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FAER-185 TAIWAN: AN EXPORT MARKET PROFILE, / DONALD A. SILLERS EC
ONOMIC RESEARCH SERVICE, WASHINGTON, DC. INTERNATIONAL ECONOMICS DI
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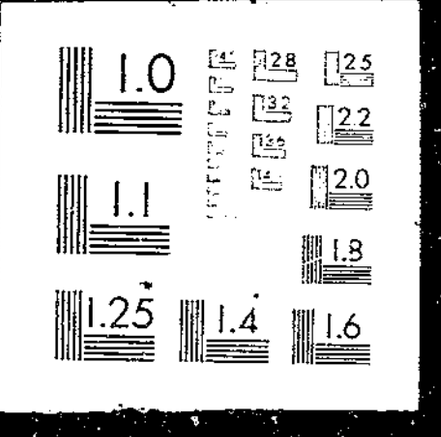

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Taiwan: An Export Market Profile

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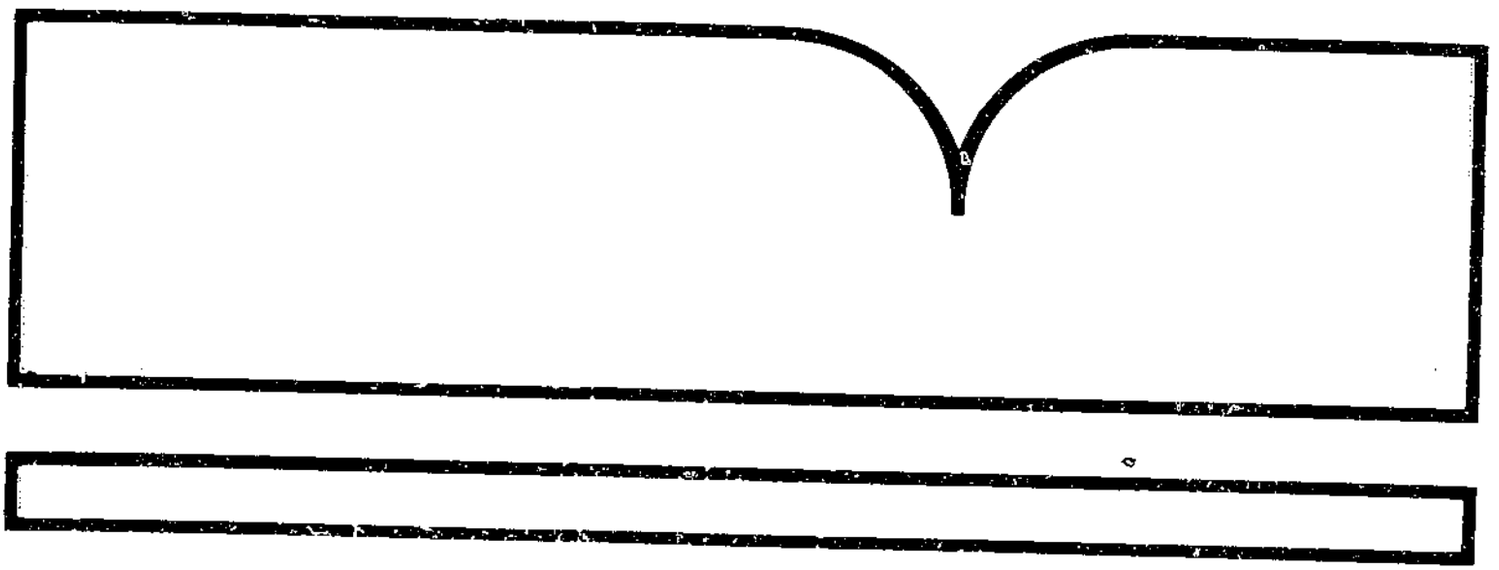

U.S. Department of Commerce
National Technical Information Service
NTIS

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. FAER-185	2.	3. Recipient's Accession No. PB83 252999

4. Title and Subtitle

TAIWAN: AN EXPORT MARKET PROFILE

5. Report Date: August 1983

6.

7. Author(s): Donald A. Sillers

8. Performing Organization Rept. No. FAER-185

9. Performing Organization Name and Address
International Economics Division
Economic Research Service
U.S. Department of Agriculture
Washington, D.C. 20250

10. Project/Task/Work Unit No.

11. Contract(C) or Grant(G) No.
(C)
(G)

12. Sponsoring Organization Name and Address

13. Type of Report & Period Covered

14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

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17. Document Analysis a. Descriptors

Exports
Imports
Market

b. Identifiers/Open-Ended Terms

Agricultural production policies
Economic growth
Import projection
Taiwan

c. COSATI Field/Group 02/B

Prices as of 1/1/83:
Paper:
Fiche: $4.50
Cost codes are: for Paper and A01 for Fiche

18. Availability Statement:
National Technical Information Service
5285 Port Royal Road, Springfield, VA 22161

19. Security Class (This Report): Unclassified

20. Security Class (This Page): Unclassified

21. No. of Pages

22. Price: See box 17

(See ANSI-Z39.18) See Instructions on Reverse

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)
Department of Commerce

United States Department of Agriculture

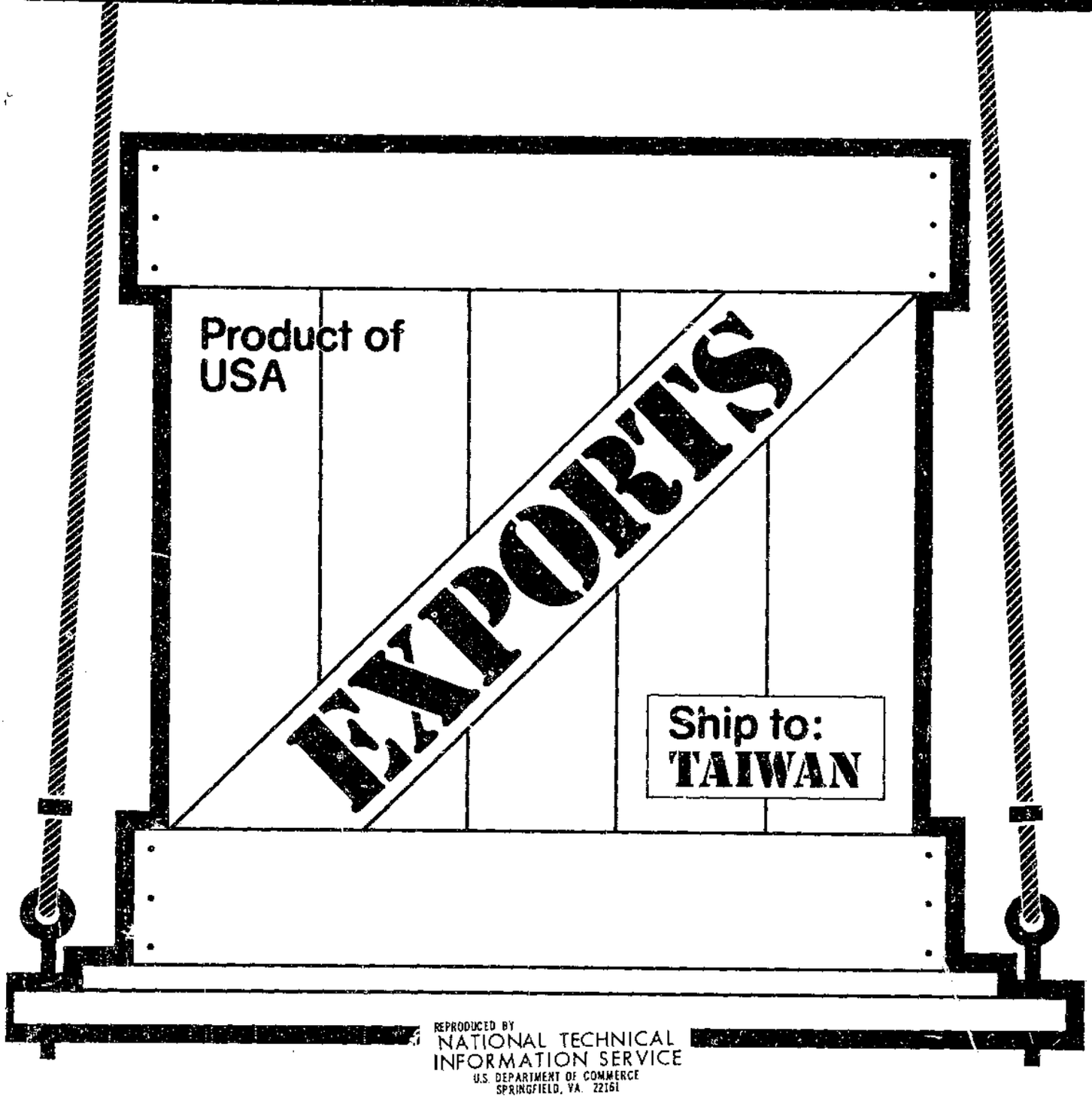
Economic Research Service

In cooperation with the Foreign Agricultural Service

Foreign Agricultural Economic Report Number 185

Taiwan

An Export Market Profile



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TAIWAN: AN EXPORT MARKET PROFILE, by Donald A. Sillers. International Economics Division, Economic Research Service, U.S. Department of Agriculture. Foreign Agricultural Economic Report No. 185.

BSTRACT

Taiwan purchased $1.2 billion worth of U.S. agricultural commodities in 1982, making it the 10th leading importer of U.S. agricultural products. The report examines the prospects for expanded exports of U.S. agricultural products to Taiwan during the 1980's. Feed grains, soybeans, wheat, cotton, tobacco leaf, and other bulk, unprocessed, and semi-processed commodities will continue to constitute the major share by value of U.S. agricultural exports to the island. Purchases of these products from the United States will grow substantially during the 1980's, even without signifi nt intervention by the U.S. Government. Horticultural products and processed foods have the greatest potential for relative growth in export value.

Keywords: Taiwan, economic growth, agricultural imports, agricultural production policies, agricultural trade policies, trade shares, import projections.

REFACE

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 of a number of high-potential markets for U.S. agricultural products. This is the first publication from that project. Other profiles are being prepared for selected markets in Africa and the Middle East, Asia, and Latin America. ERS is USDA's major source of agricultural and trade information on foreign countries and regions, while FAS has the key role in promoting U.S. agricultural exports in world markets.

This report presents information and analysis on the prospects for U.S. agricultural exports to Taiwan. The study surveys the basic factors underlying agricultural supply and demand in Taiwan and presents longrun projections of food and agricultural imports. The report is intended for use by officials responsible for export market development programs, the agribusiness community, and the public in general. This profile will help to identify gaps in the data and will serve as a benchmark reference for subsequent evaluations of the impacts of market expansion activities in Taiwan.

Washington, D.C. 20250

August 1983

CONTENTS

ACKNOWLEDGMENTS

Many persons made valuable contributions to the completion of this study. Analysts from the Foreign Agricultural Service--Alyn Beauchamp, Meg Campbell, Ed Cissel, Ed Deariso, Oldrich Fejfar, Ken Howland, Gordon Lloyd, Frank Mason, David Riggs, Jim Swain, and Bob Tisch--provided background material and reviewed previous drafts. Oswald Blaich, Christine Collins-Bolling, Charles Hanrahan, Sophia Huang, Jitendar Mann, and Carmen Nohre of the Economic Research Service, International Economics Division, read earlier drafts and made valuable comments. Amjad Gill, Taiwan analyst for ERS/IED/Asia, provided assistance with background material. Thomas McDonald rendered a thorough and exacting editorial review. Effie McConkey and Bernadine Holland devoted many hours to typing the early drafts. Finally, my wife, I-Yu Sillers, translated many documents from Chinese and made many suggestions based on her first-hand knowledge of Taiwan's food economy.

SUMMARY

Rapid economic growth since the early 1960's has greatly increased Taiwan's demand for meats and other foods. The island's highly limited agricultural land resources have forced it to rely on agricultural imports; it depends almost entirely on imports for supplies of feed grains, soybeans, wheat, cotton, and wool, and relies heavily on imports for many other agricultural products. Taiwan's import dependence has been reinforced by the relaxation of barriers to imports, first applied to feedstuffs, wheat, and agricultural raw materials, and extended more recently to a broader range of food products.

The United States has been the primary beneficiary of Taiwan's demand for agricultural imports, and will continue to be so through the 1980's. Taiwan purchased $1.2 billion worth of agricultural commodities from the United States in 1982, making it the 10th leading importer of U.S. agricultural products.

Significant growth in U.S. exports of feed grains, soybeans, wheat, and raw cotton will continue through the 1980's, even without official intervention by the United States; these products will continue to account for most of the total value of U.S. agricultural exports to the island. Sales of U.S. agricultural products to Taiwan have been boosted by the island's "Buy American" policy, initiated in 1977.

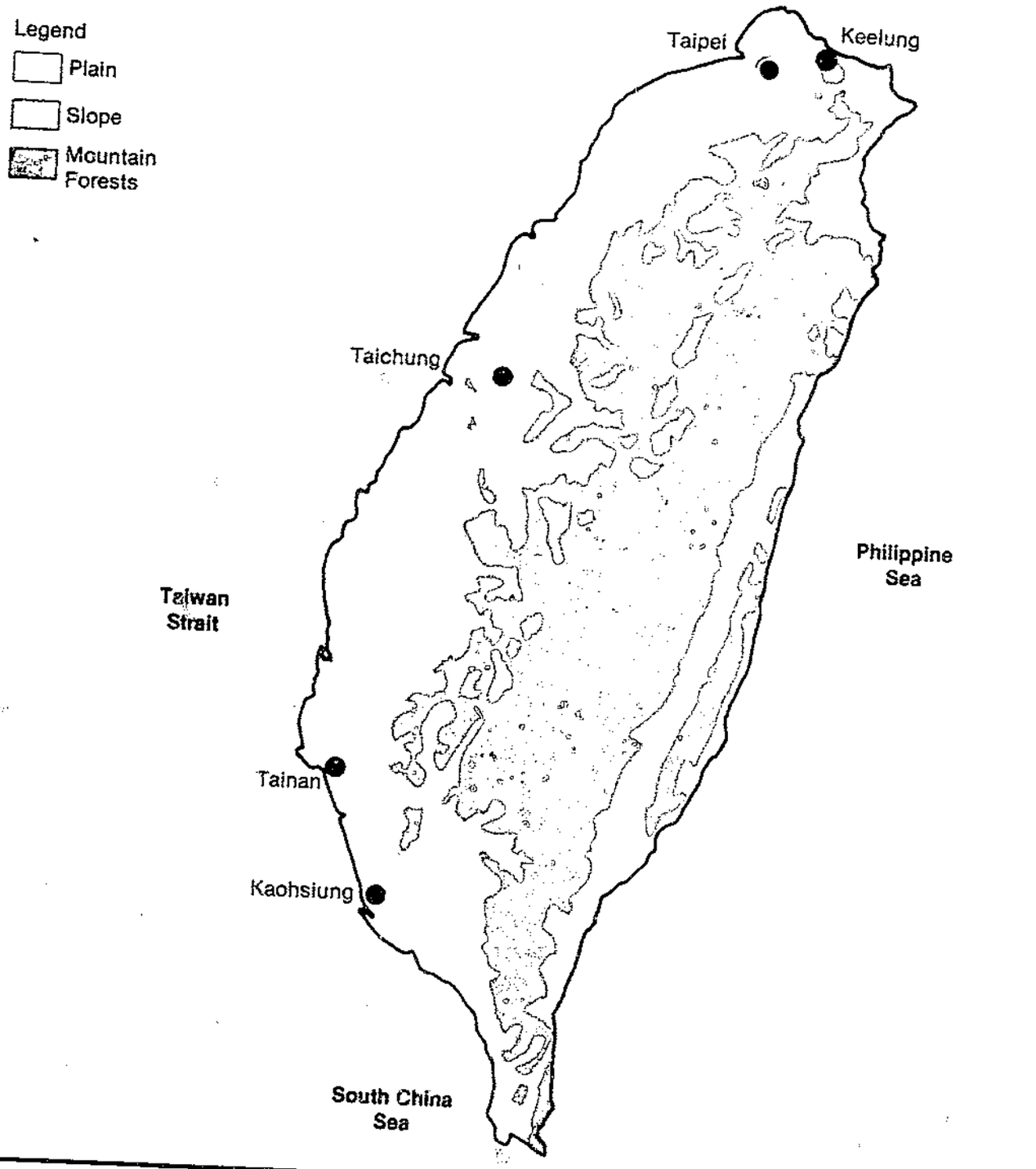
Processed foods and horticultural products offer opportunities for substantial U.S. export growth, but from a much smaller base. Further efforts to reduce Taiwan's remaining barriers to imports of these products may be useful, but even more important will be market development efforts by U.S. exporters.

