand catches up with production. Such supply constraints would allow the U.S. corn share to recover at least some of the ground lost in 1984-85.

Other sources of potential competition with U.S. corn pale in comparison with that posed by Chinese corn. Thailand's ability to export corn to Korea is likely to decline through 1990, as increased feeding in Southeast Asia absorbs Thai supplies. South Africa sometimes supplies Korea with corn for industrial, not feed, use.

Table 44—Feed concentrate production by livestock activity, 1985-90 projections[1]

Year	Beef	Pork	Poultry and eggs	Milk	Other[2]	Total
			1,000 tons			
1985	1,414	2,092	2,059	1,006	5	6,576
1986	1,364	2,262	2,125	1,064	5	6,820
1987	1,455	2,449	2,192	1,125	5	7,226
1988	1,552	2,649	2,259	1,189	5	7,654
1989	1,632	2,866	2,330	1,257	5	8,090
1990	1,716	3,100	2,408	1,329	5	8,558

[1]Assumed changes are described in text. [2]Feed production for other animals is set at its 1980-84 average.

Sources: (*33*), FAS records, and projections by authors.

Table 45—Aggregate use of components for mixed feed production, 1972-83[1,2]

Year	Grain	Bran	Protein meal			Inorganic substances[3]	Other[4]	Total
			Vegetable	Animal	Total			
				1,000 tons				
1972	471	124	88	49	138	42	2	776
	(60.7)	(16.0)	(11.3)	(6.4)	(17.8)	(5.4)	(0.3)	(100.0)
1973	508	217	85	49	135	56	3	919
	(55.3)	(23.6)	(9.2)	(5.3)	(14.7)	(6.1)	(.3)	(100.0)
1974	489	236	95	49	144	56	6	931
	(52.5)	(25.3)	(10.2)	(5.3)	(15.5)	(6.0)	(.6)	(100.0)
1975	442	262	98	50	148	53	9	914
	(48.4)	(28.7)	(10.7)	(5.5)	(16.2)	(5.8)	(1.0)	(100.0)
1976	750	323	153	73	226	83	12	1,395
	(53.8)	(23.2)	(11.0)	(5.2)	(16.2)	(5.9)	(.9)	(100.0)
1977	1,062	440	191	99	290	119	8	1,919
	(55.3)	(22.9)	(10.0)	(5.2)	(15.1)	(6.2)	(.4)	(100.0)
1978	1,583	541	293	140	433	142	19	2,718
	(58.2)	(19.1)	(10.8)	(5.2)	(15.4)	(5.2)	(.7)	(100.0)
1979	2,440	627	488	134	622	202	21	3,913
	(62.4)	(16.0)	(12.5)	(3.4)	(15.9)	(5.2)	(.5)	(100.0)
1980	2,077	685	416	101	517	184	22	3,485
	(59.4)	(19.7)	(11.9)	(2.9)	(14.8)	(5.3)	(.6)	(100.0)
1981	2,086	680	447	94	541	179	24	3,510
	(59.6)	(19.4)	(12.7)	(2.7)	(15.4)	(5.1)	(.7)	(100.0)
1982	2,908	575	583	93	676	217	44	4,420
	(65.8)	(13.0)	(13.2)	(2.1)	(15.3)	(4.9)	(1.0)	(100.0)
1983	3,880	661	831	129	960	281	70	5,852
	(66.3)	(11.3)	(14.2)	(2.2)	(16.4)	(4.8)	(1.2)	(100.0)

[1]Figures in parentheses show percentage of total use. [2]Total feed component use exceeds feed production by an average 0.8 percent in NLCF data for 1972-81; the difference reflects waste in feed production. FAS data for 1982 and later years eliminate the gap between the two series. [3]Includes shell and bone powder, salt, vitamins, and other additives. [4]Includes urea, seaweed, tallow, molasses, and other ingredients.

Sources: (*46*) and FAS records.

Argentina could supply some corn on a sporadic basis. The import projections developed under "Implications for U.S. Agricultural Exports" are based on the assumption that the United States and China will supply essentially all of Korea's corn needs through 1990. That section will explore the implications of different assumptions about the two suppliers' market shares.

Oilseeds and Protein Meals. Vegetable meals supplied 85 percent of Korea's total protein meal needs on average in 1981-83. Domestic sources include rapeseed, sesame, and perilla, which as a group face constraints on area expansion similar to those facing grains. Expanded planting of rape and sesame is a high priority for the MAF, but meal production from domestic oilseeds is unlikely to grow more than 10,000 tons by 1990. Soybean meal supplied 83 percent of all vegetable meal and 71 percent of all protein meal in 1981-83. All soybean meal used in Korea is derived from imports, most crushed from imported beans and the remainder imported directly as meal. All domestic soybean production (as well as a share of soybean imports) is used for food, and this is unlikely to change.

Table 46—Use of components in feed production, 1984-90 projections[1]

Year	Grain	Bran	Protein meal			Inorganic substances[2]	Other[3]	Total
			Vegetable	Animal	Total			
				1,000 tons				
1984	3,979	718	792	132	924	305	60	5,986
	(66.5)	(12.0)	(13.2)	(2.2)	(15.4)	(5.1)	(1.0)	(100.0)
1985	4,371	789	870	145	1,015	335	66	6,576
	(66.5)	(12.0)	(13.2)	(2.2)	(15.4)	(5.1)	(1.0)	(100.0)
1986	4,535	818	907	143	1,050	348	68	6,820
	(66.5)	(12.0)	(13.3)	(2.1)	(15.4)	(5.1)	(1.0)	(100.0)
1987	4,805	867	961	152	1,113	369	72	7,226
	(66.5)	(12.0)	(13.3)	(2.1)	(15.4)	(5.1)	(1.0)	(100.0)
1988	5,090	918	1,018	161	1,179	390	77	7,654
	(66.5)	(12.0)	(13.3)	(2.1)	(15.4)	(5.1)	(1.0)	(100.0)
1989	5,380	971	1,084	162	1,246	413	81	8,090
	(66.5)	(12.0)	(13.4)	(2.0)	(15.4)	(5.1)	(1.0)	(100.0)
1990	5,691	1,027	1,147	171	1,318	436	86	8,558
	(66.5)	(12.0)	(13.4)	(2.0)	(15.4)	(5.1)	(1.0)	(100.0)

[1]Figures in parentheses show percentage of total feed use.
[2]Includes shell and bone powder, salt, vitamins, and other additives.
[3]Includes urea, seaweed, tallow, molasses, and other ingredients.

Table 47—Feed supply and demand, 1984-90 projections

Year	Feed grains[1]			Vegetable protein meal[2]		
	Domestic supply	Use	Imports	Domestic supply	Use	Imports
			1,000 tons			
1984	88	3,979	3,891	62	792	730
1985	100	4,371	4,271	64	870	806
1986	100	4,535	4,435	66	907	841
1987	100	4,805	4,705	67	961	894
1988	100	5,090	4,990	68	1,018	950
1989	100	5,380	5,280	69	1,084	1,015
1990	100	5,691	5,591	70	1,147	1,077

[1]Corn or grain equivalent in feeding value.
[2]Includes meal crushed in Korea from imported oilseeds.

Animal protein meals supply the remaining 15 percent of Korea's protein meal needs. Sources include fishmeal (about 90 percent of all animal protein meal in 1981-83), as well as meat and bone meal and feather meal (*46*). The South Korean fleet supplied all of the country's fishmeal in 1981 and 1982, but fishmeal was both imported and exported in earlier years and again in 1983. Whereas the prospects for an increased marine catch of food quality fish in the late 1980's are apparently not bright, the situation for trash fish is an important issue which is not explored here. Increased fishmeal imports cannot be ruled out. Other animal protein sources will probably remain minor components of commercial feeds. Tallow has received considerable market development from the National Renderers Association (NRA) but has yet to gain permanent acceptance in Korea as a binding and protein-adding ingredient in feeds. South Korea feeds animal protein meals principally to broilers and layers, with little going to swine and none to ruminants (*55*). Because feed growth for ruminants and swine is expected to exceed that for poultry, demand for animal protein meals may not rise as fast as for concentrates in general. The share of animal protein meal in feed production is assumed to decline gradually from 2.2 percent in 1983 to 2 percent in 1990.

The share of total vegetable meal in feed production is assumed to rise from 13.2 percent in 1984 to 13.4 percent in 1990, mirroring the proportional decline in animal protein meal use. Vegetable protein meal from domestic sources, about 60,000 tons a year in 1981-83, is assumed to grow to 70,000 tons in 1990. These assumptions lead to forecast growth in demand for vegetable meal from imported sources from 764,000 tons in 1983 to 1.08 million tons in 1990 (equivalent to 1.36 million tons of soybeans). If recent import patterns persist, 40,000-60,000 tons of this demand will be filled by rapeseed meal, the remainder (94-96 percent) by soymeal.

The detailed import forecasts (see "Implications for U.S. Agricultural Exports") are based on the assumption that 77.7 percent of soybean meal demand will be filled by meal crushed from imported soybeans annually in 1984-90, essentially all of U.S. origin. The remaining 22.3 percent is assumed to be imported directly as meal from the United States and other suppliers. However, the United States could face increased competition from Brazil, Argentina, and China (soymeal and soybeans), Canada and possibly Australia (rapeseed and meal), and India (peanut meal). South Korea has the crushing capacity to meet all its meal needs and can add capacity if needed. It imports meal only when oil demand is projected to be insufficient to absorb the oil produced through additional crushing. The United States can probably maintain or increase its 1981-83 average share of Korea's total protein meal supply (59 percent) with continued market development and close monitoring of competing exporters' supplies, qualities, and prices.

Bran. The proportional role of bran in feed production has declined since the mid-1970's, although the absolute level of bran use has grown. The total domestic supply of bran is unlikely to change much through 1990, as increased production of rice bran offsets declining barley bran availability. However, the Government decontrolled domestic bran prices in 1983, and then allowed bran imports to rise sharply in 1983-84 to avoid sharply increased bran prices. These developments suggest that bran imports are likely to be decontrolled soon. On this basis, the share of bran in feed production is assumed to stabilize at its 1982-84 average of 12 percent.