Resumed growth in world trade and income will stimulate continued rapid income growth in Taiwan, although rapidly increasing real wages will force the island to make significant changes in its production and export structure. Such changes will foster continued growth in demand for imported feedstuffs, foods, and other agricultural products, much of which will be supplied by the United States. Growth in imports of raw cotton will probably slow because of the island's deteriorating competitive position in world textile markets.

Conversion Chart

This report uses metric units throughout.
1 metric ton = 2,204.62 pounds
1 hectare = 2.471 acres

Taiwan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Taiwan: An Export Market Profile

Donald A. Sillers

INTRODUCTION

Since the early 1960's, Taiwan has experienced exceptionally rapid economic growth. Real income grew at an average annual rate of 9.6 percent between 1965 and 1980, equivalent to an average rate of per capita real growth of 7.4 percent. This growth record is all the more remarkable in that Taiwan is a small, densely populated island with few natural resources. Much of the credit for Taiwan's economic success is due to its "export-led" growth strategy, under which income generated through exports of labor-intensive light manufactures has been translated (via high domestic savings rates) into capital investment and expanded capacity to produce further exports. In recent years, the island's export mix has begun to shift from an almost exclusive concentration on light manufactures to include more sophisticated products such as data-processing and communications equipment and machine tools. During the 1980's, rising domestic labor costs will increasingly press upon Taiwan the need to continue and strengthen this shift toward more technology-intensive products in order to maintain a high rate of economic growth.

One result of Taiwan's rapid income growth has been growth in the island's demand for U.S. exports in general, and for U.S. agricultural products in particular. In 1982, the United States exported $4,299 million worth of merchandise to Taiwan, of which $1,155 million (27 percent) consisted of agricultural commodities; this made Taiwan the 10th leading importer of U.S. agricultural products. Income growth has stimulated Taiwan's demand for U.S. agricultural exports in a number of ways. Most important has been the development of a large demand for meats (especially pork), which has led in turn to a demand for a much larger volume of feedstuffs than the island's crop sector can supply. Taiwan's heavy dependence on imported agricultural

products has been reinforced by policy decisions made in the middle and late 1960's. In view of the island's highly limited land resources, the political authorities concluded that the growing demand for food could be accommodated only by lowering trade barriers and opening the economy to agricultural imports, especially feedstuffs. As domestic real incomes have continued to grow, this decision has allowed the island to become almost completely dependent on imports for supplies of feed grains, protein meals, and a number of other key commodities.1/

While the decision to open the island to agricultural imports was probably the only realistic course, it has led to a number of problems. Whereas production of pork and poultry has grown rapidly, domestic production of wheat, soybeans, sorghum, and other field crops has withered in the face of competition from imports, further increasing the island's import dependence and vulnerability to foreign price fluctuations and supply interruptions. Further, the restraint placed on domestic crop prices by the availability of imports has increased the tendency for incomes in the agricultural sector to lag behind those in the nonagricultural sector. This, in turn, has created problems that threaten the continued viability of much of the island's farm sector. Younger workers from farm families have increasingly left agriculture for higher paying industrial jobs, so that most farms are now run by older farm owners; meanwhile, a shortage of hired agricultural labor to meet seasonal labor demand has become increasingly severe. Policies intended to slow the deterioration of the domestic agricultural sector, such as extension of support prices to new crops and a program of farm mechanization and consolidation, have met with problems of their own.

The United States has been the primary beneficiary of Taiwan's increasing reliance on imported agricultural products. The competitive price and quality of U.S. exports of feed grains, soybeans, cotton, wheat, and other products have been one reason for this. In addition, the relatively warm (though informal) political relationship between the United States and Taiwan, together with Taiwan's large bilateral trade surplus with the United States, has prompted the island's leaders actively to encourage importers to buy U.S. products. This trade relationship is bolstered by long-term agreements for feed grains and soybeans. In recent years, political considerations have led Taiwan to shift its buying patterns somewhat to increase agricultural imports from other politically friendly nations, notably South Africa.

1/ Meanwhile, imports of agricultural raw materials for industry, especially raw cotton and wool, also grew rapidly.

In general, the future course of Taiwan's consumption, production, and trade in major agricultural commodities appears to be largely an extension of trends already visible. Consumer demand will continue to shift away from cereals (especially rice) and roots and tubers toward meats, vegetables, fruits, vegetable oils, and sugar. The domestic livestock industry will continue to prosper, with growth in poultry and egg production especially rapid. Future growth in beef and milk production will depend on policy initiatives. Meanwhile, with the exception of fruits and vegetables for domestic consumption, production of field crops will continue to stagnate. Imports will continue to fill the widening gap between the demand for feed by the island's livestock and poultry producers and domestic feedstuff production capacity.

Feedstuffs will continue to be the largest source of absolute growth in U.S. agricultural exports to Taiwan. Tobacco will also experience steady growth. Growth in exports of cotton will depend on developments in the international economy, especially income growth in the industrialized nations and changes in their restrictions on imports of textiles and apparel. Fruits, nuts, and processed foods show the greatest potential for relative export growth in the 1980's; this forecast is based on the increasing ability (and willingness) of the island's inhabitants to spend on such imported "luxuries," together with reduced barriers to imports of these products and the likelihood of further steps toward trade liberalization.

GENERAL DETERMINANTS OF TAIWAN'S DEMAND FOR AGRICULTURAL IMPORTS

The central factor in the rapid growth in Taiwan's demand for agricultural imports has been the dramatic rise in per capita income since the early 1960's. Income growth has affected agricultural imports in two important ways. First, it has stimulated consumer demand for various foods, especially pork, poultry, eggs, and other sources of animal protein. This has led in turn to rapid growth in the demand for feedstuffs, most of which must be imported. Second, rising real wages in the industrial sector have pulled up farm wages as well, and have led to a steady outflow of labor from the agricultural sector. These trends have contributed to the decline in domestic production of feedstuffs and other import substitute crops.

General Economy

Aggregate real income growth in Taiwan exceeded 10 percent in 7 years between 1965 and 1980, and averaged 9.6 percent per year over that period (table 1). This record places Taiwan firmly among the Asian "supergrowth" economies, along with Japan, Singapore, Hong Kong, and South Korea. By 1980, per capita gross national product (GNP) reached the equivalent of US$2,244

Table 1--Real gross national product and population, Taiwan

Year	Real gross national product 1/		Average growth rate 2/	Population, end of year	Real gross national product per capita
	Billion 1980 NT$ 3/	Million 1980 US$ 4/	Percent	Millions	1980 US$
1955	178.0	4,936	--	9.306	530
1960	242.9	6,736	6.4	11.063	609
1965	384.5	10,662	9.6	12.946	824
1970	627.3	17,396	10.2	14.676	1,185
1975	909.0	25,208	7.7	16.150	1,561
1980	1,440.8	39,955	9.6	17.805	2,244

-- = Not calculated.
1/ Adjusted for change in terms of trade.
2/ For preceding 5-year period.
3/ New Taiwan dollars.
4/ At 1980 official exchange rate of 36.06 New Taiwan dollars per U.S. dollar.

Sources: (12, 14).

at official exchange rates, an income level roughly comparable to that of Portugal or Argentina.2/

Economic and military aid from the United States was instrumental in helping Taiwan to recover from the Second World War and the defeat of the Nationalist Government on the mainland. From 1949 to 1965, the United States extended $1.7 billion in official aid to Taiwan, a large share of this in the form of

2/ Gross national product is the value of production arising (at home or abroad) from factor services supplied by residents. A second accounting concept used in this report, gross domestic product (GDP), equals GNP less net payments from abroad for factor services. The balance on factor services plays a very small role in Taiwan's income accounts, amounting to less than 0.2 percent of GNP in 1980. Thus, for Taiwan the two income concepts may be regarded as close substitutes for most purposes.

agricultural commodity aid (36).3/ However, the island's growth actually accelerated after the termination of U.S. aid in 1965, as reforms in the areas of foreign exchange control, trade restrictions, and financial sector policy began to take hold. These reforms helped stimulate the growth of Taiwan's exports, especially of textiles, apparel, and other light manufactures. Between 1965 and 1973, the real value of merchandise exports grew at an average rate of 25.1 percent per year; during the same period, the share of SITC groups 6 and 8 (roughly encompassing light manufactures) in total merchandise export value grew from 33.3 to 60.0 percent. By 1973, exports of goods and services accounted for 45 percent of GNP.

Taiwan's heavy dependence on imported raw materials (especially petroleum) nearly halted real income growth in 1974, as world oil prices quadrupled and the prices of key agricultural and mineral commodities rose sharply. The economy began to recover in 1975, and by the following year had regained its former momentum. With the slowdown in the world economy beginning in 1980, the island's economic growth again slowed; real growth during 1981 fell to 5.5 percent, and preliminary reports placed 1982 growth at 3.8 percent (34). Although such rates are high by international standards, performance during 1981 and 1982 fell far short of the island's apparent longrun growth path.

In contrast to the experience of many developing countries, the benefits of economic growth in Taiwan have been distributed in a relatively equitable manner. According to World Bank data for the period around 1970, Taiwan's income distribution emerges as the most egalitarian of any country reporting such data (57).4/ Taiwan's income distribution is considerably more egalitarian than that of the United States, and is rivaled only by that of the Netherlands, Japan, and the United Kingdom among the industrialized nations.5/

Several factors help to account for the favorable distribution of income in Taiwan. Policy measures include a vigorous land reform

3/ Underscored numbers in parentheses refer to literature cited in the References at the end of this report.

4/ For many countries, including virtually all Communist countries, income distribution data are unavailable.

5/ The ratio of income received by the richest 20 percent of households in Taiwan to that received by the poorest 20 percent of households was 4.5 in 1971, and fell to 4.0 by 1980. These figures may be compared with the corresponding ratios for the United States (9.5 in 1972), the United Kingdom (6.2 in 1973, 5.3 in 1977-78), Japan (5.2 in 1969), and the Netherlands (6.6 in 1967, 4.4 in 1975). In contrast, Brazil had a ratio of 33.3 in 1972 (14; 57).

(1949-53) that transferred much of the island's agricultural land from large landowners to tenant farmers, official infrastructure policies that promote geographically decentralized industrialization throughout the island, strong financial support of public education, and agricultural credit and price policies that help moderate the extent to which farm household incomes lag behind those in the more dynamic industrial sector. Societal factors include the strong emphasis placed by families on education, a disposition toward high savings rates by households of all income levels, and relative ethnic homogeneity. The overall distribution of income has improved with economic growth, as the growing demand for labor has pulled up wage rates (14).

Taiwan's economic growth has been accompanied by striking changes in the composition of domestic output by sector of origin (table 2). Industrial output steadily increased its share of domestic product during the 1960's and 1970's, with the growth of the export-oriented manufacturing sector especially rapid. Manufacturing accounted for 34.3 percent of GDP in 1980, more than double its 16.7-percent share in 1960. On the other hand, the real value of agricultural production grew much more slowly, and actually declined slightly in 1980 and 1981. Agriculture's

Table 2--Composition of net domestic product, Taiwan

Sector	1960	1965	1970	1975	1980
			Percent		
Agriculture, livestock, forestry, and fishery	32.5	27.0	19.1	14.9	9.1
Industry:					
Mining	2.3	1.9	1.4	1.3	1.2
Manufacturing	16.7	19.9	23.8	29.3	34.3
Electricity, gas, and water	1.3	1.9	2.3	2.4	2.6
Construction	4.4	4.6	5.0	6.2	7.6
Total industry	24.7	28.2	32.5	39.2	45.7
Transportation and communication	4.1	4.8	5.7	6.0	6.4
Commerce	14.4	14.9	14.3	14.5	14.4
Government	11.9	11.3	13.1	13.6	11.8
Other services	12.9	14.2	15.8	15.6	16.2

Source: (12).

share in domestic income fell from almost one-third in 1960 to only 9.1 percent in 1980.

Labor force--The sectoral allocation of the labor force has also undergone striking shifts over the past two decades (table 3). The agricultural labor force declined from 1.68 million in 1960 to 1.28 million in 1980, as workers were attracted to higher paying jobs in manufacturing, construction, and services. Whereas agriculture accounted for more than half of total employment in 1960, its share had declined to less than one-fifth by 1980; meanwhile, manufacturing more than tripled its share of total employment.

Labor force participation rates in 1980 for men and women over 15 years old were 76 percent and 40 percent, respectively; women thus account for about one-third of the labor force. The labor market has been very tight since about 1968: average annual unemployment has remained below 2 percent (except for 1975, at 2.4 percent), while showing a gradual downward trend.

Table 3--Allocation of labor force by sector, Taiwan

Sector	1960	1965	1970	1975	1980
			Percent		
Agriculture, livestock, forestry, and fishery	56.1	53.7	36.7	29.9	19.5
Industry:					
Mining	1.3	1.3	2.1	1.3	.7
Manufacturing	10.0	10.6	20.4	27.2	32.8
Electricity, gas, and water	1.3 1/	1.2 1/	.8	.6	.4
Construction			5.0	6.4	8.5
Total industry	12.6	13.1	28.3	37.1	43.7
Transportation and communication	3.0	3.2	5.4	5.7	5.9
Commerce	8.9	9.0	14.7	13.3	16.0
Services (including government)	19.4	21.0	14.9	15.5	16.3

1/ Figures reported for electricity, gas, and water were combined with those for construction in 1960 and 1965.

Source: (14).

The unemployment rate hit a low of 1.2 percent in 1980, and rose thereafter in response to slow growth in export demand. Unemployment stood at 1.9 percent in June 1982.

Inflation--Inflation has been a serious problem in some recent years. Wholesale and consumer price inflation averaged 1.8 percent and 2.9 percent between 1963 and 1972; but during the 1973-80 period, the annual growth of wholesale and consumer prices averaged 12.0 percent and 12.4 percent, respectively. The economy's heavy dependence on imported oil and other raw materials led to two bursts of high inflation in recent years, the first following the 1972-74 commodity boom and the first OPEC price hike in 1973 and the second following the second oil price hike in 1979. Inflation in consumer prices peaked in 1974, when the consumer price index (CPI) rose by nearly 48 percent. The CPI increased by 9.8 percent in 1979 and by 19.0 percent in 1980. Taiwan has, however, shown a remarkable capacity to recover from these inflationary episodes, partly as a result of highly conservative monetary and fiscal policies. Consumer price inflation dropped to 5.2 percent in 1975 from nearly 48 percent in 1974; similarly, while consumer prices rose by 16.3 percent during 1981, the price level actually fell during the final quarter, and continued to fall during the first quarter of 1982. The recent deceleration in inflation has been greatly facilitated by the softening of the world oil market; short-term inflationary prospects depend heavily on whether this softening continues or is reversed. The most likely prospect over the near future is a return to "normal" inflation in the 5- to 9-percent range, with a significant chance of even greater price stability.

Investment--Gross fixed capital formation amounted to US$12.73 billion in 1981, absorbing 28.2 percent of total expenditure on GNP. This investment ratio is very high by international standards, and has been growing over time; the island's investment behavior is particularly impressive in view of the heavy defense burden on the economy. By far the largest share of investment is financed out of domestic savings, which in 1981 equaled 30.9 percent of GNP, representing the second highest average savings rate in the world (behind Japan). Domestic savings grew in real value at an annual rate of 11.1 percent between 1970 and 1981 (14).

Foreign direct investment has long played an important role in the support of overall investment levels and in the transfer of industrial technology to Taiwan. Net foreign direct investment amounted to US$101 million in 1981, while the island's net long-term borrowing was US$738 million (1). While foreign investment continues to grow in absolute terms, its relative importance has gradually declined due to the rapid growth of investment out of domestic savings.