Roughage. Finally, it is important to understand South Korea's roughage problem, which takes the form of a shortage of suitable pastureland, as well as limited production of silage and straw. The roughage problem has retarded the growth of beef and dairy production since the 1970's and will continue to act as a major constraint to production through 1990. This is important in the present context because of its implications for imports of feed grains and soybeans. If not for the roughage shortage, Korea would presumably pursue the same self-sufficiency goals that is presently achieves in the production of other livestock products. Based on the livestock demand projections made in tables 35 and 40, replacement of beef and dairy imports by domestic production would have required 561,000 tons of additional livestock feed in 1983 and would require 1.1 million additional tons in 1990. Most of this additional livestock feed demand would take the form of increased imports of feed grains and soybeans.

The Government has published a plan to add 200,000 ha of pasture by 1991 to the 58,000 ha existing in 1982, through the use of heavy subsidies and loans for pasture development. However, a variety of technical and economic problems cast doubt on the feasibility of this plan. Most of the land proposed for pasture development is quite steeply sloped and vulnerable to frequent droughts affecting mountain areas, lacks road access, water supply, and other infrastructure, and is quite remote from existing farm villages. As a result, outside observers argue that the addition of 60,000 ha of pastureland by 1991 might be a more realistic goal. Even this will entail substantial costs to the economy in the form of government subsidies, while the added pas-

ture is likely to be considerably lower in productivity than existing pasture.

A second possible source of additional roughage is increased planting of winter forage crops—mainly rye, Italian ryegrass, and barley—on paddyland following the rice harvest. About 36,000 ha were planted to these crops in 1981. Government plans call for winter forage production to double by 1991 from the 1981 level of 800,000 tons (dry weight equivalent). Although production of winter forage crops will probably continue to expand in response to government subsidies, various economic problems make it unlikely that they will meet a large share of total roughage needs. Winter forage crops compete for land with barley grown for food and face many of the same problems that have increasingly discouraged farmers from planting food barley, notably the heavy demands on farm labor when the winter crop is harvested immediately before rice transplanting and the reduced rice yield caused by the required delay in transplanting. Thus, greatly expanded winter forage production appears unlikely without the same massive government subsidies given to barley. Moreover, paddy areas are generally distant from cattle areas, so transportation costs for the winter forage crops would be a major cost factor. Many of the same problems apply to the production of corn for silage, which competes with food grains for agricultural land and labor. Government subsidies may lead to production growth, but at considerable real cost to the economy.

In principle, Korea might get around its domestic roughage shortage by importing hay, such as alfalfa cubes from the U.S. Pacific Northwest. Hay products are presently subject to import restrictions, meaning that, in practice, they are prohibited. Removal of trade barriers might open the way for occasional hay imports in periods of particular domestic shortage, but economic realities are likely to preclude reliance on hay imports as a long-term source of roughage. The main problem is the sheer amount of hay needed in beef and dairy production. Korea used about 1.1 million tons of concentrates in cattle feeding in 1981 and about three times as much roughage—2.1 million tons of grass, 800,000 tons of silage, and 300,000 tons of rice straw.

The ratio of concentrates to roughage could be raised somewhat, but this could not be pushed too far, especially in cow-calf operations and in dairy productions. Thus, pushing dairy and beef production beyond the domestic availability of roughage would probably require imports of roughage in quantities equal to or greater than the additional imports of feed grains and soybeans. This would be expensive: Japan imported alfalfa hay in 1982 and 1983 at prices 19-39 percent above those of imported corn. The costs of transportation to dairy and beef producing areas would raise the cost to producers even further. In sum, attempting to expand beef and dairy production through the use of imported hay could easily entail greater (marginal) foreign exchange outlays on roughage than on feed grains and oilseeds. These outlays would raise marginal production costs far above current levels, which are, in turn, far above the costs of imported beef and milk.[22]

Because of the difficulties of expanding domestic roughage supply and the apparent difficulty of relying on roughage import, Korea's beef and dairy production is likely to fall increasingly behind the growth of consumption (tables 35 and 40). In this situation, beef cattle raising will probably turn from grazing to expanded use of concentrates, while available pasture and silage will be concentrated where they are needed most, in cow-calf operations and in dairy production for fluid milk. Meanwhile, increasing amounts of powdered milk for use in manufacturing will be imported, together with a growing share of the nation's beef supply.

Other Products

This section examines demand and supply for a number of other agricultural products, including edible oils, cotton, and wood.

Edible Oils. Edible oil consumption jumped sharply in the 1970's (table 48). The rise in the use of palm and soybean oil since 1979 has been particularly striking. Some of the growth in palm oil consumption has come at the expense of beef tallow, but total edible oil use has certainly grown, exceeding 6 kg per person in 1983. However, consumption per person remained only half that in Japan and only about 12 percent of that in the United States. Animal fats now appear to be losing popularity, even in processed food, because of health concerns. Although growth in vegetable oil use is likely to grow rapidly through 1990, similar concerns about total fat intake may eventually limit vegetable oil demand as well.

Korean households use considerable amounts of sesame oil despite its relatively high price. Sesame oil is used as a flavoring agent rather than as a frying medium, sug-

[22]Another way around the roughage problem, at least as it affects beef production, would be to import large numbers of range-fed feeder cattle for fattening in Korea using concentrates. This would allow Korea to raise the level of domestic beef slaughter but would clearly stretch the concept of "self-sufficiency" in beef production.

gesting that it does not compete directly with soybean oil for consumer expenditure. Consumers prize the taste of sesame oil, so it is likely to be an important factor in household purchases for some time to come.

South Korea's trade in vegetable oils is rather limited. Domestic demand has often been insufficient to absorb all the soybean oil produced by the crushing industry, and the surplus has been exported. Insufficient growth in demand for soybean oil may limit U.S. exports of soybeans and open the door further to imports of Brazilian soymeal in the late 1980's.

Soybeans for Food Use. South Korea's domestic soybean crop has long been used exclusively for the production of various foods. Before Korea began crushing imported soybeans in 1971, the nation's vegetable oil needs were satisfied by oil crushed from other domestic oilseeds, notably sesame, rapeseed, and perilla, and by rice bran oil. Since then, demand for protein meal by the animal feed industry and consumer demand for vegetable oil have been the most visible sources of growth in demand for soybeans. Nevertheless, consumption of soybeans as food remains a highly significant factor, accounting for 39 percent of total soybean use in 1983. Because domestic soybean production has stagnated while consumption as food has continued to grow, food use of soybeans has become an important source of demand for soybean imports. Food use has exceeded domestic production in most years since 1970 and has done so consistently and in substantial quantities (up to 153,000 tons) since 1980 (table 49).

Data on the quantities of soybeans used in producing individual foods are not available, but the majority appears to go into the production of tofu (bean curd) and soy milk (a suspension of powdered whole beans). These products also appear to have the greatest potential for demand growth. Other traditional foods, such as soy sauce, bean sprouts, and miso (a form of broth), account for smaller quantities. The use of textured soy protein as a meat substitute or extender is still in its early stages but is being supported by the American Soybean Association.

Regression analysis of 1970-82 data suggests an income elasticity of demand for soybeans of around 0.87. Combining this estimate with assumed rates of real income growth leads to predicted consumption of 12.48 kg of beans per person in 1990, up from 8.74 kg in 1983. Aggregate use of soybeans for food would then equal about 552,000 tons in 1990. However, this forecast is probably too high. The growth rate of per capita consumption has been falling over time and is likely to continue to decline. The Japanese consumed about 10.3 kg of soybeans per person as food in 1981, and this may be a more realistic expectation of Korean consumption in 1990. This assumption leads, in turn, to aggregate consumption of soybeans for food of 456,000 tons in 1990.

Table 48—Edible vegetable oil consumption, 1970-83

Year	Sesame	Rapeseed	Rice bran	Cottonseed	Soybean	Corn	Palm	Coconut	Other[1]	Total
					1,000 tons					
1970	2	9	8	1	0	0	0	0	2	22
1971	3	12	14	1	5	0	0	0	2	37
1972	4	9	7	1	6	0	1	0	2	30
1973	4	9	6	1	7	0	5	0	4	36
1974	4	12	8	1	4	2	2	1	4	38
1975	4	11	3	1	6	3	3	1	3	35
1976	5	11	7	1	17	4	4	0	3	52
1977	6	12	7	1	19	4	2	2	3	56
1978	8	7	15	2	29	4	3	11	2	81
1979	12	7	17	1	46	5	11	23	3	125
1980	12	11	NA	2	42	NA	31	12	2	112[2]
1981	6	7	NA	3	56	NA	51	12	3	138[2]
1982	8	8	14	4	77	NA	89	17	NA	217
1983	NA	6	15	NA	95	NA	103	19	NA	251

NA = Not available.
[1]An incomplete category. Includes perilla, hot pepper, peanut, and sunflower oils.
[2]Data not available for all components; true total larger than figure shown.

Sources: (*28, 49*), and FAS records.

High-Value Agricultural Products. South Korea's trade in agricultural commodities with high unit values, or high-value products (HVP's), changed considerably in the 1970's (table 50). HVP's are here classified following the method of O'Brien (*34*). Semiprocessed products (SPP's) include fresh and frozen meat, flour, refined sugar, coffee, cocoa, tea, animal feeds, oilseed meal, animal fats and oils, and vegetable oils. Highly processed product (HPP's) include preserved meats, milk, butter, cheese, cereal preparations, prepared or preserved vegetables and fruits, nonchocolate sugar preparations, chocolate, spices, miscellaneous food preparations, beverages, and cigarettes. High-value unprocessed products (HVUP's) include eggs, fresh fruit, nuts, and vegetables. Korea's important ginseng exports have been divided between the SPP and HPP categories.

Total HVP imports grew 19 percent per year in nominal terms in 1971-81; exports grew 33 percent per year during the same period, turning South Korea from a net importer into a net exporter. The 1981 exports included $231 million in refined sugar made from imported raw sugar. The thin margin on such trade somewhat deflates the significance of the $484 million in total HVP exports. Excluding sugar, South Korea's HVP trade shows a deficit, but the implied 24 percent average annual growth in exports still exceeded that of imports. In short, South Korea must be considered both as a customer and as a competitor by nations exporting HVP's. For this reason, Korea's HVP exports are examined in this section as well as its imports, as firms searching for new products to sell in South Korea will be wise to treat with caution those products Korea presently exports.