Expected Growth--The growth of Taiwan's demand for imports during the remainder of the 1980's, including its demand for U.S. agricultural products, will largely depend on the growth of the island's aggregate real income. Predictions of Taiwan's future growth prospects involve two major uncertainties, the first concerning the timing of the recovery of income growth in the island's industrialized trading partners, and the second concerning future trends in the competitiveness of its export industries. Taiwan's current Ten-Year Plan is based on a projected 7.9-percent rate of growth in real gross domestic product (GDP) over the period 1980-89, compared with the average rate of 9.5 percent during 1970-80 (30). Independent estimates derived by Chase Econometrics are in fairly close agreement with that projection, predicting average real growth of 7.8 percent over the same period. Chase's estimates are based on an assumed slowdown in the growth of real world trade to 5.5 percent per year during the 1980's, together with growth in real oil prices of 1.5 percent per year (6).

The demand projections derived for this study are based on the assumption that world trade will begin a strong recovery in 1983, and will grow by 5.5 percent per year thereafter. A serious delay in the recovery of world trade growth will inevitably retard the growth of the island's import demand. It is further assumed that Taiwan's real GDP (and GNP) will grow by 5.5 percent during 1983 and at a uniform annual rate of 7.6 percent between the end of 1983 and the end of 1989 (corresponding to the average rate projected over the 1981-90 period in the Chase study). The real GNP levels implied by these assumptions are shown in table 4.

In order to realize even this reduced rate of growth during the 1980's, Taiwan's economy will have to undergo significant structural changes. Because of rising unit labor costs, Taiwan faces increasingly stiff competition in the market for exports of mass-market textiles and apparel from low-wage producers such as Indonesia and the People's Republic of China; this trend is almost certain to continue and to extend itself into the markets for footwear and many other labor-intensive products. In addition, provisions of the new Multi-Fiber Arrangement, concluded in December 1981, suggest the likelihood of a sharp reduction in the growth of Taiwan's textile exports to the European Community, and possibly to the United States as well.

In December 1981, Taiwan's Council for Economic Planning and Development unveiled its Four-Year Economic Development Plan for 1982-85, which summarizes the official strategy for maintaining the island's economic momentum. The core of the strategy is to encourage the manufacturing sector to shift from labor-intensive light manufactures toward high-technology products such as

Table 4—Projected level and growth of real gross national product and population, Taiwan

Year	Real gross national product			Population 1/	
	Level	Growth rate 2/	Per capita	Level	Growth rate 2/
	Bil. 1980 US$	Percent	1980 US$	Percent	1980 US$
1981	3/ 43.972	3/ 5.5	2,425	3/18.132	3/ 1.84
1982	3/ 45.644	3/ 3.8	2,472	18.466	1.84
1983	48.153	5.5	2,562	18.798	1.80
1984	51.814	7.6	2,708	19.129	1.76
1985	55.750	7.6	2,865	19.458	1.72
1986	59.989	7.6	3,032	19.785	1.68
1987	64.547	7.6	3,210	20.109	1.64
1988	69.453	7.6	3,399	20.431	1.60
1989	74.733	7.6	3,602	20.750	1.56

1/ End of year.
2/ Growth above previous year.
3/ Actual.

industrial electronic equipment, electrical machinery, machine tools, and data-processing and communications equipment. Taiwan's leaders hope that a more technology-intensive growth path can blunt the adverse effects of rising labor costs on the international competitiveness of the island's exports, as well as limit the growth of its energy import requirements compared with those entailed by reliance on heavy industry. A related element of the new development strategy is a general shift toward the "up-market" end of Taiwan's present export industries, including a shift toward higher unit-value products within the textile, apparel, and footwear industries (31).

Taiwan's manufacturing sector appears to be moving in the general directions outlined in the Four-Year Plan in response to market forces; moreover, the authorities have begun to take substantive action in support of their proposals. In May 1982, the Economics Ministry issued a list of 87 types of technologically advanced products for which investment and production will be supported through a variety of tax, credit, and trade policy incentives. A second step was the opening of the Hsinchu Science-based Industrial Park, where foreign firms are given tax incentives for establishing research and development facilities

and manufacturing plants in high-technology fields. These and other changes lend some credibility to the overall success of Taiwan's ambitious plans for economic transformation (31, 32).

On the other hand, the new development strategy represents a sharp break with established patterns in Taiwan's manufacturing sector. Despite the availability of many highly trained engineers and scientists, manufacturing firms in Taiwan have generally invested little in research and development, preferring to license existing technology from Japan and the United States. In part, this pattern is due to legal circumstances that make it difficult for firms to appropriate the benefits of their research efforts. Whether the island's entrepreneurs can quickly shift toward a more progressive style of operation remains to be seen.

Moreover, because of Taiwan's heavy dependence on external trade, its future economic growth is vulnerable to adverse developments in its import and export markets. On the import side, an increase in real oil import prices more rapid than assumed here would damage the island's growth prospects, as would any extended interruption in the supply of oil or other critical raw materials. On the export side, Taiwan's growth might fall below the projected trend if world trade fails to grow at the modest pace assumed here. Similarly, the island's economy could suffer heavily if its export markets were seriously constrained by increased protectionism in the developed countries, a risk that appears increasingly likely. Finally, recent shifts in U.S. policy on arms sales to Taiwan have raised the possibility that Taiwan feel a need to develop its own advanced weapons systems. Such a move could seriously hinder the island's development efforts by diverting research effort and capital investment from export industries. Thus, major uncertainties surround the economic growth projections that underlie this study, most involving downside risks. If Taiwan's overall growth during the 1980's falls significantly short of the trend assumed in table 4, the growth of U.S. agricultural exports to the island will inevitably suffer as a result.

Population, Education, and Urbanization—One reason for Taiwan's heavy dependence on agricultural imports is the large size of its population in relation to its limited arable land resources. Taiwan's population stood at some 18.13 million at the end of 1981. The great majority (98 percent) are ethnically Chinese. About 84 percent are "native" Taiwanese, whose ancestors migrated to the island from the Chinese mainland before the 20th century. "Mainland" Chinese, whose families came to Taiwan from the mainland between the end of World War II and the Communist consolidation of power in 1949, make up another 14 percent. In addition to the ethnic Chinese, a small group (300,000 or 2

percent) of aborigines live along the east coast and in the central mountains. Finally, Taiwan hosts a foreign community of about 20,000, concentrated in Taipei and other large cities (14).

In part because of the large influx of persons from the mainland between 1945 and 1949, and in part because of rapid population growth during the 1950's and early 1960's, Taiwan's population density is among the highest in the world.6/ Fortunately, Taiwan's population growth rate has declined markedly since the 1950's. Rapidly expanding economic and educational opportunities for women led to a dramatic increase in age at marriage and a sharp decline in desired family size, two key determinants of population growth (22). These trends have been reinforced by official promotion of family planning since 1969. The birth rate fell by 49 percent between 1951 and 1971, from 50.0 to 25.6 per thousand; the rate of natural increase (population growth rate) fell to 2.1 percent by 1971, and averaged 1.97 percent between 1975 and 1980. This rate is high compared with that of most developed countries, but it is considerably below the norm for a country of Taiwan's income level (4).

The dramatic initial phase of the demographic revolution in Taiwan appears to have run its course. Population growth has varied between 1.8 percent and 2.0 percent since 1977, with little apparent trend. However, economic growth remains high, and greater numbers of women continue to acquire more years of schooling and to enter the labor force. Fundamental conditions thus seem to favor a continuing gradual decline in birth rates and population growth. The demand projections in this study are based on the assumption that Taiwan's population will grow by 1.84 percent in 1982, and that the growth rate will decline by 0.04 percent each year from 1982 through 1989, implying a total population of 20.75 million at the end of 1989 (table 4). The implied average growth rate over the entire period is 1.7 percent.

About 67 percent of Taiwan's 1980 population lived in urban areas, including about 30 percent in the four largest cities--Taipei, Kaohsiung, Taichung, and Tainan (14). The remaining 33 percent lived in rural villages. Urbanization is proceeding steadily as increasing numbers of farmers and other rural people are drawn into industrial employment; Sun and Tsai (27) estimate that by 1996 some 83 percent of Taiwan's population will live in urban areas.

6/ Taiwan had 504 persons per square kilometer at the end of 1981, compared with mid-1979 population densities of 24 persons per square kilometer in the United States and 341 in the Netherlands (14; 57, 1981).

However, the distinction between urban and rural households is not as sharp as in many other countries, and has become increasingly blurred in recent years. The authorities in Taiwan have long followed policies to encourage the establishment of industrial firms in smaller towns and cities around the island, and have financed an impressive transportation system connecting rural and urban areas. A very large proportion of Taiwan's farm households have turned to part-time farming, in part because of easy access to industrial employment and in part because of the higher wages available in industry. Most include one or more members employed in industry, and derive a large share of total household income from nonfarm sources. Thus, in 1978 the median farm family derived only one-third of its income from farming (10). The relative ease of movement between agricultural and industrial employment has been one reason for the low rates of unemployment that have characterized Taiwan's development, since many workers can shift from farming into industrial employment without leaving the village, and can return to farming if a slowdown in the economy makes this necessary. As ever larger numbers of households withdraw from farming entirely and move into urban areas, this cushion against open unemployment is likely to become less and less effective.

Finally, an important element in Taiwan's current agricultural policy is the encouragement of farm consolidation to allow greater economies of scale. While this program is a reasonable response to the problems currently affecting the agricultural sector, success in the land-consolidation program will inevitably lead to an increased rate of urbanization.

Chinese society has traditionally placed a high value on formal education, and this tradition is reflected in strong social and official support for the educational system in Taiwan. Free public education is provided through the ninth grade, and school attendance through this level is now essentially universal for both sexes (14, 24). Secondary and higher education also receives strong public financial support, but slots in public educational institutions at these levels are allocated on the basis of performance in entrance examinations, in which competition is fierce. Secondary school attendance in the 12- to 17-year age group is about 80 percent, while about 25 percent of the 18- to 21-year age group are enrolled in college. More than half of the college population choose majors in engineering or science (5).

Taiwan sends large numbers of its most promising students abroad for graduate training in foreign universities, especially in engineering and the natural sciences. A large proportion fail to return to Taiwan, seeking jobs abroad instead. Even so, there seems to be an excess supply of such highly trained per-

sonnel in Taiwan (30), and many returnees are unable to find jobs that fully utilize their training. Nonetheless, to the extent that Taiwan succeeds in pursuing the technology-intensive growth path currently envisioned by planners, this reserve pool of scientists and engineers may provide the means for rapid expansion into new industrial fields.

Overall Structure of Trade--Foreign trade is the lifeblood of Taiwan's economy. Merchandise imports of US$21.20 billion absorbed 46.4 percent of the island's 1981 gross national income, while exports (US$23.82 billion) earned 49.5 percent of GNP. Four nations shared 69.6 percent of Taiwan's 1981 import market: Japan (US$5.93 billion or 28.0 percent), the United States (US$4.77 billion or 22.5 percent), Kuwait (US$2.18 billion or 10.6 percent), and Saudi Arabia (US$ 1.74 billion or 8.5 percent). Imports from Kuwait and Saudi Arabia consist almost entirely of petroleum, while Japan and the United States are the principal suppliers of other imported products.

Agricultural products make up a relatively small share of the island's total imports. Food and feed products accounted for about 9.3 percent of total 1981 merchandise imports (table 5). Cotton, the largest nonfood agricultural import, added another 2.0 percent, while hides, wool, and tobacco together accounted for 1.6 percent.7/ These figures, however, understate the critical importance of agricultural imports to Taiwan, especially those serving as inputs to its livestock economy and textile industry. Because of its relatively specialized pattern of agricultural production, Taiwan has come to depend almost entirely on imports for its supplies of many key agricultural commodities: 97 percent of its total feed grains (in 1981), 99 percent of its soybeans (the major source of protein feed as well as an important food source), 90 percent of its milk (fresh milk equivalent basis), and almost 100 percent of its wheat, cotton, and wool.

The United States is by far the major source of Taiwan's agricultural imports, supplying over 57 percent (by value) of the island's 1980 agricultural imports. The United States currently stands almost unrivaled in the markets for wheat and soybeans, and holds a market share of close to 60 percent in feed grains, a market shared with South Africa, Australia, and Thailand. The United States is also the dominant supplier of raw cotton and tobacco, although Taiwan spreads a sizable share of its purchases of these commodities among a wide range of other countries. Australia and New Zealand supply Taiwan with most of its imported wool, beef, and dairy products (mainly powdered milk).

7/ The composition of Taiwan's agricultural imports is discussed in greater detail below, under "Agricultural Trade."

Taiwan is also heavily dependent on imported fuels and primary commodities, which together absorbed almost 40 percent of 1981 merchandise import spending. The resource-poor island's imports of petroleum and raw materials have grown rapidly in physical terms as its industries have grown, while the ten-fold increase in world oil prices since 1973 has greatly increased the real burden of its oil bill.

Table 5--Structure of external trade

Product category	1965	1970	1975	1976	1977	1978	1979	1980	1981
					Percent				
Imports:									
Food and feeds	13.5	14.6	14.1	11.3	11.2	10.5	10.4	8.4	9.3
Fuels	4.9	4.5	13.6	17.2	18.7	17.2	17.8	25.5	25.9
Other primary	24.0	17.5	13.5	14.1	16.4	15.5	16.0	14.8	12.7
Machinery and transportation equipment	28.9	35.0	31.8	30.6	26.9	30.1	29.2	27.9	28.3
Textiles and apparel	2.4	4.8	1.8	1.9	1.6	1.8	1.7	1.5	1.6
Other manufactures	26.4	23.6	25.2	24.9	25.3	25.0	24.8	21.9	22.1
Exports:									
Food	52.4	18.6	15.6	11.8	11.8	10.2	8.9	8.6	7.2
Fuels	.4	.7	1.1	1.3	1.6	2.1	1.8	1.5	2.0
Other primary	6.5	4.7	2.2	2.0	1.8	2.1	2.3	1.9	1.9
Machinery and transportation equipment	4.3	16.7	19.5	21.0	22.5	23.3	23.6	24.7	25.6
Textiles and apparel	14.6	28.7	30.0	28.1	24.0	24.0	22.0	21.3	21.6
Other manufactures	21.7	30.7	31.5	35.8	38.3	38.2	41.5	41.9	41.6

Note: The classification pattern used in this table and in table 6 is modified from that used in table 9 of World Development Report, 1980. Food commodities include SITC sections 0, 1, and 4, plus division 22. Fuels correspond to SITC section 3. Other primary commodities comprise SITC section 2, less division 22 plus division 68. Textiles and apparel include SITC divisions 65 and 84. Machinery and transportation equipment corresponds to SITC division 7. Other manufactures include SITC sections 5, 6, 8, and 9, less divisions 65, 68, and 84.

Source: (18).

In addition to crude petroleum and other raw materials, nonagricultural imports include a wide range of heavy industrial products. Table 6 identifies the major components of Taiwan's demand for nonagricultural imports, along with the market share held by major suppliers in each of these markets. Japan is Taiwan's largest supplier of imports overall, and dominates such key markets as electrical and nonelectrical machinery, iron and steel products, and transportation equipment. The United States

Table 6--Major nonagricultural import items and market shares of suppliers, Taiwan, 1981

Commodity group	Total import value	Major suppliers	Share
	Million US$	Country	Percent
Machinery and tools	4,944	Japan	55
		United States	30
		West Germany	6
Crude oil	4,454	Kuwait	44
		Saudia Arabia	39
		Indonesia	3
Electrical machinery and equipment	2,281	Japan	58
		United States	27
		Hong Kong	3
		West Germany	2
Chemicals	1,745	United States	31
		Japan	26
		West Germany	8
Iron and steel products	1,487	Japan	62
		South Korea	7
		United States	6
		Australia	4
Transportation equipment	793	Japan	57
		United States	19
		United Kingdom	6
		West Germany	6

Sources: (14, 1981; 19, 1980).