Among semiprocessed products (table 51), beef tallow, beef, palm oil, and soybean meal imports accounted for 26.4, 31.1, 12.8, and 5.5 percent, respectively, of the $245-million increase in SPP imports in 1971-81. These commodities are discussed in other sections. The remaining growth in SPP import value came from coffee (8.4 percent), mutton (4.5 percent), cocoa (2.4 percent), and a variety of other minor products. Mutton is a special case, in that imports do not reflect domestic consumption at all. Australian mutton is imported, deboned and cut up, and re-exported to Japan. The mutton trade reached its peak volume in 1978 and has since

Table 49—Soybean production and use, 1965-83[1]

Year	Production	Beginning stocks	Imports	Total supply	Crush	Food use	Feed, seed, and waste	Ending stocks	Imports for food use[2]
					1,000 tons				
1965	163	NA	0	163	0	142	21	0	0
1966	174	NA	0	174	0	156	18	0	0
1967	161	NA	26	187	0	166	21	0	0
1968	201	NA	4	205	0	184	21	0	0
1969	245	NA	18	263	0	242	21	0	0
1970	229	NA	30	259	0	233	21	5	4
1971	232	5	62	294	30	242	18	9	10
1972	229	9	37	266	35	213	13	14	0
1973	224	14	71	295	39	237	13	20	13
1974	246	20	50	296	18	259	19	20	13
1975	319	20	57	376	30	328	18	20	9
1976	311	20	148	459	100	344	15	20	33
1977	295	20	133	428	110	300	18	20	5
1978	319	20	223	542	173	314	12	63	0
1979	293	63	422	715	291	342	42	103	49
1980	257	103	417	674	298	410	25	44	153
1981	216	44	529	745	388	319	20	62	103
1982	257	62	541	798	431	353	22	54	96
1983	233	54	695	928	550	349	24	46	116

NA = Not available.
[1]Data shown apply to market years, beginning in October of the previous calendar year for 1965-76, and in November of the previous calendar year thereafter.
[2]Amount by which food use exceeds domestic production.

Source: FAS/Seoul, various reports.

declined, presumably because of rising labor and transport costs.

Among the other SPP's presently imported by Korea, the United States has a comparative advantage only in tallow, soybean meal, and the small high-quality end of the beef market. The 130-percent growth in U.S. exports of SPP's to South Korea in 1971-81 can be attributed solely to increased Korean purchases of these three products (table 52). Total U.S. exports of other SPP's to Korea declined. Growth in livestock production will probably lead to strong growth in soybean meal imports through 1990. Tallow imports will grow much more slowly. In each case, U.S. sales will depend heavily on price relationships with competing suppliers. If recent trade shares are maintained, soybean meal should provide most of the growth in U.S. SPP sales to Korea through 1990. U.S. sales of high-quality beef should also grow strongly, though from a much smaller base than tallow or soybean meal. Prepared forage and feed supplements for beef and dairy production are the only other SPP's that offer much hope for growth in U.S. exports to Korea through 1990. The basic reason for this gloomy prognosis for SPP's in South Korea's ability to process imported raw materials, and in some cases, even re-export them.

Korean exports of SPP's, however, will decline as labor costs rise. Over 90 percent of the value of 1981 exports of SPP's came from goods that were imported, processed, and re-exported: Sugar, mutton, and rapeseed oil (table 51). Exports of each of these three products peaked in the 1970's and declined by 1981. Only sesame oil represents a completely indigenous product with good longrun export prospects. In sum, both Korean imports and exports of SPP's are likely to decline through 1990, with little prospect of substantial growth in U.S. exports.

Rapid growth in food processing turned Korea from a net importer of highly processed products in 1971 into a net exporter in 1981 (table 50). In contrast, imports grew slowly over the same period. The largest import category in 1981 was spices, with the United States supplying only certain forms of pepper (table 53). Other spice suppliers include Japan (ginger), Taiwan (ginger and pepper), Malaysia (pepper), and Indonesia (cinnamon). The next largest category was dried or otherwise preserved milk, a trade item which the United States dominated in 1971 but which 10 years later belonged to the Netherlands, Australia, and New Zealand. Strong trade barriers severely restricted the growth of dairy product imports in the 1970's. The resulting high prices stimulated rapid growth in domestic production and limited consumption growth. However, Korea will probably have difficulty increasing production in the late 1980's, and greater imports are likely.

Table 50—Trade in high-value agricultural products, 1971 and 1981

Type of product	1971	1981
	1,000 dollars	
Semiprocessed:		
Imports	42,529	287,645
Exports	2,108	273,217
Exports less imports	-40,421	-14,428
Highly processed:		
Imports	19,203	48,518
Exports	13,183	99,286
Exports less imports	-6,020	50,768
High-value unprocessed:		
Imports	1,639	33,895
Exports	13,545	111,011
Exports less imports	11,906	77,116
Total:		
Imports	63,371	370,058
Exports	28,836	483,514
Exports less imports	-34,535	113,456

Source: (*49*).

Table 51—Trade in semiprocessed high-value agricultural products, 1981

Products	Value	Percentage of value	Volume
	1,000 dollars	*Percent*	*Tons*
Imports:			
Beef, fresh or frozen	77,099	26.8	47,000
Mutton, fresh or frozen	11,533	4.0	10,577
Coffee	22,517	7.8	9,085
Tallow	80,693	28.1	153,306
Palm oil	31,516	11.0	53,701
Cocoa and preparations	6,599	2.3	2,836
Soybean meal	15,624	5.4	51,623
Other	42,064	14.6	—
Total	287,645	100.0	—
Exports:			
Mutton, frozen	11,362	4.2	6,252
Other meat and offal, frozen	11,640	4.3	635
Rapeseed oil	5,796	2.1	9,357
Sesame oil	5,457	2.0	12,263
Refined sugar	231,003	84.5	353,929
Other	7,959	2.9	—
Total	273,217	100.0	—

— = Not applicable.

Source: (*49*).

Korean trade data provide no information on the detailed product composition of the nation's imports of "other food preparations" (SITC category 2107.0820). However, this catch-all category may contain some of the processed food products most promising for U.S. exports of HPP's to South Korea. The United States supplied 84 percent of Korea's imports in this category in 1981; Japan, Britain, and Switzerland trailed far behind. Examination of U.S. exports for 1981 shows that major items probably included ready-to-serve breakfast cereals, worth about $1 million, and cream and milk substitutes (nondairy whiteners), valued at $1.7 million. This category presumably includes many highly processed and relatively new products; the unit value of imports is relatively high at $2,795 per ton. The high U.S. share in Korea's imports of these products suggests that the United States may be doing quite well in penetrating the Korean market in innovative ways.

Citrus juice imports, worth $3.4 million in 1981, have become increasingly important, with the United States now barely leading Brazil. Orange juice still dominates the trade, and imports of other citrus juices, only $13,000 in 1981, may be an area for more market development.

Pineapple products—canned pineapple ($6 million) and pineapple juice ($240,000)—come from the Philippines, Thailand, and Taiwan, with the United States fourth, although still the largest juice exporter. At nearly 8,000 tons, processed pineapple was the largest fruit-related import both in volume and value, and South Korea can be expected to import more as it moves to limit its trade surplus with Southeast Asia.

Table 52—Imports of high-value agricultural products from the United States, 1971 and 1981

Products	Value	Percentage of value	Volume
	1,000 dollars	*Percent*	*Tons*
1971:			
Semiprocessed—			
Wheat flour	9,085	29.6	109,423
Corn flour	495	1.6	3,097
Instant coffee	658	2.1	105
Soybean meal	2,086	6.8	16,878
Beef tallow	15,271	49.7	64,605
Fixed vegetable oils	679	2.2	1,092
Fatty acids	516	1.7	2,063
Other	1,906	6.3	—
Total	30,696	100.0	—
Highly processed—			
Powdered milk	8,841	67.9	798,041
Lard	644	4.9	2,475
Beverage base	809	6.2	141
Other	2,724	21.0	—
Total	13,018	100.0	—
High-value processed—			
Hops	50	35.2	20
Potato flour, meal, and flakes	24	16.9	175
Prepared vegetables	32	22.5	42
Other	36	25.4	—
Total	142	100.0	—

Products	Value	Percentage of value	Volume
	1,000 dollars	*Percent*	*Tons*
1981:			
Semiprocessed—			
Frozen beef	3,510	5.0	471
Flour of wheat and other cereals	954	1.4	4,407
Beef tallow	54,137	76.8	102,500
Cottonseed oil	2,266	3.2	2,373
Fatty acids	766	1.1	660
Other hydrogenated oil (excluding cottonseed oil)	1,224	1.7	637
Soybean meal	4,936	7.0	16,220
Additives for mixed feed	680	1.0	148
Other	1,975	2.8	—
Total	70,449	100.0	—
Highly processed—			
Spices	881	6.6	186
Canned fruits	1,213	9.1	1,059
Fruit and vegetables juices	2,078	15.6	1,702
Mayonnaise	429	3.2	236
Miscellaneous food preparations	6,098	45.8	2,649
Essential oils	640	4.8	32
Other	1,972	14.9	—
Total	13,311	100.0	—
High-value processed—			
Dried vegetables (excluding garlic and mushrooms)	1,187	16.9	448
Raisins	4,571	65.0	1,794
Forage grass seeds	745	10.6	610
Other	533	7.5	—
Total	7,036	100.0	—

— = Not applicable.

Source: (*49*).

Imports of essential oils (chiefly mint and citrus oils) grew more than fivefold in volume between 1971 and 1981. But the United States had lost its dominant position in this market by 1981, ranking second behind Japan, while a number of other countries succeeded in staking out market shares. Casein imports increased from $200,000 to $4 million over the same period, with Australia and New Zealand the dominant suppliers.

The categories noted above accounted for only 73 percent of Korea's 1981 HPP imports. The remainder was made up of many products traded in quantities too small to justify separate examination. Spices, canned pineapple, orange juice, essential oils, and casein comprised half of the $29 million growth in HPP imports in 1971-81. The rest, $15 million, while too fragmented to describe here, represented a wide array of modern, exotic, or cost-competitive products that could grow quickly as the Korean market becomes wealthier, more sophisticated, and more open to trade.

The World Bank and Korea's Agriculture and Fisheries Development Corporation (AFDC) surveyed the situation and prospects of food processing in 1979, in an effort to find what further investment in this sector would benefit South Korea (*63*). They found (without the aid of detailed data) that the processing of food grains (chiefly wheat) had grown at an annual rate of 6 percent from 1970-76; fruits and vegetables, 23 percent; processed livestock products, 23 percent, and fish products, 18 percent. The rates of consumption increase were somewhat lower, although still high: Fruits and vegetables, 18 percent; livestock products, 18 percent; and fish products, 12 percent. Income elasticities of demand were calculated as 1.0 for processed fruit and vegetable products, 1.9 for processed livestock products, and 0.9 for processed fishery products.

Table 53—Trade in highly processed, high-value agricultural products, 1981

Products	Value	Percentage of value	Volume
	1,000 dollars	*Percent*	*Tons*
Imports:			
Milk, powdered or otherwise preserved	5,919	12.2	5,786
Spices	8,064	16.1	5,768
Canned pineapples	6,001	12.0	7,790
Orange juice	3,415	6.8	2,727
Other food preparations	4,654	9.3	1,665
Essential oils	3,398	6.8	161
Casein	3,976	7.9	1,323
Other	13,091	28.9	—
Total	48,518	100.0	—
Exports:			
Chewing gum	10,463	10.5	4,916
Noodles and instant noodles	6,016	6.1	26,672
Kimchi	4,057	4.1	2,967
Canned mushrooms	20,685	20.8	9,576
Canned mandarin oranges	3,945	4.0	3,552
Bean sauces and pastes	5,246	5.3	15,267
Ginseng products	13,660	13.8	559
Beer	2,212	2.2	3,902
Cheroots	5,284	5.3	621
Other	27,718	27.9	—
Total	99,286	100.0	—

— = Not applicable.

Source: (*49*).

The researchers estimated that "processed foods accounted for 14 percent of consumers' total expenditures in 1978 compared to only 5 percent a decade earlier" (*63*). However, their definition of processed foods seems to have been very broad and to include quite rudimentary forms of processing. The study forecast that demand increases through 1983 would be "mainly for canned and dried fruits and vegetables, frozen, dried, and canned fisheries products, canned and smoked meat, dairy, and other livestock products." Demand for processed grain products was not expected to increase significantly.

The results of the World Bank-AFDC review are consistent with other information on consumer demand from Korea. The Annual Report on the Family Income and Expenditure Survey of 1978 estimated that about 10 percent of urban consumer spending went to processed foods and beverages. The Annual Report also found that the income elasticity of food consumption away from home was high, a factor that will boost consumption of food preparations in eating places, including many HPP's. Convenience in eating, both at home and away from home, is steadily gaining in importance, stimulating consumption of HPP food preparations.

South Korea's consumption and imports of HPP's seem likely to grow, but foreign suppliers will often run into competition from Korean producers. In 1980, the World Bank and AFDC began a program of lending to help South Korean production meet the expected growth in domestic consumption and also to export HPP's (*63*). South Korea has long been a large exporter of highly processed marine products and has the technical and trade knowledge to export many other processed foods. South Korea is a leading exporter of canned mushrooms and chewing gum. It also exports canned mandarin oranges, bean sauces and pastes, kimchi, ginseng products, beer, cheroots, and instant noodles (largely made with U.S. wheat and tallow) (table 53).

South Korea's labor costs now exceed those in many other potential exporting countries, so many of its HPP exports are vulnerable to competition from lower cost competitors, especially China. However, South Korea will probably protect domestic processors from competition in the home market from lower cost producing countries, rather than incur large trade deficits in HPP's.

Land-poor South Korea would appear to be a natural market for imported fruits, vegetables, and high-value unprocessed products of all kinds. However, South Korea has broadened its role as a net exporter of HVUP's since 1971, mainly because its trade barriers severely restrict imports (table 54). Imports grew by 35 percent per year between 1971 and 1981 to $34 million, or less than $1 per person, while exports grew to $111 million in 1981, with average growth of 23 percent over the same period.

South Korea's chief HVUP imports in the 1970's were dried pulses, a market which has grown rapidly since 1978. Imports of seeds for planting have grown steadily and should continue to do so. The United States has been the leading supplier in both categories and has good prospects of continued export growth because of a natural comparative advantage and intelligent market development. Imports of dried and fresh flavor vegetables, such as garlic and whole red peppers, varies with Korea's crop failures and successes. Otherwise, South Korea excludes imports of fresh fruits and vegetables with its phytosanitary, tariff, and quota barriers. The United States is a chief loser of potential trade. For example, imports of U.S. raisins rose to nearly $5 million within a year of the removal of import restrictions.

Table 54—Trade in high-value unprocessed agricultural products, 1981

Products	Value	Percentage of value	Volume
	1,000 dollars	*Percent*	*Tons*
Imports:			
Dried vegetables	3,405	10.0	1,730
Dried beans	6,360	18.8	10,148
Raisins	4,772	14.1	1,906
Seeds for planting (nongrain)	2,752	8.1	749
Other	16,606	49.0	—
Total	33,895	100.0	—
Exports:			
Onion and garlic, fresh or chilled	3,208	2.9	7,283
Mushrooms, fresh	16,229	14.6	391
Vegetables, frozen	3,930	3.5	2,715
Mushrooms, dried	5,803	5.2	338
Pears, frozen	3,831	3.5	5,162
Fruit, provisionally preserved	9,785	8.8	3,253
Ginseng	28,780	25.9	216
Other	39,445	35.6	—
Total	111,011	100.0	—

— = Not applicable.

Source: (*49*).

South Korea's chief HVUP exports are ginseng, vegetables, and fruits grown in temperate climates. The fruit and vegetable industries have grown considerably in recent years, and South Korea's ability to export fresh and frozen vegetables suggests that firms hoping to export such products to Korea can expect stiff competition. South Korea's climate, with its cold winters and warm summers, resembles that of parts of the United States and Europe, and Korea grows many of the same fruits and vegetables. The Korean Government is unlikely to permit imports of such fruits and vegetables (whether fresh, frozen, canned, or dried) in the foreseeable future, except in the event of a crop failure or a rise in domestic costs of production to such a level that imports are used to control prices. Thus, large-scale imports of most major fruits and vegetables grown in the United States do not seem likely in the foreseeable future. Possible exceptions include some U.S. fruits and vegetables that are not grown in Korea. Some are listed in table 55.

Imports of most of these products are, at present, largely excluded from the Korean market through their placement on the restricted imports list and through further restrictions applied on phytosanitary grounds. However, in the long run, the Korean Government may

Table 55—Horticultural products with little or no South Korean production

Fruits	Nuts	Vegetables
Cherries[1]	Almonds	Tomatoes (winter)
Kiwi	Cashews	Green peppers (winter)
Grapefruit[1]	Brazilnuts	Okra[2]
Pineapple[1]	Hazelnuts	Avocados
Dates[1]	Pecans	Artichokes
Figs		
Berries (except strawberries)		
Lemons		
Limes		
Tangelos[2]		
Plums and prunes[1,2]		
Papaya		

[1]Korean production very minor.
[2]No official Korean production information available; listing based on agronomic considerations.

begin relaxing some of these trade barriers as a gesture aimed at avoiding the imposition of trade restrictions on the part of Korea's major trading partners. If South Korea's bilateral trade surplus with the United States continues to grow, the United States will be in a stronger position to insist on the relaxation of some trade barriers to horticultural imports.

Cotton. Dramatic growth in Korean exports of cotton yarns, textiles, and clothing during the 1970's made the nation one of the world's leading exporters of cotton goods by 1979. Korea's cotton goods producers rely almost exclusively on imported raw cotton, the great majority of which has long been of U.S. origin (table 56). Raw cotton consumption has leveled off since 1979, as international recession, growing protectionism in the developed countries, and increasing competition from other producers have constrained the growth of Korean textile product exports. However, South Korea remains one of the three leading markets for U.S. cotton, and raw cotton remains the leading U.S. agricultural export to Korea by value.

Raw cotton used in producing textiles and garments for the domestic market varied between 200,000 and 400,000 bales per year in the 1970's, with no strong trend evident. In contrast, use in exported goods grew strongly during the decade, peaking in 1979 and 1980 at just over 1 million bales (*15, 55*). Most of the cotton used in export products has gone into cotton/synthetic blends in yarns and finished goods, although use in all-cotton yarns, fabrics, and finished goods has grown as well (tables 58-62). Mill consumption of all fibers grew more than 40 percent per year in the 1970's, mainly reflecting increased use of synthetic fibers, both for the domestic and export markets (table 57). Korean producers shift readily between cotton and polyester fibers in response to price changes, so trends in the price relationship between cotton and polyester fibers will strongly affect the growth of Korean consumption and imports of raw cotton.

More than 80 percent of South Korea's exports of cotton garments and other finished goods are sold to developed countries (table 58). Available data do not allow a similar breakdown of exports of part-cotton finished goods. Protectionist quotas led to reduced sales of cotton finished goods to Japan in 1978-83, and severely limited export growth to the European Community (EC) and Oceania. Growth in sales to the United States and Canada slightly outweighed these reductions. In addition, the Middle East (principally Libya, Egypt, Kuwait, and Saudi Arabia) absorbed a significant share of exports of cotton finished goods, but this market is increasingly being penetrated by exports from low-wage producers in Southeast Asia. All- and part-cotton fabric exports have shown a broadly similar pattern (tables 59 and 61). These trends are likely to continue through 1990, implying limited growth in exports of cotton fabrics and finished goods.

South Korea uses a sizable share of its raw cotton imports to produce yarn for export to Japan, Hong Kong, Europe, South and Southeast Asia, and Oceania (tables 60 and 62). Yarn export prospects appear to be deteriorating rapidly. Korea undertook voluntary restraints on yarn exports to Japan beginning in 1983, leading to a large drop in sales (*29*). Much of the yarn shipped to Hong Kong and Southeast Asia goes into fabrics and garments for export, which have also been strongly constrained by quotas in developed-country markets. The indirect effects of developed-country quotas appear to have been chiefly responsible for a decline in Korean yarn exports to Hong Kong and Southeast Asia, which in 1981 took 28 percent of Korea's exports of all- and part-cotton yarn. No growth markets are likely to replace Hong Kong and Japan, so Korea's yarn exports are forecast to decline through 1990 (table 63).