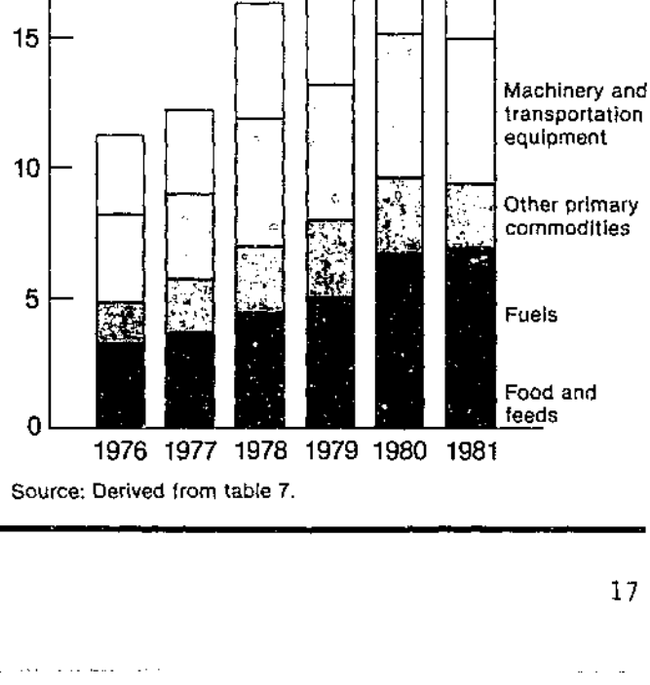
plays a secondary role in each of these markets, while remaining the largest supplier of chemicals.

Taiwan's export structure has undergone radical changes since 1965 (table 5). Food exports, which formerly accounted for over half of the island's export revenue, have gradually fallen to a relatively minor role. Exports of manufactures have been the main driving force behind the island's economic growth for over two decades, during which time Taiwan has emerged as one of the world's leading exporters of textiles and apparel, footwear, electronic products, and a wide range of other light manufactures. Taiwan exported more than US$4 billion in textiles and apparel in 1980, along with more than US$8 billion in "other manufactures," which roughly encompass light manufactures (table 7, fig. 1). The real value of the island's manufactured exports (deflated by the wholesale price index) has grown very rapidly, averaging 28.7 percent growth per year between 1965 and 1975 and 21.7 percent per year between 1975 and 1980. This has led in turn to a steady increase in the share of manufactures in total export value, which reached 87.9 percent in 1980.

The United States is the largest purchaser of Taiwan's manufactured exports, buying 30 percent of the island's 1981 exports of textile products, 53 percent of its metal manufactures, and 45 percent of its electrical equipment. Other major buyers include

Figure 1

Composition of Taiwan's Merchandise Imports



Source: Derived from table 7.

Table 7--Real value of merchandise exports and imports by category, Taiwan

Product category	1965	1970	1975	1976	1977	1978	1979	1980	1981
				Million 1980 US$					
Food and feeds:									
Exports	668	687	1,253	1,415	1,576	1,907	1,733	1,707	1,512
Imports	213	578	1,268	1,267	1,362	1,705	1,860	1,660	1,827
Net	455	109	-15	147	215	202	-126	47	-315
Fuels:									
Exports	6	23	86	159	218	398	344	295	421
Imports	77	176	1,222	1,923	2,278	2,784	3,196	5,030	5,076
Net	-71	-153	-1,136	1,764	2,060	2,387	2,852	4,735	4,655
Other primary commodities:									
Exports	82	174	175	238	241	395	445	383	407
Imports	381	692	1,218	1,578	1,996	2,509	2,875	2,910	2,480
Net	-298	-518	-1,042	-1,340	-1,755	-2,113	-2,429	-2,527	-2,073
Machinery and transportation equipment:									
Exports	57	614	1,564	2,519	3,010	4,343	4,601	4,881	5,343
Imports	455	1,384	2,867	3,421	3,273	4,878	5,250	5,508	5,536
Net	-398	-770	-1,301	-902	-263	-534	-649	-627	192
Textiles and apparel:									
Exports	188	1,060	2,402	3,374	3,204	4,464	4,299	4,201	4,522
Imports	40	189	157	215	199	295	312	330	322
Net	148	871	2,244	3,159	3,005	4,170	3,987	3,900	4,199
Other manufactures:									
Exports	276	1,135	2,525	5,182	5,117	7,102	8,094	8,276	8,685
Imports	418	933	2,272	2,781	3,078	4,049	4,462	4,317	4,324
Net	142	202	253	2,401	2,039	3,053	3,632	3,957	4,361
Total:									
Exports	1,277	3,693	8,005	12,887	13,366	18,609	19,516	19,743	20,890
Imports	1,584	3,952	9,004	11,185	12,186	16,220	17,955	19,726	19,565
Net	-307	-259	-999	1,702	1,180	2,389	1,561	17	1,325

Source: (19).

Note: Constructed using same classification scheme as in table 5.

Hong Kong (which transships a large share of these imports to a variety of countries, including the People's Republic of China), Canada, and West Germany; Japan is a relatively minor importer of Taiwan's manufactured goods.

Because Taiwan possesses few mineral deposits of commercial significance, nonagricultural raw materials account for a very small share of its exports (table 5). The island's forests are its most important source of raw material exports; timber (excluding plywood) and bamboo products together accounted for 3.9 percent of total export earnings in 1980, but this role has been declining. Taiwan exports significant amounts of refined petroleum products and basic metals, but these are largely processed from imported raw materials. It is highly unlikely that raw materials will provide Taiwan with an important share of its export earnings in the foreseeable future.

Agricultural exports have grown substantially since the mid-1960's: their real value grew at an annual rate of 3.2 percent between 1965 and 1980 (table 8). Nevertheless, the much more rapid growth in the island's industrial exports has led to a steady decline in the relative importance of agricultural commodities in total exports. Thus, while agricultural products accounted for some 47.9 percent of total export earnings in 1965, their share had declined to 6.3 percent by 1980.

Exports of processed agricultural goods grew in importance relative to those of primary agricultural products between 1965 and 1980 (table 8). Exports of canned mushrooms, asparagus, fruits, and vegetables grew rapidly, with the United States and West Germany providing the largest markets for these goods. On the other hand, sugar exports (in quantity terms) fell by nearly half between 1965 and 1980.8/

Among raw agricultural commodities, exports of frozen pork (mainly to Japan) and fresh vegetables expanded rapidly during the 1970's, while exports of bananas and pineapples declined. Exports of rice, Taiwan's leading export when the island began its industrialization drive in the early 1960's, entered a steep decline in 1965, falling to negligible levels in 1975 and 1976. However, in 1977 Taiwan resumed exporting significant quantities of rice. Rice exports are now viewed as a means of reducing large excess rice stocks accumulated by the authorities as a result of official purchases aimed at supporting producer prices; these exports are necessarily made at prices far below the cost of acquisition. Because of pervasive restrictions on imports of rice among Asian countries, opportunities to export

8/ The decline in the quantity of sugar exported is disguised in table 8 as a result of high sugar prices in 1975 and 1980.

Table 8--Real value of agricultural exports, Taiwan

Item	1965	1970	1975	1980
		Million 1980 US$		
Total agricultural exports 1/	776.6	741.8	1,036.0	1,238.6
Primary agricultural products:	325.6	197.1	152.1	298.9
Rice	129.5	2.2	*	59.9
Vegetables	9.5	25.5	16.7	36.6
Bananas	153.6	89.6	32.7	25.6
Pineapples	*	11.8	4.2	1.2
Citrus fruits	5.9	12.7	11.5	9.6
Other fruits	4.1	4.2	3.2	7.1
Flax, jute, etc.	2.5	2.2	2.0	.9
Poultry feathers	5.7	10.1	8.3	34.0
Tobacco	4.7	6.1	11.0	7.6
Hogs and pork	.6	18.6	33.8	63.5
Others	9.2	14.1	28.8	53.0
Processed agricultural products:	451.1	544.7	883.9	939.8
Sugar	184.5	132.6	425.4	231.8
Tea	27.8	36.6	29.6	28.5
Canned pineapple	54.3	55.8	23.0	20.6
Other preserved fruits	21.6	30.8	68.2	130.8
Canned mushrooms	61.2	91.8	75.5	108.8
Canned asparagus	33.0	96.7	124.4	134.5
Other preserved vegetables	15.1	58.0	93.2	197.8
Other	52.7	42.3	44.7	86.9

* = Nil or negligible.

1/ Excludes fish and other sea products, timber, and bamboo products.

Sources: (8, table 23; 12).

rice are chiefly determined by production shortfalls in the importing countries. Thus, while Taiwan sold 260,000 metric tons of rice in 1980 (almost entirely to Indonesia), its 1981 export sales fell to 92,000 tons, with a similar quantity unsold because of a lack of buyers (47).

Agricultural exports play a relatively minor role in the island's overall development efforts. Taiwan continues to meet (indeed, to exceed) self-sufficiency goals in basic crops such as rice, even as workers move out of the agricultural sector. Agricultural exports provide a means to buoy the real incomes of the remaining agricultural population, which otherwise would fall even further behind those in the industrial sector. The primary exception to this generalization is rice, where exports mainly represent disposal of surplus production.

Although fish and other sea products are not counted as agricultural commodities for the purposes of this study, exports of these products represent a large share of Taiwan's total food exports. Exports of raw and processed fish and sea products from Taiwan totaled $560 million in 1980, about 45 percent of the value of exports of crop and livestock products.

Chase Econometrics recently forecast the average annual real growth of Taiwan's total merchandise exports between 1981 and 1990 at 11.2 percent, a very respectable growth rate but far below the 21.7-percent average rate achieved during 1975-80 (6). Average export growth at this rate appears feasible as long as overall growth of world trade recovers sufficiently to achieve the modest 5.5-percent average rate assumed in the Chase forecasts. Because manufactures presently represent a very large share of Taiwan's total exports, it may be assumed that the growth of manufactured exports will set the pace for growth of total exports.

Balance of Payments--Taiwan's currency, the New Taiwan dollar or NT dollar, is pegged to the U.S. dollar at an exchange rate which is occasionally adjusted in response to changes in international competitiveness. The exchange rate was fixed at 40.1 NT dollars to the U.S. dollar from 1961 through 1972. The currency was revalued in 1973 to 38 NT$/US$, and again in 1978 to 36 NT$/US$. More recently, in response to the strengthening of the U.S. dollar and the consequent loss in demand for Taiwan's products in international markets, the exchange rate was devalued back to 38 in August 1981, and to 39.6 in July 1982.

Because Taiwan's economy depends so heavily on foreign trade, changes in the demand for exports and in the prices of imports are strongly reflected in the island's balance of payments, which in turn affects the economy through changes in domestic

income and in monetary aggregates. The balance on current account (table 9) showed sizable surpluses during most of the 1970's, but fell into deficit during 1974 and 1975 following the first oil price shock and the associated boom in commodity prices. A second current-account deficit arose in 1980 from the combined impact of the second oil price hike in 1979, the general slowdown in the international economy, and the reduced competitiveness of Taiwan's exports resulting from the NT dollar's peg to the appreciating U.S. dollar. The small 1981 devaluation seems to have helped restore Taiwan's competitive position: the balance of payments on merchandise account showed a surplus of US$2.08 billion in 1981. When net direct investment and other long-term capital flows are added to the current account to arrive at the basic balance (sixth column of table 9), the longrun inflow of foreign assets into Taiwan is further emphasized.

Taiwan's balance-of-payments surpluses have allowed it to invest heavily in foreign exchange reserves. Two alternative measures are reported: official international reserves (those held by the Bank of China), and the net foreign assets of the banking system as a whole (right-hand columns of table 9) (12). Holdings of foreign assets in commercial banks are available to the central monetary authorities to cover balance-of-payments deficits, so that net foreign assets provide a better measure of international liquidity than official reserves. Based on the size of past changes in the balance of payments, present holdings of foreign assets appear to provide ample coverage for import needs in the foreseeable future, and recent official statements touching on trade and balance-of-payments issues have generally indicated that this perception is shared by most policymakers. Taiwan's publicly guaranteed external debt was US$6.15 billion at the end of 1981. The island's debt service ratio (interest and principal repayments to export earnings) is low (7.7 percent in 1981), and its international credit rating is excellent (1).9/ This situation gives Taiwan the option of undertaking substantial borrowing in international credit markets to supplement its foreign exchange reserves, in the unlikely event that the need should arise.

Forecasts made by Chase Econometrics reinforce the conclusion that foreign exchange availability is unlikely to impose a serious constraint on Taiwan's purchases of agricultural imports during the 1980's (6). Import growth is expected to lag behind export growth, resulting in a gradual rise in the island's reserves of foreign assets. Moreover, Taiwan's demonstrated willingness to adjust its exchange rate in response to changes

9/ In contrast, Brazil's 1981 debt service ratio was 64.3 percent, Mexico's 44.5 percent, and South Korea's 14.7 percent.

Table 9--Balance of payments, Taiwan

Year	Merchandise exports	Merchandise imports	Current account balance	Net direct investment	Net other long-term capital	Basic balance	Official reserves	Net foreign assets
				Million US$, current				
1970	1,468.6	1,363.4	0.8	61.4	62.4	124.6	622	590.3
1971	2,047.2	1,756.2	170.6	51.4	35.2	257.2	704	843.0
1972	2,979.5	2,331.9	512.7	23.7	39.2	575.6	1,039	1,455.8
1973	4,476.0	3,741.8	566.3	60.9	135.4	762.6	1,124	2,092.6
1974	5,592.0	6,422.4	-1,112.7	82.9	289.8	-740.0	1,191	1,527.6
1975	5,304.1	5,558.6	-588.5	34.1	460.6	-93.8	1,169	1,347.0
1976	7,809.6	7,125.1	290.0	67.7	538.1	895.8	1,607	2,357.4
1977	9,517.2	8,316.9	943.1	45.1	260.4	1,248.6	1,447	3,529.9
1978	12,601.9	10,367.4	1,669.4	109.8	191.0	1,970.2	1,515	5,631.6
1979	15,863.5	14,472.7	224.0	122.1	332.2	678.3	1,503	5,617.1
1980	19,841.3	19,428.5	-698.8	119.2	1,084.1	504.5	2,345	5,323.2
1981	22,519.5	20,438.2	608.0	101.3	754.1	1,463.4	NA	6,502.2

NA = Not available.
Source: (13, 1981).

in the economic environment should help to ensure a stable or growing supply of foreign exchange.

Hidden within the overall balance-of-payments statistics is a troublesome set of bilateral trade imbalances between Taiwan and several of its major trading partners. Taiwan currently suffers a combined merchandise account deficit of US$3 billion with its two largest suppliers of oil, Kuwait and Saudi Arabia. Trade with Japan is also characterized by a large and rapidly growing merchandise deficit, which in 1981 exceeded US$3.44 billion. Offsetting these deficits are large bilateral trade surpluses with the United States (US$3.40 billion in 1981), Hong Kong (US$1.59 billion), West Germany (US$260 million), Singapore (US$405 million), Canada (US$300 million), and other countries. While the size of Taiwan's oil bill is largely out of its hands, the large and persistent trade imbalances with other countries have caused considerable official concern, particularly concerning trade with the United States and Japan. Various officials in Taiwan have suggested that the size of the trade surplus with the United States is a political embarrassment and a potential source of protectionist sentiment in the United States. As a result, Taiwan has in recent years actively looked for ways to reduce the trade surplus with the United States. Balance-of-payments considerations have played an important role in the island's official "Buy American" policy, which since its initiation in November 1977 has boosted imports of U.S. feed grains, soybeans, and other agricultural and nonagricultural products. Moreover, tariff negotiators for Taiwan have recently shown considerable willingness to lower trade barriers to imports of U.S.-produced agricultural products where such relaxation would not impose severe hardship on domestic producers: liberalization of apple imports in 1979 and tariff reductions on orange juice and other horticultural products in 1979 and 1981 are examples. Similar motives were probably a factor in Taiwan's recent purchases of wheat and rapeseed meal from Canada, another country with which the island has enjoyed a longstanding trade surplus.

On the other hand, Taiwan's large and growing trade deficits with Japan have led to considerable friction. In March 1982, Taiwan, underlining oft-repeated charges that Japan had dragged its feet in opening its market to industrial imports from Taiwan, banned imports from Japan of some 1,500 consumer goods (including many agricultural items), plus trucks and diesel engines; Japan responded by threatening to suspend tariff preferences on imports from Taiwan. Consultations with Japanese trade officials apparently convinced the Taiwan authorities that they had made their point: most of the import prohibitions were lifted in August 1982, the remainder in November of the same year (23). However, the size and persistence of the bilateral

trade imbalance between Japan and Taiwan suggest that it will remain a potential source of friction in the future.