Growth in Korea's exports of cotton textile products will depend on trends in polyester and cotton prices, world economic conditions, and the behavior of Korea's customers and competitors. However, based on export market share data, prospects for growth in fabric and garment exports seem slightly to outweigh possible losses in yarn exports. Cotton used in export goods is expected to grow slowly in the mid-1980's, and competition from other producers may hurt South Korea more deeply in the late 1980's. Thus, cotton used in exports is forecast to grow 1 percent per year until the 1985/86 market year (August 1985-July 1986), and 0.5 percent per year from 1985/86 to 1990/91.

Forecasting domestic demand involves even greater uncertainty. Price and quantity data are lacking with which to estimate preference for cotton over other fibers. Regression analysis of cross-sectional expenditure data for 1980 showed an income elasticity of expenditure on clothing of 0.7 (*42*). If real income and population grow as assumed, this elasticity implies annual growth of more than 5.5 percent in expenditure on clothing through 1990. But the elasticity estimation left out so many variables that its reliability is suspect. Furthermore, the elasticity estimate reflects income-expenditure, not income-quantity, relationships. As their incomes rise, consumers are likely to move toward higher quality goods, so that the quantity of cotton goods purchased will grow more slowly than expenditures. For this reason, raw cotton consumption for

Table 56—Cotton imports by country of origin, 1971-83[1,2]

Country of origin	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
							1,000 bales of 480-lb. net						
United States	508.0	475.3	745.6	705.2	991.3	875.2	1,271.1	1,311.8	1,578.8	1,348.4	1,397.0	1,368.0	1,280.5
Mexico	.1	.3	0	0	1.3	2.0	7.8	5.3	7.1	16.7	19.5	.8	1.0
Guatemala	0	0	0	.5	0	0	0	.3	4.1	9.9	1.9	0	0
Nicaragua	.8	.1	0	0	1.4	0	0	8.3	0	2.6	10.2	0	0
El Salvador	.5	1.4	3.4	0	.3	0	0	3.5	0	0	3.1	0	0
Colombia	0	0	.2	.1	0	0	.4	8.3	0	0	2.1	0	0
Brazil	.3	.6	1.9	2.1	4.4	0	3.1	2.4	0	25.1	2.6	13.4	21.8
Peru	0	0	.4	0	0	.9	.1	0	0	3.6	.8	0	1.0
Paraguay	0	0	0	0	.2	0	0	1.8	2.1	6.9	13.8	10.8	5.9
Argentina	0	0	0	0	2.7	0	0	1.0	4.5	.5	2.4	.5	0
Subtotal	1.7	2.4	5.9	2.7	12.6	2.9	11.4	30.9	17.7	65.3	56.4	25.5	29.7
Egypt	3.1	1.9	7.4	1.8	3.0	7.5	6.3	11.2	12.0	20.4	18.9	17.4	19.7
Sudan	.1	.4	.7	.6	2.9	3.3	6.9	0	2.9	12.1	.3	47.2	80.6
Turkey	0	0	0	0	0	0	0	0	0	7.6	.2	0	0
Subtotal	3.2	2.3	8.1	2.4	5.9	10.8	13.2	11.2	14.9	40.1	19.4	64.6	100.3
India	0	0	0	0	0	0	0	5.2	8.8	27.7	9.1	50.3	69.9
Pakistan	0	0	0	0	0	0	0	1.0	2.8	34.1	0	21.6	35.4
Subtotal	0	0	0	0	0	0	0	6.2	11.7	61.8	9.1	71.9	105.3
Japan	9.0	3.9	16.3	8.3	1.1	2.4	2.4	0	.8	.4	0	0	.1
Australia	0	0	1.2	0	0	0	0	1.3	2.4	3.4	12.9	30.7	22.2
Other	.9	.4	10.6	3.4	20.3	17.7	14.3	1.7	.8	7.2	:	1.7	8.5
Total	523.3	484.3	787.7	722.0	1,031.2	909.0	1,312.4	1,363.1	1,627.1	1,526.6	1,495.6	1,562.4	1,546.6
							Percent						
U.S. cotton as percentage of total	97.2	98.1	94.7	97.7	96.1	96.3	96.9	96.2	97.0	88.3	93.4	87.6	82.8

[1]Market years beginning August 1 of year specified.
[2]Seed cotton and cotton linters not included.

Sources: (*15*) and FAS and ERS records.

Table 57—Mill consumption of cotton, wool, and synthetic fibers, 1965-81

Year	Amount consumed				Percentage of total		
	Cotton	Wool[1]	Synthetic[2]	Total	Cotton	Wool	Synthetic
	1,000 tons				*Percent*		
1965	71	1	22	94	75.5	1.1	23.4
1970	112	4	101	217	51.6	1.8	46.6
1975	160	7	272	439	36.4	1.6	62.0
1976	204	12	342	558	36.6	2.2	61.3
1977	216	12	385	613	35.2	2.0	62.8
1978	254	15	489	758	33.5	2.0	64.5
1979	298	18	536	852	35.0	2.1	62.9
1980	321	17	552	890	36.1	1.9	62.0
1981	305	22	NA	NA	NA	NA	NA

NA = Not available.
[1]Does not include tops. Clean basis.
[2]Available for mill consumption.

Sources: (*15, 53*), and FAS and ERS records.

Table 58—Exports of cotton finished goods by destination, 1978-83

Destination	1978	1979	1980	1981	1982	1983
	Tons					
Japan	8,000	7,000	4,900	5,400	6,776	6,703
Hong Kong	0	0	200	0	142	146
United States	4,200	3,400	4,400	4,100	6,223	7,186
Canada	300	200	200	500	700	1,158
Latin America	200	400	400	800	811	413
European Community	3,300	3,800	4,500	3,800	3,579	4,758
Other Western Europe	800	700	800	800	933	1,537
Eastern Europe	100	0	0	0	0	0
Southeast Asia	0	0	0	500	70	68
Middle East and North Africa	2,300	1,500	2,500	6,000	3,429	3,698
Sub-Saharan Africa	500	500	700	700	169	153
Oceania	300	100	100	400	152	155
Other	100	2,400	100	600	2,367	1,158
Total	20,100	20,000	18,300	23,600	25,351	27,133

[1]Figures for 1978-81 are rounded to the nearest 100 tons.

Source: (*49*).

Table 59—Exports of cotton fabrics by destination, 1978-83[1]

Destination	1978	1979	1980	1981	1982	1983
			Tons			
Japan	3,373	4,435	3,254	3,203	4,104	3,558
Hong Kong	2,943	1,307	2,638	2,509	847	778
Taiwan	9	47	55	39	9	36
United States	2,147	2,492	8,753	6,102	5,882	9,841
Canada	182	339	669	579	575	502
Latin America	84	163	414	349	146	61
European Community	7,117	7,013	9,268	7,357	6,703	7,286
Other Western Europe	1,531	2,201	2,381	1,843	4,607	3,758
Eastern Europe	303	319	361	0	0	0
Southeast Asia	206	342	760	297	375	371
South Asia	85	13	199	327	424	579
Middle East and North Africa	2,494	5,162	1,323	2,752	211	1,346
Sub-Saharan Africa	162	782	501	1,093	5,581	791
Oceania	559	703	498	745	681	995
Other	132	43	58	555	4,443	6,037
Total	21,327	25,361	31,132	27,750	34,588	35,939

[1]Fabrics with cotton content of 85 percent or more.
Source: (*49*).

Table 60—Exports of cotton yarn and thread by destination, 1978-83

Destination	1978	1979	1980	1981	1982	1983
			Tons			
Japan	57,204	61,510	49,997	44,223	53,985	30,810
Hong Kong	9,510	11,685	27,876	24,839	8,816	5,470
Taiwan	0	0	0	0	2	13,455
United States	18	34	263	124	135	1,073
Canada	319	272	407	408	53	374
European Community	328	495	4,021	4,169	1,466	604
Other Western Europe	223	26	682	933	469	577
Eastern Europe	0	59	1,029	0	0	0
Southeast Asia	720	1,064	1,365	1,214	508	711
South Asia	2,765	858	1,982	2,755	112	173
Middle East and North Africa	114	52	1,235	968	834	153
Sub-Saharan Africa	943	7	361	97	374	188
Oceania	329	342	773	1,435	1,113	1,012
Other	14	46	1,991	1,798	576	10,098
Total	72,486	76,450	91,982	82,963	68,443	64,698

Source: (*49*).

Table 61—Exports of part-cotton fabrics by destination, 1978-83[1]

Destination	1978	1979	1980	1981	1982	1983
			Tons			
Japan	4,871	6,002	6,301	3,850	2,473	2,116
Hong Kong	6,389	6,144	4,093	6,326	4,739	7,691
Taiwan	1,911	2,211	1,583	1,359	640	1,102
United States	2,360	1,746	2,613	2,524	3,658	7,556
Canada	640	431	292	761	610	1,368
Latin America	298	855	1,052	1,295	1,125	1,286
European Community	7,274	7,558	7,302	8,011	8,067	7,692
Other Western Europe	883	986	622	618	1,449	2,406
Eastern Europe	55	129	48	0	0	0
Southeast Asia	1,155	1,934	1,826	1,808	1,596	1,897
South Asia	106	299	346	865	723	1,870
Middle East and North Africa	1,733	748	2,521	1,887	2,096	3,086
Sub-Saharan Africa	224	306	397	311	267	107
Oceania	259	423	1,098	1,683	1,171	1,572
Other	42	5,554	309	614	638	2,298
Total	28,200	35,326	30,413	31,912	29,252	42,047

[1]Fabrics with cotton content of 85 percent or less.
Source: (*49*).

Table 62—Exports of part-cotton yarn and thread by destination, 1978-83

Destination	1978	1979	1980	1981	1982	1983
			Tons			
Japan	5,216	1,457	2,290	2,068	1,053	285
Hong Kong	242	287	1,195	1,324	0	311
United States	0	11	12	11	12	1,196
Canada	357	272	1,901	1,138	757	1,103
Latin America	0	1	23	33	0	0
European Community	36	119	589	1,424	387	0
Other Western Europe	315	0	73	165	65	0
Southeast Asia	25	37	833	1,071	45	95
South Asia	15	11	18	118	0	0
Middle East and North Africa	238	134	1,691	365	0	0
Sub-Saharan Africa	230	0	150	51	0	0
Oceania	2,080	37	5,792	7,748	0	15
Other	24	468	7,697	2,957	0	215
Total	8,778	2,834	22,253	18,473	2,319	3,125

Source: (*49*).

meeting domestic needs is assumed to grow 2.5 percent per year through 1990.