Agricultural Production System

Domestic agricultural supply conditions affect Taiwan's demand for agricultural imports in two principal ways. First, changes in the production of meats and dairy products lead to changes in the demand for feedstuffs, which represent a major share of the island's total agricultural imports. Second, changes in domestic crop production affect demand for imported substitutes, especially for feedstuffs. The performance of the crop and livestock subsectors is affected both by the physical and the economic environment in agriculture. Official policies, in turn, play an important role in shaping the economic environment.

Physical conditions--Taiwan lies off the coast of the Chinese mainland astride the Tropic of Cancer. Total land area is 36,000 square kilometers, slightly larger than the combined areas of Connecticut and Massachusetts. Roughly two-thirds of this area is covered by rugged mountain ranges, which run down the eastern side of the island from north to south. Most of Taiwan's arable land lies in the broad alluvial plains along the western side of the island. A much narrower strip of cropland is sandwiched between the mountains and the eastern coast. Official estimates place the area potentially available for cultivation (table 10) at 1.07 million hectares, about 30 percent of the island's total land area.10/ Of this potential cropland, 900,000 hectares or 84 percent were actually culti-

10/ This estimate excludes land covered by forests, whether or not commercially exploited.

Table 10--Potential farmland in Taiwan

Land classification	Potential farmland			Forests	Other uses	Total
	Irrigable	Non-irrigable	Subtotal			
	1,000 hectares					
Plains	490.1	123.2	613.2	--	334.9	948.2
Slope lands	75.5	382.6	458.2	425.3	90.3	973.7
Mountain forests	—	--	--	1,677.0	--	1,677.0
Total	565.6	505.8	1,071.4	2,113.3	425.3	3,598.9

— = Nil or negligible.

Source: (10).

vated in 1981 (table 11); the amount of land under cultivation thus comes to slightly less than 0.05 hectare per capita. The allocation of land to different crops is governed by considerations of altitude and grade; a north-south climatic gradient plays a secondary role. The island's mild winters and hot, humid summers allow up to three crops per year in many areas; a three-crop rotation might include two crops of rice plus a winter crop of corn, soybeans, or vegetables. Abundant rainfall throughout the island provides the basis for irrigating most level farmland, and heavy public investment in water control projects helps to ensure that water is available to farmers when needed. Taiwan's irrigation potential is rather fully developed: of an estimated 565,600 hectares of potentially irrigable land, 502,800 hectares were irrigated in 1981.

Land use and cropping patterns--Despite the potential for intensive cultivation of Taiwan's limited cropland area, actual use has declined markedly in recent years. Cultivated area fell from a peak of 922,800 hectares in 1977 to 900,100 hectares in 1981, as high-quality cropland was lost to residential, industrial, or other purposes and as marginal land was fallowed because of high labor costs and low prices on suitable crops. Even the cultivation of irrigated land has declined in recent years, from a peak of 520,500 hectares in 1977 to 502,800 hectares in 1981.

Table 11--Area of cultivated land and irrigation status, Taiwan

Type of land	1977	1981
	1,000 hectares	
Irrigated:	520.5	502.8
Double-cropped rice	361.9	353.5
Single-cropped rice	55.5	53.7
Rice rotated with other crop(s)	103.1	95.6
Nonirrigated	402.3	397.2
Total	922.8	900.1

Source: (28, 1982).

A trend with more serious implications for total crop production in Taiwan is the decline in total cropped area through reduced multiple cropping. The index of multiple cropping fell from a high of 189.7 in 1964 to 168.7 in 1977 and to 155.3 in 1981, as total crop area fell from 1.67 million hectares to 1.40 million hectares.11/ With low prices on winter crops such as soybeans and sweetpotatoes, an increasing shortage of hired agricultural labor, rising farm wages and other production costs, and good employment opportunities off the farm, many farmers are no longer willing to continue farming as intensively as before, and have reduced the number of crops planted per year.

As total crop area has declined, the area planted to various crops has undergone major changes (table 12). Although rice remains by far the most widely planted crop, area planted to rice fell by nearly 16 percent between 1975 and 1981; however, increasing yields helped to slow the decline in rice production. Area planted to sweetpotatoes fell by more than 65 percent over this period as a result of high labor costs and stagnant crop prices. Likewise, soybean area declined by 74 percent between 1975 and 1981 because of rising labor costs, price competition from imported soybeans, and domestic competition for planted area from red (adjuki) beans.

The area planted to a wide range of other crops has declined to a lesser extent (table 12). Corn, peanuts, bananas, pineapples, citrus fruits, and asparagus have all lost ground. The main crops showing gains in planted area between 1975 and 1981 were winter and summer vegetables, mangoes, watermelons, and other fruits. These trends reflect in part the diversification of the island's diet and in part the growth of exports of canned vegetables and fruits.

Agricultural labor force--Between 1965 and 1980, the number of farm households in Taiwan grew slightly, from 847,000 to 872,000. This growth was much slower than that of the general population, so that the number of farm households as a proportion of total households fell from 38 percent to 23 percent. The total 1980 population of farm households--5.29 million--represented 30 percent of the total population, compared with 45 percent in 1965.

However, these figures understate the very marked reduction in the supply of labor actually available to the agricultural sector because they omit several key aspects of that process.

11/ The multiple cropping index expresses the ratio during a given year of total crop area to cultivated land area, times 100. If all cultivated land were double cropped, the index would equal 200.

Table 12--Area and production of selected crops, Taiwan

Crop	Unit	1975	1976	1977	1978	1979	1980	1981
Rice:								
Area	1,000 ha	790.2	786.3	777.6	752.3	720.6	637.4	667.1
Production	1,000 mt	2,494.2	2,712.9	2,648.9	2,444.5	2,449.8	2,353.6	2375.1
Corn:								
Area	1,000 ha	49.7	41.4	36.1	36.9	33.8	40.0	35.8
Production	1,000 mt	137.9	114.2	95.0	107.2	98.5	115.1	96.2
Other grains								
Area	1,000 ha	12.2	7.0	6.3	7.3	5.9	6.2	6.4
Production	1,000 mt	15.2	8.4	7.3	9.2	8.2	9.3	9.4
Sweetpotatoes:								
Area	1,000 ha	156.7	123.7	108.9	91.6	74.3	62.3	54.4
Production	1,000 mt	2,403.4	1,850.9	1,694.8	1,462.9	1,224.7	1,055.1	833.8
Soybeans:								
Area	1,000 ha	41.4	35.5	30.1	24.5	19.3	15.3	10.3
Production	1,000 mt	61.9	52.9	51.7	40.8	31.8	25.9	15.9
Peanuts:								
Area	1,000 ha	64.1	58.8	52.8	57.7	53.9	53.3	51.6
Production	1,000 mt	91.5	88.9	77.1	92.2	85.9	86.1	81.7
Sugarcane:								
Area	1,000 ha	99.2	109.4	118.8	105.6	105.4	107.2	104.0
Production	1,000 mt	7,687.2	8,727.9	11,036.9	7,941.1	9,363.1	8,851.3	8422.0
Tobacco:								
Area	1,000 ha	8.5	10.3	10.0	8.6	8.5	8.4	8.5
Production	1,000 mt	18.1	26.4	24.7	22.1	21.5	19.7	22.7
Tea:								
Area	1,000 ha	32.9	32.3	31.0	30.4	29.8	29.6	29.1
Production	1,000 mt	26.1	24.7	26.3	25.9	27.1	24.5	25.2

Continued--

Table 12--Area and production of selected crops, Taiwan--Continued

Crop	Unit	1975	1976	1977	1978	1979	1980	1981
Citrus fruits:								
Area	1,000 ha	32.9	33.7	34.3	33.5	32.8	32.7	37.9
Production	1,000 mt	347.8	383.9	368.6	373.7	398.8	374.4	388.9
Bananas:								
Area	1,000 ha	14.1	13.4	11.7	11.1	10.9	10.5	10.0
Production	1,000 mt	196.6	213.4	252.4	182.1	226.8	214.3	185.3
Pineapples:								
Area	1,000 ha	16.4	13.7	12.0	11.6	11.1	8.8	8.0
Production	1,000 mt	318.9	278.8	282.2	249.6	244.8	228.8	181.0
Mangoes:								
Area	1,000 ha	10.5	10.9	11.4	12.0	12.9	13.7	15.5
Production	1,000 mt	43.3	79.2	57.4	34.7	77.3	91.0	152.1
Watermelons:								
Area	1,000 ha	13.0	14.3	16.7	18.3	19.5	19.9	19.3
Production	1,000 mt	210.9	249.8	289.7	216.9	313.5	341.4	307.8
Other fruits:								
Area	1,000 ha	43.3	43.7	45.6	50.0	56.1	59.5	48.1
Asparagus:								
Area	1,000 ha	17.4	12.9	13.7	12.6	13.5	12.4	12.5
Production	1,000 mt	80.1	94.0	102.1	97.4	102.8	112.9	81.3
Bamboo shoots:								
Area	1,000 ha	19.3	18.5	19.0	19.5	20.0	21.1	21.8
Production	1,000 mt	161.9	162.0	182.7	218.8	215.2	225.2	252.7
Mushrooms:								
Production	1,000 mt	48.8	51.9	88.3	119.5	103.4	76.2	66.9
Other vegetables:								
Area	1,000 ha	137.6	146.1	152.4	172.4	176.9	180.5	189.4

Source: (28, 1982).

First, the age composition of the agricultural labor force has changed markedly: most of the younger workers in farm households have left farming for higher paying jobs in manufacturing and other industries, although many continue to reside on family farms. This has been paralleled by the movement of a very large proportion of the landless agricultural labor force into industrial employment. As a result of these trends, the present agricultural labor force consists largely of older owner-operators and their unpaid family members, with relatively small numbers of hired agricultural workers available to meet peak seasonal labor demand. The size of the labor force in agriculture declined by about 1 percent per year between 1965 and 1978, from 1.62 million to 1.42 million. The downward trend has since accelerated, with the agricultural labor force falling to 1.27 million in 1979 and to 1.15 million in 1980, a loss of nearly 19 percent in 2 years.

The decline in the agricultural labor force has been accompanied by the rapid growth of part-time farming (table 13). Between 1965 and 1980, the number of full-time farm households fell from 279,000 to 91,000, only 10 percent of the total number of farm households. Meanwhile, the proportion of farm households who viewed nonagricultural employment as their main pursuit grew to 55 percent of the total. The growth of part-time farming has been one element in the declining proportion of farm-family income derived from agriculture, from 66 percent in 1965 to only 26 percent in 1980. Despite the growing participation of farm households in off-farm employment, household incomes in the farm sector continue to lag well behind those in the rest of the society. Between 1966 and 1978, per capita income of farm families fell from 69.8 percent to 64.0 percent of that of nonfarm families (29). This income gap maintains the pressure for more workers to leave the farm sector.

The growing shortage of agricultural labor now plays a key role in discussion of farm policy in Taiwan. The lack of farmworkers to assist farmers in land preparation, rice transplanting, and harvesting has been a major factor in the decline of multiple cropping; few farm families can perform all the tasks necessary for triple cropping, and many have retreated from double cropping.

Farm size and commercialization—Taiwan's land reform program during the early 1950's produced a rural economy made up of large numbers of households owning and cultivating small and medium-sized farms. In 1955, about 65 percent of Taiwan's farms consisted of 2 hectares or less, with an average farm size of 1.1 hectare. The size of the average holding has declined over time, as farmers have divided their farms among their sons in keeping with Chinese custom. Moreover, the increase in farmers'

Table 13--Farm households by main type of work, Taiwan

Type of farm household	1960	1965	1970	1975	1980
	Thousands				
Total	808	873	916	886	891
Full-time farm households	385	279	277	157	91
Farm housholds with sideline:	423	594	639	729	800
Agriculture as main pursuit	241	357	371	422	306
Sideline as main pursuit	182	237	268	307	495

Source: (14).

average age and the tight rural labor market have reduced the area that can be cultivated by a farm household, and thereby reduced incentives for farm consolidation. One result of these trends has been steady growth in the number of very small farms: the proportion of farms of 1 hectare or less increased from 67 percent to 73 percent between 1965 and 1980, while the number of farms smaller than 0.5 hectare grew from 38 percent to 43 percent of the total.

Taiwan's leaders have come to view this situation with considerable concern, viewing the decline in farm size as one of the major reasons for the growing disparity between farm and nonfarm incomes. In 1980, the authorities formalized a "second-stage land reform" aimed at raising average farm size to 2 hectares or more through subsidized loans for farm consolidation and for the purchase of agricultural machinery. Farmers selling their land have been promised help in finding jobs in the industrial sector and in investing the money they receive from farm sales. The second-stage land reform is expected to require 10 years to complete, at a cost of about US$8 billion (38).

Despite the small average farm size, farmers in Taiwan have become highly market oriented. Farmers have shown themselves to be highly receptive to profitable new crops and cultural practices; indeed, Taiwan's farmers are widely regarded as among the

most technically proficient in the developing world. A study of rice-farming practices carried out by the International Rice Agroeconomic Network during 1975-76 concluded that rice farmers in Taiwan come close to profit maximization, given the prevailing price structure and available technology (21). Rice yields are high by Asian standards, averaging 4.1 metric tons per hectare during the first season of 1980 and 3.2 tons per hectare during the second season; overall rice yields increased at a rate of 1.47 percent per year between 1970 and 1980. Use of hybrid varieties of rice is virtually universal.

Taiwan's farmers applied an average of 1.50 metric tons of fertilizer per gross cropped hectare in 1980. Large amounts of organic fertilizers, such as compost and manure, are also applied. However, use of organic fertilizers has declined in recent years, probably because of the relatively high labor input involved in collecting and using such fertilizers.

Conditions in the livestock sector are very different from those in the crop sector. Once a strictly farmyard operation, production of all livestock--but especially that of hogs--has become increasingly concentrated and commercialized. Whereas in 1973 some 72 percent of the hog population were raised on farms with fewer than 50 hogs, by 1980 this proportion had declined to 21 percent, while a similar proportion was raised on large-scale commercial farms of more than 1,000 hogs each. The Taiwan Sugar Corporation (a public corporation) alone was raising over 8 percent of the island's hogs, using byproducts of sugar production as components of its hog feed. While data on the size distribution of poultry farms are less readily available, the poultry sector appears to have undergone a broadly similar shift toward concentration and commercialization.

Agricultural credit and investment--Until recently, agricultural policymakers emphasized inputs and technical improvements aimed at augmenting the island's scarce land resources. Heavy investment in irrigation development and in crop breeding, and production subsidies and loans to farmers for purchasing fertilizer, pesticides, and other agricultural chemicals have typified these efforts. In recent years, however, the increasingly urgent complaints of farmers about the unavailability of hired farm labor have led the authorities to regard labor rather than land as the critical scarce resource in the farm sector. The result has been a new emphasis on incentives for investment in laborsaving farm machinery, with subsidized credit for agricultural mechanization a major component (with farm consolidation) of the second-stage land reform (38). By increasing the degree of farm mechanization, planners hope to increase the amount of land that can be profitably cultivated by each farm family, and thereby to raise the incomes of those remaining on

the farm. Farmers themselves have recognized the importance of mechanization for some time: real fixed capital per agricultural worker grew at an annual rate of 8.6 percent between 1965 and 1970 and accelerated to 11.1 percent per year between 1970 and 1975.

Taiwan provides subsidized credit to farm households for a number of other purposes. The Unified Agricultural Credit Program is the major source of production loans, and is administered through the local Farmers' Associations (officially organized, multi-purpose cooperatives). About 60 percent of Taiwan's farm households participate in this program (9). Other important credit programs include loans for large-scale integrated farming of hogs, poultry, feed crops, and dairy cattle.

Research and extension--Agricultural policymakers in Taiwan place strong emphasis on agricultural research, which offers a means of raising real farm incomes while increasing the domestic supply of agricultural commodities. The real value of total agricultural research expenditures grew at an annual rate of 8.9 percent between 1965 and 1980, reaching some US$14 million in 1980 (18). Rice breeding is carried out by the Taiwan Agricultural Research Institute (TARI), in cooperation with seven regional agricultural improvement stations scattered around the island which test the suitability of new varieties under different agroclimatic conditions. TARI also benefits from association with the International Rice Research Institute (IRRI) in the Philippines, which provides new genetic material for breeding purposes. Some field trials are carried out by local Farmers' Associations (9).