Combining the forecasts of cotton use for domestic and export markets leads to a rise in total cotton imports to 1.744 million bales in 1990/91, 9 percent above the 1982/83 level (table 64). Because domestic production will remain tiny (around 4,000 bales per year), imports are forecast to be about the same as use in the 1980's.

The U.S. share of South Korea's cotton import market could play a major role in determining U.S. cotton exports to Korea in the late 1980's. When the United States stopped allocating credit guarantees to support Korean cotton imports in the 1983/84 market year, the U.S. share began dropping sharply and was forecast to fall as low as 70 percent over the whole market year. Only the resumption of export credit guarantees late in the year allowed the U.S. share to reach 79 percent. This experience suggests that continuing substantial allocation of credit or credit guarantees to Korean imports of U.S. cotton may be necessary to help the United States retain its traditional 90-95 percent share of the Korean cotton market.

Table 63—Expected trends in Korean cotton product markets through 1990

Yarn	Fabrics	Finished goods
Japan and Hong Kong: Decline or no growth	Middle East, Latin America, and Africa: Potential growth from small base	European Community, Japan, Canada, and Oceania: No growth or decline
Elsewhere: No growth	Hong Kong and Southeast Asia: No growth or decline	United States: Slow growth
	Elsewhere: No growth	Middle East, Latin America, and Africa: Potential growth from small base

Table 64—Raw cotton use, projections to 1990/91

Market year[1]	Domestic use	Export use	Total use[2]
		1,000 bales	
1983/84	500	1,100	1,600
1984/85	513	1,111	1,624
1985/86	525	1,122	1,647
1986/87	538	1,128	1,666
1987/88	552	1,133	1,685
1988/89	566	1,139	1,705
1989/90	580	1,145	1,725
1990/91	594	1,150	1,744

[1]August/July.
[2]Assumed equal to imports.

A second determinant of the U.S. share could be the trend in U.S. cotton export prices as influenced by the domestic cotton loan rate and the U.S. dollar exchange rate. If the dollar remains strong against major currencies as in 1984, or if the 1985 U.S. farm bill provides for cotton loan rates in excess of world market clearing levels, U.S. export prices could rise in relation to those of competing exporters. This could in turn lead to problems in maintaining the U.S. market share during the late 1980's.

Beef Tallow. Beef tallow is not produced in Korea because fat is left on the carcass and sold along with the meat. Tallow was formerly used primarily for making soap, but use in foods (such as noodles, margarine, and shortening) grew considerably in 1970-76, only to decline sharply thereafter (*55*). A 1980 report forecast that noodle consumption would grow by 3 percent per year and margarine and shortening by 6 percent (*28*), but palm oil is now replacing tallow as an ingredient in these foods. Price is an important factor, but health concerns about animal fat are widespread in Korea and are aggrevated by the grade name ("inedible tallow") assigned by the United States to its exports. In addition, palm oil has a lower melting point than tallow, making it easier to nandle. Food use of tallow will probably continue to decline, although shortrun market opportunities will continue to arise in years of high palm oil prices. Changing the designation "inedible tallow" to something like "grade B" might help U.S. exports to some extent.

Use of tallow in the production of instant noodles is expected to continue, but use in margarine and shortening is expected to decline. The import projection assumes use of 35,000 tons per year of tallow for food in 1986-90 (table 65).

Use of tallow in making soap increased until 1980 and has since leveled off at 100,000 tons. The domestic soap industry, which furnished most of the growth in tallow use in the 1970's, appears to be growing more slowly in the 1980's. This is more true of laundry soap than of cosmetic (toilet) soap. Soap exports, however, surged in 1981 and now account for about one-fifth of the tallow used for soaps. The bulk of Korea's laundry soap exports in 1981-83 went to Northeast Africa and the Middle East, with Ethiopia the leading importer. No information is available on this trade or on Korea's

smaller cosmetic soap exports, for which the United States is the main market. For this report, soap exports have been assumed to remain static, at 38,000 tons per year, through 1990. Domestic soap use will probably grow faster than the rate of population growth (1.5 percent), but the increasing use of tallow in soap for export and the static overall use of tallow in making soap imply that tallow use in domestic soap production declined in 1980 and 1981. Competition from palm oil and, possibly, from coconut oil is causing tallow to lose some of its market share. Further competition from palm oil can be expected in the late 1980's. The projections made here assume that tallow use in soap production will remain static at 100,000 tons per year in 1986-90 (table 65). This may prove to be optimistic and assumes continued effective market development by the National Renderers' Association.

Korean feed mills have used tallow on a small scale as a source of fat in animal feeds since the early 1970's. Although feed millers reportedly understand the benefits of feeding tallow, the price relationship with corn and the 20-percent tariff applied through 1981 to tallow used in feed kept feed use very low. In 1982, tallow for feed use was placed under the tariff quota system, with a quota of 25,000 tons and a within-quota tariff rate of 12 percent. This helped raise imports for feed use from negligible amounts in 1981 to 2,000 tons in 1982 and 10,000 tons in 1983 (*55*). Finally, in 1984, all tallow was returned to the general tariff schedule at a reduced tariff rate of 12 percent. The 1983 tariff quota on imports of tallow for feed use, at 26,000 tons, probably reflects what the Government and industry felt was a realistic and desirable level of use at that time. With continued market development, tallow use in feeds could grow at the same rate as total feed production through the end of the decade, reaching 38,000 tons in 1990. This would raise total use of tallow to 173,000 tons in 1990.

Tallow imports have come from four suppliers: the United States, New Zealand, Canada, and Australia (table 66). Only Pacific-basin countries that trim fat from carcasses in large amounts are potential suppliers, so the list of exporters is unlikely to change. Price competition among the four countries is active. The largest U.S. share in recent years, 78 percent in 1980, occurred when its prices were below those of its main competitors. The United States suffers a disadvantage relative to Australia and New Zealand in shipping costs, but is likely to hold at least a 50-percent market share through the 1980's because of good market development.

Hides and Leather. South Korea was the second leading market for U.S. cattle hides (after Japan), and the third leading market for U.S. wet blues (semi-finished leather) in 1983. Imports of U.S. cattle hides and leather were valued at $258 million in 1983. Korea also imported smaller quantities of sheepskins and of sheep, pig, and reptile leather.

Hides are processed into leather for use in several Korean industries that depend heavily on exports. Leather garments form the largest component of leather goods exports, at $414 million in 1983, and consumed 69 percent of the leather used in Korea (*55*). Other major leather industries include footwear, with $564 million in exports in 1983; suitcases

Table 65—Supply and use of beef tallow, 1978-84 and 1985-90 projections

Year	Beginning stocks	Imports	Soap	Food	Feed	Total use	Ending stocks
				1,000 tons			
1978	12	164	83	81	0	164	13
1979	13	177	102	69	0	171	18
1980	18	142	102	45	0	147	13
1981	13	155	101	52	0	153	15
1982	15	138	100	39	2	141	12
1983	12	138	100	30	10	140	10
1984	10	174	85	80	10	175	12
1985	9	140	90	31	19	140	12
1986	9	160	100	35	25	160	12
1987	9	162	100	35	27	162	9
1988	9	165	100	35	30	165	9
1989	9	169	100	35	34	169	9
1990	9	173	100	35	38	173	9

Sources: (*28, 49*), and FAS records.

and bags, $93 million; and gloves, $39 million. Leather goods exports totaled $1.17 billion in 1983. Korea's large, strong leather industries have the potential to export their products on an even larger scale. Although Korea voluntarily monitors its leather goods exports, protectionism by trade partners is not nearly as serious as that facing the textile industries. The United States put imports of Korean footwear under a quota restraint in 1981, but lifted the import restrictions in mid-1982. The United States bought 46 percent of Korea's exports of leather garments in 1983, 83 percent of its leather footwear exports, 69 percent of its total exports of leather goods. Other major markets for South Korean leather goods are West Germany and Japan (*55*).

The size and growth of the Korean market make it attractive to American hide exporters. While the vast majority of the hides used by Korea's leather industry are of U.S. origin, many first pass through Japan, where they are processed into leather and then re-sold to Korea. In 1983, the value of South Korea's leather imports from Japan exceeded that from the United States by a wide margin, reflecting much higher unit values. This situation was typical of all recent years (table 67). By finding out why Japanese-processed leather commands a premium in Korea and by replicating the same processes in the United States, U.S. tanners should be able to capture much of Japan's current market share (69 percent in 1981, 60 percent in 1982, 53 percent in 1983).

In addition, depending on the cost structures of the U.S. and Korean tanning industries, the United States might eventually be able to cut its shipments of hides to Korea and substitute shipments of leather in their place. The unit value of a ton of U.S. leather (c.i.f. in Korea) was 3.3 times that of a ton of U.S. hides in 1982. If the United States expanded its share of Korea's leather market at the expense of Japan, the additional value added would be even greater than suggested by this ratio because the process would presumably involve a rise in the unit value of U.S. leather shipped to Korea. Leather is not counted as an agricultural product, so this shift would, in itself, marginally reduce agricultural export sales, because leather would be substituted for U.S. hides going to Japan. FAS in Seoul suggests that appropriate market development efforts could help the United States win up to $100 million in leather sales to South Korea away from Japanese exporters.

Korea levies tariffs of 20 percent on hides and 30 percent on leather. Either tariff can be waived for imports destined for processing and re-export. The mix of hides and leather going into Korea will depend partly on the Korean Government's attitudes and actions on tariff rates. Given past experience, the Government would probably prefer that hides be tanned in Korea and may adjust tariffs to bring this about.

The projections below assume that Korea's hide needs will expand by 6 percent annually in volume through 1990, and that the mix of hides and leather imports will not change (table 68). This strong rate of growth is based on the projected growth of Korea's exports of leather goods. Because Korea's own cattle hide production is unlikely to grow by more than 7,000 tons from its present 8,000- to 11,000-ton level and because the market shares of New Zealand, Canada, and Australia are

Table 66—Beef tallow imports by country of origin, 1977-83[1]

Country of origin	1977	1978	1979	1980	1981	1982	1983
				1,000 tons			
United States	91	78	106	111	103	69	78
Canada	20	23	21	22	11	17	15
Australia	23	33	19	4	4	18	10
New Zealand	20	29	17	5	26	34	33
Other	1	1	14	0	11	0	2
Total	155	164	177	142	155	138	138

[1]Adjusted for errors.