A strong effort is also being made in vegetable improvement, where Taiwan benefits from the presence of the Asian Vegetable Research and Development Center (AVRDC) near Tainan, a research institute funded by the Consultative Group for International Agricultural Research. AVRDC lines of tomatoes, eggplants, and Chinese cabbage have been particularly successful, while Taiwan's heavy dependence on imported soybeans prompts the authorities to follow closely AVRDC's efforts in soybean improvement.

Extension is generally carried out through the Farmers' Associations. Although it is difficult to separate public expenditure for extension activities from more general efforts to improve rural welfare, extension is generally regarded as one of the leading responsibilities of the Associations. Because Taiwan's farmers have shown themselves to be receptive to improvements in plant varieties and agricultural techniques, such improvements are likely to be incorporated quickly into farmers' practices.

Prospects--In general, recent trends in the evolution of Taiwan's agricultural production system are likely to continue into the foreseeable future. The recently announced "second-stage land reform" program emphasizes farm enlargement through consolidation. To the extent this policy succeeds, a sizable number of households may move out of agriculture altogether; otherwise, the number of farm households might remain relatively stable. In either case, however, younger workers from the remaining farm households will continue to move into industrial employment, leaving most farms to be run by older owner-operators. The tendency to rely on off-farm employment as the major source of farm family income will continue.

Rising labor costs and the unavailability of hired agricultural labor will continue to stimulate the demand for laborsaving machinery, which will be financed through publicly subsidized credit. Progress in the farm-consolidation program will reinforce the trend toward mechanization, as farmers are able to take greater advantage of economies of scale. The increasing scarcity of farm labor will also lead to further reductions in planted area, especially in the case of winter crops like soybeans.

Finally, the hog and poultry industries will continue their trends toward specialization, commercialization, and enlargement. These industries, together with an increasingly sophisticated feed-mixing industry, will become more efficient and more sensitive to changes in price relationships among alternative feeds.

Agricultural Policies

Tariffs, crop support prices, and subsidized inputs for producers are the main policies used to affect agricultural markets in Taiwan. Tariff barriers and import controls on agricultural products have been relaxed over the years in order to permit lower consumer food prices; loss of tariff protection has been a major factor in the decline of domestic production of feed grains, sweetpotatoes, and soybeans. Support prices and input subsidies have been raised in part to compensate for the adverse impact of liberalized agricultural trade on farmer incomes.

In addition, agricultural commodity markets in Taiwan are frequently subject to various forms of temporary intervention, generally undertaken for the purpose of stabilizing consumer or producer prices. Such intervention is generally undertaken in an ad hoc manner in response to significant changes in prices or other market conditions. Measures employed in recent years on behalf of consumers have included temporary quotas or prohibitions on exports of particular commodities (notably hogs), reductions in state-controlled exports of rice, and release of

official rice stocks onto the domestic market. Measures used to benefit producers have included administrative controls on imports of peanuts and limits on domestic sales of hogs by the Taiwan Sugar Corporation and other large producers when hog prices were depressed.

Consumption Policies--Direct intervention in retail food markets is very limited. One exception is a substantial tax on domestic sales of sugar, which has long been levied so as to free sugar production for export. This tax was reduced from 60 percent to 30 percent in 1979 to encourage domestic consumption and aid the ailing sugar industry. In addition, consumption of tobacco and alcoholic beverages is effectively taxed through the price policies of the Taiwan Tobacco and Wine Monopoly Board, an official agency with the sole right to market such products. The Monopoly Board's price policies are mainly aimed at raising revenue.

Price ceilings apply to wheat flour and bran sold by millers to wholesalers and to soybean meal and oil sold by crushers. These ceilings were imposed in 1973 as counterparts to import subsidies on wheat and soybeans, adopted in response to the rapid escalation in world prices of these commodities.12/ Since their adoption, the price ceilings have been adjusted frequently in response to market conditions, particularly the import prices of wheat and soybeans. No corresponding price controls apply to retail sales of wheat or soybean products. However, because imports of wheat and soybeans have been subject only to nominal quantitative controls since the late 1960's, the wholesale price ceilings on the products derived from these commodities have placed effective ceilings on the prices that can be charged in retail markets.

Finally, public employees receive allocations of rice, oil, fuel, and salt as part of their salaries. Military officers and their dependents, civil servants, public school teachers, and mineworkers are eligible for these allocations. The recipients of these rations are allowed to forego them and receive instead a cash equivalent, and increasing numbers are resorting to this option (7).

Production Policies--As part of its program to increase farm incomes and to maintain a certain degree of self-sufficiency, Taiwan currently offers farmers minimum "guarantee prices" on rice, sugar, corn, soybeans, milk, and a number of other crops and livestock products (38). The rice guarantee price is the most important price support in the agricultural sector; its

12/ Soybean oil price ceilings were dropped in mid-1974 and resumed in 1976.

benefits reach a far greater proportion of the island's farmers than those of any other guarantee price. As rice production has in recent years substantially outgrown the island's requirements, and as imports of other agricultural commodities have grown, policymakers have tried to induce farmers to switch from rice to import-substituting crops (especially corn and soybeans) and sugarcane by raising guarantee prices on alternative crops and by placing new crops under the guarantee price system. Because of the limited success of these new guarantee prices in inducing reallocation of riceland, diversion payments to farmers switching from rice to other crops were introduced in 1982. However, so far the authorities have not been willing to reduce the rice guarantee price, nor to allow its real value to be eroded by general inflation while maintaining real support prices for alternative crops, apparently because of the possibility of political repercussions from farmers with land specialized to rice production. On the other hand, raising the support prices of substitute crops enough to shift a substantial amount of land from rice would add considerably to the overall budgetary cost of the guarantee price program, which was estimated at some US$97-114 million per year as of 1980 (38). In view of the difficulties encountered thus far in inducing farmers to substitute import-competing crops for rice, it appears highly doubtful that such policies will significantly reduce Taiwan's demand for U.S. agricultural exports.

Farmers receive price subsidies on a number of key inputs to agricultural production. The most important of these is the maintenance of below-market prices on fertilizer manufactured by the publicly owned Taiwan Fertilizer Corporation (TFC) and sold to farmers through the Provincial Food Bureau and the Farmers' Associations. In order to insulate farmers from the effects of the first oil price shock on the market prices of energy-intensive fertilizers, the authorities froze all fertilizer prices from June 1974 until May 1981. As feedstock prices rose and the real value of the currency was eroded by inflation, this policy led to a growing degree of subsidization of fertilizer prices relative to opportunity costs. By Spring 1981, the domestic prices of urea and ammonium sulfate had fallen to approximately half their border prices. Maintenance of the price freeze naturally required increasing production subsidies for TFC, which totaled US$43 million during fiscal 1981. Finally, in May 1981 the authorities responded to pleas from TFC by raising all wholesale fertilizer prices by 37 percent, a move which still left prices far below world levels. Moreover, it was expected that the overall degree of subsidization to farmers would be maintained through direct subsidies for their purchases of fertilizer (44).

Irrigation water is a second important input supplied to farmers at subsidized prices; data allowing estimation of the degree of subsidization are not available.

In addition to price subsidies for agricultural inputs, the agricultural sector receives indirect subsidies through public funding for construction and maintenance of irrigation systems, land reclamation, and agricultural research.

Tariffs and other import policies--Taiwan places primary reliance on tariffs rather than on quantitative restrictions to control import flows. Certain general patterns characterize the tariff structure pertaining to agricultural and food products. Tariff rates tend to be high on items considered to be luxuries (100 percent on manufactured tobacco products; 75 percent on candies, wine, beer, and spirits; 75 to 100 percent on processed grain products, snack foods, etc.), on horticultural goods and their products, and on meats (60 to 75 percent on most processed meats, 65 percent on chicken meat). Conversely, low tariffs generally apply to feed grains, wheat, and oilseeds, as well as to raw cotton and other industrial inputs. Tariff rates tend to increase with the degree of processing embodied in a product, and with the proportion of total consumption satisfied out of domestic production.13/ Taiwan levies tariffs against the landed or cost and freight (c.&f.) value of imported goods rather than their value net of shipping (free on board or f.o.b. value), a practice that somewhat magnifies the effect of differences in shipping costs among products imported from different suppliers.

Since Taiwan began to liberalize its trade system in the mid-1960's, it has reduced tariffs on many agricultural imports. The first tariff reductions were applied to wheat, feed grains, and soybeans, and were accompanied by the removal of import controls on these products. These steps were taken to help supply consumers with low-priced meat and wheat flour. More recently, Taiwan signed bilateral trade agreements with the United States in 1979 and 1981, which reduced tariffs on a number of horticultural products such as orange juice, prunes, raisins, walnuts, and almonds, as well as on turkey meat, eggs, and live poultry. The more recent tariff concessions were motivated in part by a desire to ensure continued access for the island's manufactured exports to U.S. markets.

A so-called "uplift" factor--effectively a tariff surcharge--whereby tariffs and other ad valorem charges on imported products had been levied against 120 percent of c.&f. value,

13/ The latter relationship, of course, works in both directions.

began to be phased out in 1980 and should be eliminated by 1986. The uplift factor was scheduled to be reduced from 115 percent to 110 percent late in 1982, but the authorities apparently decided to delay the reduction because of a shortfall in tariff collections stemming from the recent slowdown in import demand.

Various quasi-tariffs are levied in addition to formal tariffs. A uniform harbor duty of 4 percent (2 percent for wheat) is charged against all cargoes as a nonspecific user's fee for port facilities; fees for docking, unloading, and storage are additional. A fee of NT$0.30 per US$1.00 value (about 0.83 percent) is assessed on imports of feed grains. Finally, a specific duty of NT$40 (US$1.05) per metric ton is levied against imports of soybeans, wheat, and feed grains to support the activities of the Taiwan Grains and Feeds Development Foundation (TGFDF), a quasi-official organization charged with various functions in support of feed grain and oilseeds production and utilization, including the payment of guarantee prices on these crops. In early 1982, consideration was given to raising this duty to NT$100 per ton; however, the proposal was eventually dropped because of strong resistance from importers. A surcharge of NT$30 per ton levied against imported grains and soybeans since 1974 to fund the construction of two port elevators expired in mid-1981 (43).

Taiwan introduced a "two-column" tariff schedule in 1981. Under this system, imports from countries maintaining normal trade relations with Taiwan are assessed at one set of tariff rates, while those from other countries--including most Communist countries plus Israel--face generally higher rates. All references to particular tariff rates in this study refer to the more favorable rates accorded normal trading partners.

Three key agricultural commodities--corn, soybeans, and wheat--have been placed under a system of "uniform import prices." For present purposes, the main effect of these policies is to fix the price paid by domestic users for the imported commodity at an administratively determined level (known as the base price or stabilization price), which is not directly affected by changes in landed prices. The systems applied to the three commodities are discussed later, in the section titled "Trade Policies and other Constraints on Imports."

The principal instrument of quantitative control over imports is the use of the controlled list. Imports are divided into three categories: permitted, controlled, and prohibited. Import licenses for permitted commodities (which include the vast majority of agricultural products) can be obtained routinely from the Board of Foreign Trade. Importation of items on the

controlled list (including peanuts, pork, offals, and wheat flour, bran, and other milling byproducts) is subject to direct administrative control. While applications for import licenses for such items are in principle reviewed on a case-by-case basis to assess their impact on domestic producers or processors, in many cases the imposition of import controls on an item effectively constitutes a ban on its importation. On the other hand, no important agricultural products are included in the list of formally prohibited commodities.

In certain cases (pork, offals, milling byproducts), import controls have been maintained on a more-or-less permanent basis to protect domestic producers. In other cases (dairy cows, controlled from 1975 until 1980; peanuts, controlled since 1979), controls are imposed temporarily to shield producers from changes in market conditions.

Other products are subject to export controls. Exports of rice, sugarcane, hogs and pork, and soybean oil and meal are all subject to direct administrative control. The controls on exports of soybean oil have retarded the growth of U.S. soybean exports to Taiwan by limiting the market for oil extracted as a byproduct of meal production.

Taiwan also applies restrictions on the geographical origin of some imported commodities, including many agricultural items. In most cases, these are intended to exclude items produced in the People's Republic of China and transshipped through Hong Kong, Singapore, or other Southeast Asian entrepots. Discriminatory exclusions against many items of Japanese origin were adopted in March 1982 to protest perceived Japanese barriers to Taiwan's exports, but the last of these limitations were dropped in November 1982. None of the geographical controls works to the disadvantage of the United States, and for some products (beef, for example) the United States is specifically favored (in this case, along with Australia and New Zealand).

All imports of tobacco, manufactured tobacco products, wine, beer, and spirits are made through the publicly owned Taiwan Tobacco and Wine Monopoly Board, and are thus under official control.

Imports of soybeans, feed grains, and wheat are subject to the provisions of the Regulation Governing Bulk Commodity Imports. Under this law, the various industry associations concerned with importing these commodities negotiate annually with the Board of Foreign Trade on the quantities of each that may be imported during the coming year. In principle, the quantity actually imported is supposed to fall within 15 percent of the agreed-upon volume. However, the authorities have shown themselves to

be quite willing to revise the import quotas whenever events warrant such a revision, and the quota system is generally viewed as a planning mechanism rather than as an instrument of import control.

While Taiwan maintains controls on private nonbank holdings of foreign exchange, firms can routinely purchase foreign exchange to pay for imports for which they hold licenses. Uniform exchange rates apply to all product categories.

Prospects--Legislators and other public officials with a primary interest in the agricultural sector tend to view inadequate farm income as the primary agricultural problem facing the island, and place primary blame on imports for the deterioration of the island's farm sector. These officials tend to advocate tariffs on imported agricultural commodities, high guarantee prices, and other policies aimed at maintaining high producer prices on domestic agricultural output. Such policies are opposed by a more diffuse group that favors low food prices in the interest of consumers, together with lower barriers on imports as a means of assuring access to foreign markets for Taiwan's exports. The free-trade position has generally prevailed on most issues in recent years. At present, the most likely future policy scenario appears to be a continued decline in the protection given to domestic feed crops, along with some heightened efforts to induce switching from rice. However, it appears that much of the land thus released from rice will be planted to sugarcane and vegetables rather than to import substitutes. Cropland substitution is likely to come about through increased guarantee prices for substitute crops and expanded use of diversion payments, rather than through reduced support for rice, so the budgetary cost of the farm program will increase. Under such a policy mix, the area planted to crops competing with U.S. feed grains and soybeans would probably continue its steady decline; a possible exception is corn, whose area and production could remain stable or expand slowly.

Alternate scenarios are suggested by the agricultural production targets for the 1980's set by the Council for Agricultural Planning and Development, and by the land use plan for 1996 drawn up by the same body (9, 10). The former calls for strong expansion of soybean and corn production, while the latter envisions a dramatic expansion of these and other import-competing crops, such as wheat and sorghum. If implemented, either of these plans would certainly require much higher tariff barriers to agricultural imports to reach their goals. However, it is likely that importer and consumer interests would prevent any such policies from being implemented; application of such policies would also be likely to provoke a strong reaction from Taiwan's trading partners. In sum, the current prospect is for

present farm price and tariff policy trends to continue into the foreseeable future.

The future development of the "second-stage land reform" appears to be in some doubt. Early reports suggest that some of the initial momentum of the program has been dissipated, perhaps because of reported difficulties in the farm consolidation aspect of the program: many small farmers have proved unexpectedly attached to their family farms, refusing to sell them to others in spite of financial inducements (3, 33). Whether the authorities will respond to these difficulties by reinforcing existing policies and supplementing them with new policy initiatives, or by de-emphasizing the land reform program, remains to be seen. Moreover, it remains unclear how any new policies adopted in support of the program would affect Taiwan's agricultural imports.

FACTORS AFFECTING IMPORTS OF SPECIFIC COMMODITIES

The growth of Taiwan's agricultural imports has resulted from differences between the island's demand for foods, feeds, tobacco products, and agricultural raw materials and the domestic supply of these products. Official policies affect import demand in several ways: by changing production incentives in domestic agriculture, by moving domestic prices away from international prices through tariffs, and by directly limiting imports through quantitative restrictions.

Consumption

Utilization patterns for several important agricultural commodities are outlined in table 14. Excluded from this summary are meats, fruits, vegetables, sugar, and "other milk," which are consumed exclusively as food; also excluded are cotton, wool, hides, and other products used only as raw materials in manufacturing.

Further information is available on the utilization of several commodities. Wheat flour is consumed mainly in the form of Chinese flour foods (51 percent) and noodles (33 percent) (59); the primary industrial uses of wheat are in the manufacture of alcoholic beverages and soy sauce. Although feeding of wheat or wheat flour is prohibited by law, most wheat bran is fed.

Out of an estimated 1981 corn availability of 2.924 million metric tons (imports plus domestic production), industry sources estimate that 332,640 tons (11.4 percent) would be used by industrial processors outside of the feed industry; only imported corn is so used. Out of this total, 95,000 tons would be used to manufacture starch for export, for industrial purposes, and for consumption by food industries and households; the remaining 239,000 tons would be crushed for flour and grits, mostly for feed manufacture. Almost all remaining corn is used as feed; relatively small amounts of fresh domestic corn and

imported canned corn are eaten by households (54). Nonfeed use of other coarse grains is less varied; most nonfeed sorghum is used in the manufacture of spirits, while some barley is used in brewing and some consumed directly as food.

Attaché estimates indicate that out of total 1981 soybean disappearance of 1,141,000 metric tons, 3 percent were used in the manufacture of soy sauce, 10 percent for making soybean curd (doufu), and 3 percent for making other soy foods such as soy milk, bean pastes, and so on. The remaining 83 percent were crushed for oil and meal (52). Similarly, industrial use of peanuts reflects crushing, from which the meal is fed and the oil used by businesses and households in cooking.

Table 14--Main uses of major agricultural commodities, Taiwan, 1980

Commodity	Domestic disappearance	Feed	Industrial	Food
	Metric tons	Percent 1/		
Rice	2,171.2	2	3	95
Wheat flour	442.7	0	5	94
Corn 2/	2,711.9	93	3	5
Sorghum	430.0	96	3	0
Barley	393.5	80	9	10
Sweetpotatoes	1,055.0	63	20	7
Peanuts 3/	84.2	0	37	55
Soybeans 3/, 4/	1,050.1	0	81	19
Milk, powdered nonfat	29.1	18	0	72

1/ Percentages may not add up to 100 because other forms of disappearance (seed use and waste) are not included in the table.

2/ Corn utilization pattern derived from figures reported by U.S. Feed Grains Council.

3/ Industrial use of peanuts and soybeans indicates crushing; the resulting meal is fed to livestock, while the oil is consumed as food.

4/ Soybean utilization pattern based on attaché estimates.

Sources: (11, 1980; 54).

Finally, essentially all tobacco used domestically goes into the manufacture of cigarettes; use of tobacco in cigars, pipe tobacco, and other forms is very limited (41).

Feed Use--Estimates of the use of various energy and protein sources in animal feeding are calculated from Food Balance Sheet data (table 15). These figures should be treated with caution, but they give a general idea of changes over time in feed use. During the early expansion of Taiwan's hog industry (through about 1970), increased demand for energy feeds was satisfied partly through increased planting of sweetpotatoes and cassava, and partly through imports of corn and barley. Molasses, produced as a byproduct of the island's sugar-refining industry, supplemented coarse grains as an energy feed; specific feed use data for molasses are limited. Protein feed demand was satisfied mainly by meal from domestic and imported soybeans and from peanuts, supplemented by table scraps and food byproducts.

Since 1970, domestic production of sweetpotatoes, cassava, peanuts, and soybeans has declined because of rising labor costs and price competition from imported substitutes. As the production of pork and other animal products has grown, the decline in domestic production of feedstuffs has reinforced the growth of Taiwan's demand for imported feedstuffs. Most of the increased demand for energy feed has been satisfied by corn; in 1980, corn represented 78 percent of total feed grain supply. However, in 1979 and 1981, the high base price assigned to corn (see the section, "Uniform import price plans," below) resulted in significant substitution of barley and sorghum. Demand for molasses has also grown, both as a feed and as an input into alcohol manufacture and other industrial processes. By the early 1970's, Taiwan had ceased exporting and had begun to import large quantities of molasses.

Soybeans are by far the most important source of protein meal for the livestock sector; other sources include meatmeal, fishmeal, peanut meal, and powdered milk. With the exception of peanut meal, all of Taiwan's protein meals are primarily derived from imports. Table 15's entry for feed use of fish apparently refers only to fishmeal produced domestically. No precise figures are available, but it appears that slightly more than half of the 146,900 metric tons of fishmeal imported in 1981 were used in feeding livestock, and the remainder in feeding eels (2, 42).

Recent Trends in Food Consumption--The diet in Taiwan has undergone significant changes during the island's economic

Table 15--Feed use of major agricultural commodities, Taiwan

Type of feed	1965	1970	1975	1976	1977	1978	1979	1980
				Metric tons				
Rice bran	90.9	94.5	48.1	48.5	48.4	45.1	43.6	43.4
Wheat bran	36.1	48.7	48.9	44.2	47.5	51.9	52.4	53.1
Corn	79.2	592.1	1,556.0	2,080.4	1,875.8	2,325.1	2,174.1	2,569.6
Barley	6.8	215.5	194.8	278.0	203.2	243.8	465.6	314.3
Sorghum	4.6	4.1	79.5	184.7	428.8	462.0	505.5	414.4
Sweetpotatoes	1,609.7	2,142.9	1,513.3	1,164.7	1,065.7	919.5	771.0	664.7
Cassava	119.1	138.7	125.4	132.3	123.7	112.5	101.5	83.2
Molasses	NA	NA	NA	NA	60	67	70	72
Soybeans:								
Crush volume 1/	NA	445.0	600.0	740.0	643.0	788.0	867.0	832.0
Meal 1/	NA	347.1	468.0	577.2	501.5	614.6	676.3	649.0
Peanuts:								
Crush volume	60.1	52.2	33.3	32.1	28.2	35.3	31.9	30.9
Meal	45.1	39.2	25.0	24.1	21.2	26.5	23.9	23.2
Meatmeal 2/	NA	NA	58.8	69.5	91.6	99.5	69.3	101.6
Fishmeal	*	9.9	30.6	37.5	44.0	42.6	52.4	33.0
Nonfat dry milk	.9	*	*	*	14.8	12.8	18.1	5.3

NA = Not available.
* = Nil or negligible.
1/ Based on industry estimates.
2/ Estimated by author.

Sources: (11, 2).

development (tables 16 and 17).14/ Total caloric intake per capita rose gradually over the period, reaching 2,845 calories per day per person in 1979 before dropping slightly in 1980. As incomes rose, consumers shifted the composition of their diets, generally away from carbohydrate sources and toward sources of protein. Total calories supplied by cereals peaked in 1974 and have declined steadily since, mainly at the expense of rice consumption. Among the cereals, only corn showed any significant growth over the period. The dietary role of roots and tubers (mainly sweetpotatoes), formerly one of the mainstays of the Taiwanese diet, declined steadily; sweetpotatoes are now eaten mainly as snacks.

Per capita consumption of soybeans grew rapidly between 1965 and 1975, but appears since to have leveled off; this probably reflects consumer substitution of meats and other high-protein foods for bean curd and other soybean foods. Likewise, per capita consumption of fruits and vegetables each more than doubled between 1965 and 1975, and thereafter shifted to a slower growth path. Consumption of vegetable oils (mainly soy oil) continues to show healthy average growth; lard consumption is relatively unstable.

Consumption of fish, traditionally an important source of protein in the island's diet, has increased slowly in physical terms since 1975. However, consumers have increasingly shifted toward lower fat varieties of fish, with the result that total calories from fish consumption have varied little. On the other hand, meats, eggs, dairy products, and sugar have all shown steady growth as sources of calories. Per capita consumption of pork, by far the dominant meat in the typical diet, increased by 50 percent between 1975 and 1980 alone, while poultry consumption grew by 47 percent over the same period. Per capita beef consumption remains miniscule. Consumption of milk products has grown rapidly; the bulk of the increase in consumption has been supplied from imported whole and nonfat milk powder. Finally, the people of Taiwan show an increasing preference for sugar, one of the island's leading agricultural exports. Although sweets are not traditionally a major part of the Chinese diet, contact with foreign dietary habits has helped to promote consumption of soft drinks, candies, and pastries.

14/ The data in tables 16 and 17 are derived from official food balance sheets in which human consumption is calculated as a residual after other claims are deducted from available supplies. As such, the consumption figures are subject to substantial year-to-year variance resulting from errors in the data series on inventory changes, feed and manufacturing use, and waste. However, the data do give a rough idea of the composition of the median diet and of long-term changes taking place in this diet.

Table 16--Annual per capita consumption of foods, Taiwan

Type of food	1965	1970	1975	1976	1977	1978	1979	1980
	Kilograms per year							
Rice (milled)	132.9	134.5	130.4	128.1	125.1	114.0	107.0	105.5
Wheat flour	22.3	25.4	24.3	20.8	22.6	23.9	23.8	23.6
Corn	1.7	2.2	2.8	3.0	6.7	6.6	10.6	7.3
Other cereals	.5	2.0	4.6	4.4	1.6	1.9	2.7	2.4
Total cereals	157.3	164.1	162.1	156.3	156.6	146.5	144.2	138.8
Sweetpotatoes	48.3	18.1	10.2	7.7	6.9	5.9	4.8	4.1
Total roots and tubers	51.3	21.3	14.5	11.2	10.3	10.7	8.9	8.2
Sugar	10.0	12.0	14.6	16.3	17.6	24.3	24.6	24.0
Soybeans 1/	5.4	9.5	10.4	10.8	9.3	10.4	10.1	10.3
Peanuts 1/	4.6	3.6	3.1	3.0	2.5	3.1	2.8	2.6
Total pulses and nuts	10.0	15.9	16.3	16.6	14.8	16.9	16.0	16.3
Vegetables	56.8	84.8	109.8	118.4	122.4	114.9	127.5	129.6
Fruits	21.0	45.8	55.0	62.1	57.4	54.3	66.6	70.2
Pork	16.8	18.9	17.5	21.4	23.7	23.4	27.2	26.2
Beef	.4	.6	.9	1.2	1.1	1.1	1.2	.9
Poultry	2.0	5.6	8.4	9.0	10.3	11.5	11.7	12.3
Total meats	19.2	25.3	27.0	31.6	35.3	36.1	40.3	39.6
Eggs	2.4	4.1	5.2	5.9	6.3	7.6	7.8	8.0
Fish	27.7	34.2	35.6	35.3	35.1	36.5	38.1	38.7
Milk 2/	5.3	10.5	16.0	20.0	23.1	27.4	26.8	27.6
Soybean oil	NA	4.4	5.6	5.6	6.2	7.0	6.0	7.1
Peanut oil	NA	.9	.5	.5	.4	.5	.5	.4
Total veg. oils	3.5	5.6	6.3	6.4	6.9	7.8	6.7	7.8
Lard	1.9	2.1	2.7	3.5	2.7	2.8	3.2	3.0
Total oils and fats	5.4	7.7	9.0	10.0	9.6	10.5	9.9	10.8

NA = Not available.

1/ All forms except oil; bean equivalent basis.

2/ Fresh milk equivalent.

Source: (11).

Table 17--Calories per capita per day by source, Taiwan

Type of food	1965	1970	1975	1976	1977	1978	1979	1980
	Calories per day							
Rice (milled)	1,310	1,326	1,286	1,264	1,234	1,124	1,056	1,040
Wheat flour	223	254	243	208	226	239	238	236
Corn	16	16	27	29	65	64	103	71
Other cereals	4	3	43	41	21	19	25	22
Total cereals	1,554	1,621	1,599	1,541	1,546	1,446	1,423	1,370
Sweetpotatoes	140	53	30	22	20	17	14	12
Total roots and tubers	154	67	45	36	33	33	28	24
Sugar	106	126	154	172	185	257	259	253
Soybeans 1/	49	86	95	98	85	94	92	93
Peanuts 1/	49	38	33	32	27	33	30	28
Total pulses and nuts	119	152	155	156	141	160	151	154
Vegetables	30	45	61	65	67	60	67	69
Fruits	25	53	57	66	61	58	72	78
Pork	165	233	215	263	291	288	335	322
Beef	2	4	6	8	7	7	7	6
Poultry	12	34	51	55	63	70	71	75
Total meats	180	271	273	325	362	365	414	403
Eggs	10	18	22	25	27	32	34	34
Fish	64	68	62	62	62	61	63	66
Milk products	8	17	24	27	34	39	39	40
Vegetable oil	85	134	153	155	167	188	162	189
Lard	46	53	67	87	69	68	80	74
Total oils and fats	132	187	220	243	236	256	242	264
Beer and wine	30	37	50	52	52	55	55	57
Total	2,411	2,662	2,722	2,771	2,805	2,822	2,845	2,812

1/ All forms except oil.

Source: (11).

Price and Income Elasticities--T. C. Wu reported price and income elasticities of demand for major food commodities in Taiwan (58), based on an analysis combining time series and cross sectional data (table 18). Average incomes in Taiwan rose dramatically over Wu's sample period (1951-76), and have continued to rise since then, so that his estimated income elasticities may seriously overstate the true current values. To reduce this bias, single equation demand functions were re-estimated for a number of commodities over the period 1967-80, and the resulting income elasticity estimates were used to project future demand trends. Where no acceptable alternative estimate could be made, Wu's estimates are used by default. In neither case are the own-price elasticity estimates judged to be reliable.

Future Shifts in Food Consumption--As indicated by the relationships among the income elasticities for different foods (table 18), future income growth is likely to produce further significant shifts in the composition of the median diet in Taiwan. In general, these shifts will represent a continuation of existing trends. Cereals and sweetpotatoes will continue to lose ground to all sources of protein and fats; consumption of

Table 18--Own-price and income elasticity estimates for major food commodities, Taiwan

Commodity	Own-price 1/	Income 1/	Income 2/
Rice	0.21	-0.10	-0.42
Wheat flour	2.16	.49	.01
Other cereals	.94	.14	#
Sweetpotatoes	.75	-1.34	#
Pork	.44	.39	.45
Beef	1.99	.97	.96
Poultry	.55	1.10	1.07
Fish	.36	.66	.28
Eggs	.76	.68	.67
Milk	.68	1.12	#
Soybeans	.88	.78	.55
Sugar	.42	.27	.66
Vegetable oils	1.10	.84	.59

= No satisfactory re-estimate found.
1/ Estimated by T. C. Wu (58).
2/ Estimated by author.

rice and particularly sweetpotatoes will decline in absolute terms, while that of corn will grow at a modest pace. Per capita consumption of wheat flour is likely to grow very slowly and may decline.

Consumption of poultry, eggs, and milk will continue to increase proportionally faster than that of pork, and fish will increase more slowly; beef consumption will grow rapidly, though from a very low base. In absolute terms, increased consumption of pork will continue to be the largest single source of increased calories from animal sources.

Direct food consumption of soybeans will grow at a moderate rate, but will continue to be overshadowed by feed use. Consumption of vegetable oils (especially soybean oil) will increase somewhat more rapidly.

Projections of per capita food use of principal commodities to 1989 (table 19) are based on the income elasticities reported in table 18, assuming aggregate real income and population growth as shown in table 4. The possible effects of changes in relative prices are ignored because of the uncertainty surrounding forecasts of such changes, because of the unknown degree to which future changes in international prices might be offset in the retail market by intervention, and because of the much larger standard errors attached to the own- and cross-price elasticity estimates available. Projections of aggregate consumption of major food commodities to 1989 (table 20) are based on per capita consumption projections (table 19) and population projections (table 4).