Source: (*49*).

Table 67—Leather imports by country of origin, 1983

Country of origin	Volume		Value		Unit value
	Tons	*Percent*	*1,000 dollars*	*Percent*	*Dollars per ton*
United States	18,967	35.9	81,721	26.3	4,309
Canada	365	.7	635	.2	1,740
New Zealand	1,372	2.6	3,422	1.1	2,494
Australia	1,294	2.4	1,978	.6	1,529
Oceania	2,666	5.0	5,400	1.7	2,026
Japan	17,148	32.5	163,727	52.7	9,548
Taiwan	670	1.3	1,676	.5	2,501
Hong Kong	347	.7	500	.2	1,441
East Asia	18,165	34.5	165,903	53.4	9,133
Argentina	8,404	15.9	15,579	5.0	1,854
Brazil	534	1.0	573	.2	1,073
Paraguay	226	.4	394	.1	1,743
Uruguay	1,551	2.9	4,159	1.3	2,681
Latin America	10,715	20.2	20,705	6.7	1,932
Europe	1,022	1.9	17,828	5.7	17,444
Other	934	1.8	18,667	6.0	19,986
Total	52,834	100.0	310,859	100.0	5,884

Source: (*49*).

Table 68—Cattle hide supply and demand, 1976-84 and 1985-90 projections

Year	Beginning stocks	Production	Imports	Consumption	Ending stocks
			1,000 tons		
1976	9	9	110	115	13
1977	13	9	118	126	14
1978	14	9	149	155	18
1979	17	11	98	115	11
1980	11	10	91	102	10
1981	10	8	121	130	9
1982	9	7	128	137	7
1983	7	8	155	160	10
1984	10	11	152	166	7
1985	7	13	156	169	7
1986	7	17	163	179	8
1987	8	14	177	190	9
1988	9	14	188	201	10
1989	10	15	199	213	11
1990	11	16	211	226	12

Source: FAS records.

unlikely to grow substantially, U.S. hide exports to South Korea are expected to continue to grow steadily. Although substituting exports of leather for those of hides would be to the U.S. advantage, this shift is not assumed in the projections.

Wood and Products. South Korea's forests cover 6.6. million ha, almost two-thirds of the nation's total land area. Although these forests are generally available for commercial use, most of the wood is useful only for erosion control or as fuel. The limited quantity of timber harvested is used largely for mine props and as pulpwood. Domestic pulp production is insufficient to meet Korea's needs, while domestic timber is not suitable for use by the nation's large plywood industry. Korea is forced to import large quantities of wood as a result. Korea's need for paper and paper products is expected to grow and will lead to increased imports of pulpwood and pulp through 1990. However, the discussion in this report is confined to the plywood industry because Korea's imports of logs and lumber for plywood and its exports of plywood are more relevant to U.S. forest products trade.

Plywood can be made in a number of ways and with various types of wood, which means that a wide variety of countries can successfully compete in world plywood trade (*9*). The growth in Korea's plywood exports in the 1960's and 1970's rested on its relatively low wages and its timely entry into the world market. Korea set up a technically advanced industry and gained expertise in marketing its products, especially to the United States (*16*). Korea grew to become the world's leading plywood exporter in the 1970's, with over half of the U.S. import market late in the decade (*34, 65*). Exports to the United States fell off markedly from 1977 on, however, and exports to Europe declined after 1978 (table 69). Although exports to the Middle East and North Africa grew strongly through 1982, these exports are vulnerable to competition from new producers in Southeast Asia.

The period 1979-82 was one of almost uninterrupted setbacks for the Korean plywood industry. Part of the problem lay on the demand side. The Korean economy entered a deep recession in 1979-80, which undercut domestic construction demand for plywood; recovery in 1981-82 was painfully slow. Likewise, world economic growth and trade stagnated during much of the period, reducing the export market for Korean plywood. Korea's 17 plywood firms quickly found themselves in financial difficulties, which bankrupted some of the largest firms and continue to limit the operation of most of the rest (*65*).

But the fundamental problem confronting the plywood industry has been the source of its raw material, Southeast Asia. Korea has traditionally used hardwood logs from Southeast Asia for making plywood (table 70). Unfortunately for South Korea, the nations of Southeast Asia have decided to manufacture plywood at home and export it directly, rather than allowing Korea and Taiwan to capture the value added from processing. The Philippines and peninsular Malaysia ended most log exports in the 1970's, and Indonesia, East Malaysia, and Papua-New Guinea have sought to keep log export prices high and gradually reduce exports (*9*). These developments are likely to erode severely, if not end, the plywood export role of Korea and Taiwan. Korean firms have been relocating plywood factories to Indonesia for several years (*9, 34*). South Korea may find a smaller niche in world trade in the production of high-quality or specialty plywood and other paneling.

The brighter side of the plywood picture is that domestic demand is likely to increase rapidly through 1990. As noted earlier, Korea suffers from a serious housing shortage, and residential construction is expected to grow throughout the 1980's. Growth in housing and business construction will vary somewhat according to general economic growth, but preparations for the Asian and Olympic Games will lead to considerable growth in the construction industry, regardless of other economic conditions. While growth in the construction industry should be sufficient to support a scaled-down plywood industry, finding a suitable source of wood may present significant difficulties. One alternative to Southeast Asian hardwood is Western hemisphere softwood; the United States and China already supply softwood to Korea (table 71). Market development efforts are underway to expand this trade. One barrier is the Korean tariff structure, which assigns general duties of 5 percent to logs and to tropical hardwood lumber but a 10-percent duty to softwood lumber.

Implications for U.S. Agricultural Exports

Previous sections have examined the supply and demand balance for individual agricultural commodities in South Korea, forecasting import trends based on likely changes in supply and demand conditions through 1990. This section uses these results to forecast South Korea's demand for total agricultural imports and for U.S. agricultural products (table 72).

The forecast for total agricultural imports (table 72) is based on the import forecasts for individual commodities (the "forecast" commodities) developed under "Commodity Demand, Supply, and Trade Projections." This calculation requires a number of strong assumptions, the strongest being that the value of the forecast commodity imports, as a group, remains a constant fraction of total agricultural import value through 1990.

First, market year forecasts for wheat, corn for processing, soybeans, and cotton are transformed into calendar year forecasts by allocating quantities to calendar years according to the overlap between the market year and each calendar year. Thus, the soybean import forecast for calendar year 1984 equals five-sixths times the import forecast for market year 1984 plus one-sixth times the import forecast for market year 1985. This adjustment reflects the fact that calendar year 1984 includes the last 10 months of soybean market year 1984 and the first 2 months of market year 1985.

Second, a "real" import unit value for forecasting import value trends is derived for each commodity. In each case, import unit values for 1981-83 are calculated from South Korean trade statistics, which report import values in terms of current U.S. dollars. Unit values for 1981 are inflated by an index reflecting the proportional change in the U.S. wholesale price index between 1981 and 1983, and converted into 1983 dollar terms. Unit values for 1982 undergo a similar adjustment. The average of the adjusted unit values for 1981-83 is then used to forecast 1984-90 import values in terms of 1983 dollars.

Table 69—Plywood and overlaid plywood exports by destination, 1977-83[1]

Destination	1977	1978	1979	1980	1981	1982	1983
				1,000 square meters			
Japan	8,319 (2.3)	7,343 (2.2)	9,416 (3.9)	6,936 (4.1)	700 (.7)	664 (.5)	10 (0)
Other East Asia	3,447 (1.0)	1,976 (.6)	1,019 (.4)	877 (.5)	237 (.2)	41 (0)	3 (0)
United States	247,729 (69.4)	221,838 (68.6)	149,005 (62.2)	86,944 (50.8)	8,826 (8.3)	49,632 (39.6)	24,215 (38.7)
Canada	17,534 (4.9)	14,127 (4.3)	2,975 (1.2)	3,175 (1.9)	4,713 (4.5)	1,400 (1.1)	336 (.5)
South and Central America	1,249 (.4)	847 (.3)	306 (.1)	126 (.1)	1,590 (1.5)	1,360 (1.1)	1,745 (2.8)
European Community	34,240 (9.6)	49,624 (15.2)	38,714 (16.2)	22,767 (13.3)	22,546 (21.3)	4,097 (3.3)	3,869 (6.2)
Other Western Europe	411 (.1)	439 (.1)	586 (.2)	751 (.4)	864 (.8)	1,649 (1.3)	1,827 (2.9)
Middle East and North Africa	24,548 (6.9)	25,376 (7.8)	31,274 (13.1)	33,860 (19.8)	49,703 (47.0)	50,533 (40.3)	20,900 (33.4)
Sub-Saharan Africa	14,313 (4.0)	2,214 (.7)	3,343 (1.4)	10,317 (6.0)	9,092 (8.6)	6,430 (5.1)	1,693 (2.7)
Oceania	2,294 (.6)	1,269 (.4)	701 (.3)	172 (.1)	366 (.3)	376 (.3)	48 (.1)
Other	2.707 (.8)	1,599 (.5)	2,033 (.8)	5,325 (3.1)	7,099 (6.7)	9,100 (7.3)	7,949 (12.7)
Total	356,791	326,652	239,372	171,250	105,736	125,282	62,595

[1]Numbers in parentheses show percentage of total.

Source: (*49*).

Table 70—Hardwood log and lumber imports by country of origin, 1977-83

Country of origin	1977		1978		1979		1980		1981		1982		1983	
	Logs	Lumber	Logs	Lumber	Logs	Lumber	Logs	Lumber	Logs	Lumber	Logs	Lumber	Logs	Lumber
	1,000 cubic meters													
Southeast Asia:														
Indonesia	4,558	t	5,320	t	4,338	3	2,451	35[1]	818	110	161	112	318	25
Malaysia	1,612	0	1,673	2	1,881	1	1,900	t	3,287	8	3,338	13	3,225	8
Philippines	37	0	49	0	39	0	56	0	653	0	160	0	212	2
Other	25	0	4	0	35	t	18	0	151	0	8	1	4	2
Subtotal	6,232	t	7,046	2	6,293	4	4,425	35	4,909	118	3,667	126	3,759	37
United States	8	4	5	7	2	11	37	4	1	53	2	24	18	21
Australia	0	0	40	0	1	0	0	22	2	t	12	0	0	0
Papua-New Guinea	27	0	72	0	75	0	99	0	189	0	361	0	417	0
Japan	22	10	5	13	10	8	17	20	t	9	2	8	t	7
Other	6	1	13	0	15	t	16	9	18	3	31	5	162	8
Total	6,295	15	7,181	22	6,396	23	4,594	90[1]	5,119	183	4,075	163	4,356	73

t = Trace.
[1]Tradebook figures for volume from Taiwan and Indonesia appear to be in error. Estimates, based on unit values for other trading countries, are included here.

Source: (*49*).

Table 71—Softwood log and lumber imports by country of origin, 1977-83

Country of origin	1977		1978		1979		1980		1981		1982		1983	
	Logs	Lumber	Logs	Lumber	Logs	Lumber	Logs	Lumber	Logs	Lumber	Logs	Lumber	Logs	Lumber
	1,000 cubic meters													
United States	1,036	2	1,438	3	1,143	302	889	77	844	48	1,076	139	1,397	527
Chile	0	0	455	0	625	6	483	0	335	0	385	0	415	0
New Zealand	83	0	140	0	157	0	134	0	12	0	19	0	94	t
Southeast Asia	13	0	7	5	15	t	t	0	0	t	0	0	9	0
Japan	14	t	15	1	14	t	10	t	5	0	11	64	25	49
Other	0	0	17	2	24	1	17	0	1	0	36	5	227	1
Total	1,146	2	2,072	11	1,978	309	1,533	77	1,197	48	1,527	208	2,167	577

t = Trace.

Source: (*49*).

South Korean imports of the forecast commodities are forecast to rise from $2.28 billion in 1984 to $2.72 billion in 1990, all in 1983 dollars. Assuming that the share of the forecast commodities plus rice in total agricultural import value remains at its 1981-83 average (67.9 percent), total agricultural imports will rise from $3.36 billion to $4.01 billion in real terms from 1984 to 1990.[23] In fact, the value of total agricultural imports is likely to rise somewhat more slowly than that of the forecast commodities because of the relatively rapid growth of demand for feed grains, soybeans, and cattle hides.

Forecasting U.S. agricultural exports to South Korea requires additional strong assumptions on the U.S. share of total Korean imports of each forecast commodity. No relevant theory is available for projecting trade shares, so these share assumptions must be based on a projection of current trends in the U.S. competitive position in each commodity market:

- The U.S. shares of Korea's imports of soybeans, soybean meal, inedible tallow, and cattle hides are assumed to remain at their respective 1981-83 averages.
- Unusual conditions in world feed grain markets in wheat market years 1983-85 led to the substitution of large amounts of feed wheat from non-U.S. sources for feed grains (see table 34). To account for this substitution, the U.S. wheat market share is set at 71.9 percent (the actual figure) in calendar 1984 and 85 percent in 1985. The U.S. share is assumed to rise to 95 percent in 1986-90, allowing for modest imports of non-U.S. feed and food wheat.
- By far the most serious source of uncertainty in U.S. agricultural exports to South Korea is coarse

[23]Rice is implicitly treated as a forecast commodity, with forecast imports of zero.

Table 72—Agricultural imports from all sources, 1984-90 projections

Commodity	Assumed import unit value	1984	1985	1986	1987	1988	1989	1990
	Dollars per ton[1]	*1,000 tons*						
Wheat	192.27	2,651	2,625	2,149	1,998	1,999	2,000	2,001
Coarse grains[2]	149.89	4,188	4,507	4,855	5,052	5,359	5,684	6,019
Soybeans[3]	300.57	810	909	950	1,017	1,084	1,159	1,229
Soybean meal	266.14	152	175	183	194	205	219	232
Inedible tallow	486.97	140	174	140	160	162	165	169
Cattle hides	1,325.24	135	152	156	163	177	188	199
Raw cotton (1,000 480-lb. bales)	374.78[4]	1,634	1,655	1,674	1,693	1,713	1,733	1,753
		Million dollars						
Value of forecast commodities[5]	—	2,280	2,407	2,378	2,428	2,524	2,622	2,722
Value of total agricultural imports[6]	—	3,359	3,545	3,502	3,575	3,717	3,862	4,008

— = Not applicable.
[1]Expressed in 1983 dollars. See text for the derivation of unit value measure.
[2]Feed grains plus corn for food and processing.
[3]Soybeans for food and feed.
[4]In constant 1983 dollars per 480-lb. bale.
[5]Total value of projected imports of the commodities included in the table, evaluated at the specified real import unit values.
[6]Represents the total value of the forecast commodities multiplied by the reciprocal of the 1981-83 average value share (0.679) of these commodities plus rice in total agricultural imports.

grains. Mainly reflecting competition from Chinese corn, the U.S. share of Korea's coarse grain imports is assumed to drop from 75 percent in 1984 to 50 percent in 1985. Thereafter, the U.S. share is assumed to recover gradually, reflecting declining Chinese export availability plus improved U.S. competitiveness because of an expected depreciation in the dollar. The U.S. share is assumed to rise to 60 percent in 1986, 70 percent in 1987, 75 percent in 1988, 80 percent in 1989, and 86 percent in 1990. Competition from China and other suppliers, plus Korean efforts to diversify agricultural import sources, are assumed to prevent the U.S. share from recovering to its 1981-83 average of 92 percent. The effects of alternative share assumptions are examined below.

- An additional source of uncertainty is cotton. The U.S. market share fell from 93.4 percent in the 1981/82 market year to 87.6 percent in market year 1982/83. The U.S. market share dropped further to 79.4 percent in market year 1983/84 in response to reduced allocations of GSM-102 credit guarantees for U.S. cotton exports to South Korea. The forecasts assume that the U.S. cotton share will rise from 79.4 percent in 1984 to 82 percent in 1985, 84 percent in 1986, 86 percent in 1987, and 88 percent in 1988-90. Again, the effects of alternative assumptions are considered.

Quantity forecasts of U.S. exports of individual commodities to South Korea (table 73) are next transformed into value forecasts. Export unit values for this purpose

Table 73—U.S. agricultural exports to South Korea, 1984-90 projections

Commodity	Assumed U.S. market share	Assumed U.S. export unit value	1984	1985	1986	1987	1988	1989	1990
	Percent	*Dollars per ton*[1]	*1,000 tons*						
Wheat	71.9-95.0[2]	168.49	1,906	2,231	2,042	1,898	1,899	1,900	1,900
Coarse grains[3]	75.0-86.0[4]	134.68	3,128	2,253	2,913	3,536	4,019	4,547	5,176
Soybeans[5]	99.0	272.34	802	900	941	1,007	1,073	1,147	1,217
Soybean meal	37.4	240.42	57	66	68	72	77	82	87
Inedible tallow	59.3	443.92	83	103	83	95	96	98	100
Cattle hides	88.0	1,262.98	119	134	137	143	156	165	175
Raw cotton (1,000 480-lb. bales)	79.4-88.0[6]	332.51[7]	1,297	1,357	1,406	1,456	1,508	1,525	1,542
			Million dollars						
Value of forecast commodities[8]	—	—	1,593	1,606	1,687	1,795	1,913	2,024	2,148
Value of total U.S. agricultural exports to Korea[9]	—	—	1,687	1,702	1,787	1,902	2,026	2,144	2,276

— = Not applicable.

[1]Expressed in 1983 dollars. See text for the derivation of unit value measure.

[2]The U.S. wheat market share is adjusted downward to 71.9 percent for 1984 and to 85 percent for 1985; this procedure is explained in the text. For all other years, the U.S. wheat share is assumed to be 95 percent.

[3]Feed grains plus corn for food and processing.

[4]Assumed to fall from 75 percent in 1984 to 50 percent in 1985, and thereafter to recover gradually to 86 percent in 1990.

[5]Soybeans for food and feed.

[6]Assumed to rise gradually from 79.4 percent in 1984 to 88 percent in 1988-90. See text for discussion.

[7]In constant 1983 dollars per 480-lb. bale.

[8]Total value of projected exports of the commodities included in the table, evaluated at the specified real export unit values.

[9]Represents the total value of the included items multiplied by the reciprocal of the 1981-83 average value share (0.944) of these items plus rice in total U.S. agricultural exports to Korea.

are calculated using 1981-83 U.S. export unit values, adjusted for general price inflation and averaged as with the Korean import unit values. Finally, the value of the forecast commodities plus rice is assumed to stay at its average 1981-83 proportion of total U.S. agricultural exports to South Korea, 94.4 percent.

Under these assumptions, U.S. agricultural exports fall to $1.69 billion in 1984 and then grow to $2.28 billion by 1990. The decline in U.S. agricultural sales to South Korea in 1984 results primarily from a drop in the U.S. shares of Korea's coarse grain and raw cotton imports. An expected further drop in the U.S. coarse grain share in 1985 leads to a further drop in value of U.S. coarse grain exports in that year despite increased total Korean coarse grain imports. The effect on total U.S. agricultural export value is slightly outweighed by an increased U.S. cotton market share and increased Korean imports of other agricultural products. If the U.S. coarse grain share were assumed to remain at its 1981-83 average of 91.8 percent, this would give the United States additional sales of $254 million in 1985 relative to the share assumptions used in table 73. This forecast loss in potential sales tapers off to less than $50 million by 1990 as the U.S. market share recovers. In contrast, if U.S. coarse grains were to fail to regain more than the 50-percent market share assumed for 1985, this would result in a loss of $292 million in sales in 1990 relative to the forecast, leaving total U.S. exports to Korea only slightly higher than in 1983. The U.S. market share in Korea's coarse grain imports thus emerges as a critical determinant of total agricultural sales to Korea in the mid-1980's.

Changes in the assumed U.S. cotton share result in smaller, though still significant, changes in forecast U.S. export earnings. For example, a 95-percent U.S. share of the South Korean cotton market in 1984-90 leads to $85 million in additional sales in 1984, declining to $41 million in 1990. Conversely, if the U.S. cotton share remained at 79.4 percent as in the 1983/84 market year, the United States would lose $50 million in 1990 relative to the assumptions made above.

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