Production

Cropland allocation in Taiwan has undergone very significant shifts in recent years, reflecting changes in domestic consumer and export demand and in official guarantee prices, competition from imports, and rising production costs (table 12). Rice area has declined strongly since 1975, reflecting substitution to other crops during the second crop and reduced multiple cropping. However, rising yields have helped to cushion the decline in production. Meanwhile, per capita consumption of rice has fallen steadily since 1967, so that Taiwan continues to produce more rice than can be disposed of domestically. Area planted to sweetpotatoes has declined to less than a quarter of its 1967 level as labor costs have risen, as consumers have substituted cereals and meats in their diets, and as hog producers have substituted coarse grains in their feed rations. Similarly, soybeans have lost substantial ground as a result of rising labor costs and price competition from imported soybeans. Competition from imported soybeans may also help to account for the decline in peanut planting and production, although here the effect has been cushioned by consumer preference for peanut oil in cooking, together with import controls on peanuts since 1979.

Table 19--Projections of per capita consumption of principal foods, Taiwan

Type of food	1981	1982	1983	1984	1985	1986	1987	1988	1989
	Kilograms per year								
Rice (milled)	104.1	102.4	100.1	96.9	93.8	90.8	87.9	85.1	82.3
Wheat flour	26.4	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7
Corn	10.3	10.3	10.4	10.4	10.5	10.6	10.7	10.8	10.9
Sweetpotatoes	3.9	3.8	3.6	3.3	3.0	2.8	2.6	2.4	2.2
Sugar	22.0	22.7	23.2	24.1	25.0	25.9	26.8	27.7	28.6
Soybeans 1/	11.8	10.4	10.6	10.9	11.2	11.5	11.8	12.2	12.5
Pork	26.3	26.3	26.7	27.3	28.0	28.6	29.2	29.9	30.5
Beef	1.19	1.20	1.24	1.31	1.38	1.44	1.51	1.58	1.65
Poultry	12.6	12.8	13.3	14.1	15.0	15.8	16.6	17.4	18.2
Eggs	8.2	8.2	8.4	8.7	9.0	9.4	9.7	10.0	10.3
Fish	39.2	39.5	39.9	40.5	41.1	41.8	42.4	43.1	43.7
Milk (fresh equiv.) 2/	31.2	31.9	33.2	35.4	37.8	40.3	43.0	45.8	49.0
Vegetable oil	7.9	7.7	7.8	8.1	8.4	8.6	8.9	9.2	9.4

Note: Projections are based on the income elasticities of table 18 and forecasts of growth in population and real income in table 4.

1/ All forms except oil, bean equivalent basis.

2/ Dairy products are converted to their fresh milk equivalents at the following rates: powdered milk, 8:1; butter, 20:1; evaporated and condensed milk, 2.2:1; cheese, 9.5:1.

Table 20--Projections of aggregate consumption of principal foods, Taiwan

Type of food	1981	1982	1983	1984	1985	1986	1987	1988	1989
					1,000 metric tons				
Rice (milled)	1,886.0	1,889.3	1,880.1	1,852.0	1,823.7	1,794.9	1,766.2	1,737.2	1,706.3
Wheat flour	477.9	479.4	489.4	500.2	510.9	521.7	532.6	544.9	554.3
Corn	186.6	190.0	195.3	198.8	204.1	209.5	215.0	220.5	226.0
Sweetpotatoes	70.7	70.1	67.6	63.1	58.3	55.4	52.2	49.0	45.6
Sugar	398.7	418.3	436.5	461.1	486.3	512.2	538.8	566.0	593.8
Soybeans 1/	213.5	191.1	198.3	207.8	217.6	227.5	237.7	248.1	258.7
Pork	476.1	484.9	501.1	522.0	543.4	565.2	587.3	610.0	633.2
Beef	21.6	22.1	23.3	25.0	26.8	28.5	30.3	32.3	34.2
Poultry	229.0	236.7	250.6	270.3	290.7	311.5	333.1	355.4	378.2
Eggs	147.5	151.3	157.8	166.7	175.7	185.1	194.6	204.5	214.5
Fish	710.9	728.6	749.2	774.3	799.8	825.7	852.1	878.8	906.0
Milk (fresh equiv.) 2/	565.3	588.6	623.6	676.6	734.9	796.7	864.0	935.0	1,015.9
Vegetable oil	142.9	141.5	147.1	154.7	162.4	170.4	178.5	186.8	195.3

Note: Projections are based on the projections of per capita consumption in table 19 and forecasts of population growth in table 4.

1/ All forms except oil, bean equivalent.

2/ Dairy products are converted to their fresh milk equivalents at the following rates: powdered milk, 8:1; butter, 20:1; evaporated and condensed milk, 2.2:1; cheese, 9.5:1.

In recent years, farmers have been encouraged by the authorities to substitute corn and sugarcane for rice. Despite increased guarantee prices, neither substitute crop has shown a clear growth trend in area or production.

Vegetables were the biggest growth crops of the 1970's, reflecting growing domestic and export demand. Competition from winter season vegetables contributed to the decline of crops such as wheat and soybeans. However, mushrooms and asparagus, two of the island's leading vegetable crops for export, have recently fallen on hard times. Production of mushrooms dropped off sharply in 1980 and 1981 due to the combined effects of recession and increased trade barriers in the United States and the European Community, together with increased competition from the People's Republic of China and other producers. Asparagus exports and unit values fell in 1981 in response to reduced demand in Western Europe. In both cases, the appreciation of the NT dollar relative to the currencies of Taiwan's European customers contributed to the drop in export demand (48, 49). In the long run, steadily rising production costs are likely to erode the position of these crops in Taiwan's export mix.

Fruits present a similarly mixed picture. Rising production costs and price competition from low-wage competitors have limited sales of two of Taiwan's major traditional export crops, bananas and pineapples, and production of both has begun to decline. Citrus fruit production shows no clear trend. However, mangoes, watermelons, and a broad range of minor fruits have made steady gains in response to growing domestic (and, in some cases, foreign) demand.

Other crops (not covered in table 12) include wheat, whose planted area declined from 11,000 to 1,000 hectares between 1965 and 1980 due to competition from imports; cotton, with a mere 209 hectares planted in 1980; and cassava, whose area fell from 18,000 to 12,000 hectares between 1975 and 1980.

In contrast to the declining production of most field crops, meats and other animal products have registered impressive gains (table 21); chicken meat production more than tripled between 1970 and 1981, while that of duck meat nearly doubled. Pork production increased by 65 percent during the same period. Production of hen eggs has risen dramatically, while growth in duck egg production has been much less steady. This has reflected both a shift in consumer tastes and the more rapid development of large-scale chicken and egg production techniques.

Milk production increased strongly between the early 1960's and 1975, but leveled off thereafter in apparent response to increased competition from imported milk and restrictions on importing dairy cows. Modest output growth resumed in 1980 with

Table 21—Production of fish, livestock products, poultry, and milk, Taiwan

Item	1965	1970	1975	1976	1977	1978	1979	1980	1981
	1,000 metric tons								
Fish	382.7	613.2	779.9	810.6	854.9	885.0	929.3	936.3	911.7
Pork 1/	173.8	282.8	284.6	375.8	413.7	417.1	500.3	474.0	474.1
Beef 1/	5.1	9.1	4.3	10.6	15.8	9.7	8.5	5.5	5.2
Milk	13.7	16.1	46.2	45.1	45.7	44.6	44.4	47.7	50.2
Chicken meat	25.0	37.6	71.0	82.1	100.2	115.9	119.4	132.6	146.5
Duck meat	25.2	31.9	43.6	47.1	54.3	62.0	64.3	64.7	75.2
Hen eggs	13.1	31.9	54.3	67.0	76.3	96.6	103.9	112.1	113.5
Duck eggs	22.9	28.9	29.8	29.8	29.2	32.3	32.7	29.6	29.7

1/ Carcass weight.

Source: (12).

the removal of import controls on dairy cows and increased guarantee prices for milk. The tiny beef industry, based mainly on culls from dairy herds and draft animals, has declined since 1977 in response to competition from imported milk and beef and the substitution of farm machinery for draft animals.

Price and Subsidy Programs--Two main policy tools are used to influence the production of particular crops and livestock products in Taiwan: intervention in international trade and official guarantee (support) prices. Trade policy is discussed elsewhere in this study; since in most cases the qualitative effects of tariffs and quotas on crop production are self-evident, this element of policy need not be reexamined here.

Taiwan currently offers farmers minimum guarantee prices on rice, sugar, tobacco, corn, sorghum, wheat, soybeans, mushrooms, asparagus, onions, bananas, pineapples, wine grapes, milk, cattle, and cocoons for silk. The key guarantee price is that offered for rice, which is announced before the planting of each rice crop with the aim of giving the median rice farmer a return of 20 percent on the covered portion of his crop. The quantity of rice purchased from each farm family at the guarantee price is limited to 970 kilograms per hectare of riceland; additional production must be sold at market prices, which are generally lower. However, if the market price falls below the estimated

cost of production, the Provincial Food Bureau purchases and stores rice in order to boost the market price to cover production costs (51). The guarantee price set for rice from the 1982 second crop was NT$18.80 per kilogram, or US$521 per metric ton.

Guarantee prices for sugar, corn, soybeans, and other crops are set with reference to estimated production costs and the guarantee price for rice. With the emergence in recent years of chronic surplus rice production and declining area planted to import-competing feed crops, much discussion has taken place in official circles about the need to restructure the guarantee price system to encourage substitution of farmland from rice production to that of other crops. However, the authorities hesitate to reduce rice guarantee prices because of the fear of adverse reaction from farmers, while budgetary considerations inhibit them from increasing guarantee prices for substitute crops. In 1982, the authorities began to offer diversion payments of NT$8,500 (US$220) per hectare to farmers switching from rice to other specified crops, including corn, soybeans, and sorghum. While it is too early to judge the effect of this new initiative, initial attaché reports suggest continued reluctance among rice farmers to switch to other crops. Ultimately, the authorities may resort to more direct methods, forcing farmers to divert area from rice by reducing irrigation water supplies to marginal ricelands. The debate over policy is still in progress, and the eventual outcome is not clear (38, 51).

Official policies play a less important role in the markets for livestock products, aside from substantial trade barriers on pork and poultry meat and occasional intervention in the hog market for price stabilization purposes. In 1979, the authorities announced a goal of increasing milk production by 20 percent yearly between 1980 and 1986 in order to increase Taiwan's self-sufficiency in milk production and to make better use of extensive slope lands for grazing and of food processing wastes for feeding. Controls imposed in 1975 on imports of dairy cattle were lifted in January 1980, but at the same time the authorities imposed a requirement that farms importing dairy cows first secure commitments from milk-processing firms to purchase their milk output. Because most such firms in Taiwan are set up to process powdered milk, which can be imported for considerably less than the milk guarantee price, this requirement is likely to be a major stumbling block to the expansion of the dairy sector. Achieving the announced targets will require a substantial increase in the level of milk guarantee prices. Moreover, the authorities will probably have to provide subsidies to domestic milk processors for purchasing equipment to produce powdered milk, as well as for buying higher priced domestic fresh milk in place of imported powdered milk. Although milk production has increased since 1980, the absence

thus far of strong policy steps in support of the official milk production goals puts the chances for their full realization in considerable doubt (3, 45).

Production Potential--Taiwan recently published official agricultural production targets for the period 1980-89 as part of its official 10-year agricultural development plan. These targets include substantial expansion of harvested area and production of soybeans and corn, as well as of citrus and noncitrus fruits, tomatoes, and other vegetables. Soybean production under the plan is scheduled to increase from 26,000 tons (actual) in 1980 to 109,000 tons in 1989, while corn output is supposed to increase from 115,000 tons to 403,000 tons over the same period. Achievement of these goals would give Taiwan a self-sufficiency ratio of 6.4 percent in soybeans and 6.5 percent in feed grains in 1989, compared with 1.4 percent and 2.9 percent, respectively in 1981 (9).

However, circumstances described elsewhere in this study make it highly unlikely that actual production of soybeans and feed grains will come anywhere near target levels during the plan period. These circumstances include the continuing outflow of labor from the agricultural sector and the apparent preference of farmers for planting rice rather than import-competing crops. Similarly, the authorities appear unwilling to incur the high budgetary costs needed to induce a significant increase in self-sufficiency in feed grains and oilseeds through increased guarantee prices, or to sacrifice consumer interests to those of producers by raising trade barriers.

Production projections for crops (table 22) are based on the assumption that no major policy shift takes place to stimulate the production of import-substituting crops, so that harvested areas, yields, and output continue on their apparent present trends for the remainder of the decade. Under these assumptions, soybean output will continue to decline steadily over the decade, while corn production will register gains far more modest than those projected in the plan. Production of sweetpotatoes and cassava is forecast to continue its steady decline. For wheat, sorghum, and sugar no clear production trend is visible, so future production is assumed to remain at 1981 levels.

It is possible that at some point during the projection period, the authorities will take positive steps to stimulate production of corn, soybeans, and other import-substituting feed crops. Because of official interest in supporting farm incomes, such policies would likely take the form of higher guarantee prices on alternative crops, rather than reduced incentives for rice production. The effects of such policy changes are not incor-

Table 22--Production projections for leading crops and livestock products, Taiwan

Item	1981	1982	1983	1984	1985	1986	1987	1988	1989
	1,000 metric tons								
Rice (rough)	2,375.1	2,357.5	2,325.2	2,270.9	2,216.4	2,161.3	2,106.3	2,050.9	1,993.3
Wheat	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Corn	100.5	105.6	108.1	109.3	109.8	110.1	110.3	110.4	110.4
Sorghum	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
Soybeans	16.9	14.4	12.4	10.6	9.1	7.8	6.7	5.7	4.9
Peanuts	85	82	81	80	78	77	76	75	74
Sweetpotatoes	680	640	551	473	407	350	301	259	223
Cassava	164	144	127	112	98	87	76	67	59
Sugar (refined)	8,431	8,431	8,431	8,431	8,431	8,431	8,431	8,431	8,431
Pork 1/	509.1	522.7	543.6	569.2	571.7	574.6	587.3	610.0	642.6
Beef 1/	5.0	4.9	4.8	4.7	4.9	4.8	4.7	4.8	4.8
Poultry	229.0	236.7	250.6	270.3	290.7	311.5	333.1	355.4	378.2
Eggs	147.5	151.3	157.8	166.7	175.7	185.1	194.6	204.5	214.5
Milk	51.6	55.7	60.1	70.1	75.8	81.8	88.4	95.4	103.0

1/ Carcass weight.

porated into the projections made in table 22, because of: uncertainty about the strength of the policy changes which that might be implemented as well as about the timing of such changes; and the unlikelihood that any steps that might be taken along these lines would significantly reduce the demand for imported feedstuffs. The projection for rice production assumes that the authorities will gradually strengthen policies to reduce surplus rice production, so that production gradually declines to the level of domestic requirements by 1989. However, the strictly hypothetical nature of this projection should be recognized.

Technical considerations suggest that, with a relatively brief adjustment lag, Taiwan can produce any quantity of pork, eggs, and poultry needed to supply domestic demand without incurring rising real costs. Reliance on imported feedstuffs rather than on domestic feedstuff production capacity reinforces this conclusion. Production projections for pork, poultry, and eggs (table 22) are based on the demand projections in table 20, on the assumption of full self-sufficiency in these products; the pork production figures additionally assume that official export targets for pork are achieved over the remainder of the decade. In the event that pork exports remained constant at their 1980 level (16,000 tons), total demand for pork (and, by assumption, pork production) would undershoot the projections by a maximum of 3.2 percent in 1984, with the difference tapering off thereafter. Such a development would in turn result in a reduction in the projected demand for feed grains and soybeans by about 2 percent in 1984. Beef production projections reflect official targets, while those for milk assume a growth rate in milk production of 8 percent per year from a 1980 base period, considerably less than the growth rate assumed in the official targets. Milk and beef production account for a very small share in the total demand for feedstuffs, so errors in these forecasts would have little impact on feed grain and soybean import projections.

Because of Taiwan's dependence on imported feeds, changes in domestic production of feedstuffs have a limited impact on the livestock sector. Conversely, because the internal prices of feed grains and meals are effectively set by the prices of imports (plus tariffs, etc.) and by the import base prices on corn and soybeans, growth in livestock production will generally not lead to increased domestic production of feedstuffs.

For present purposes, it may be reasonably assumed that a change in the supply of domestic feed grains or soybeans to the livestock industry will be offset by an equivalent change in imports. This relationship is complicated somewhat by the use of sweetpotatoes, cassava, and molasses as feed grain substi-

tutes. The present rapid decline in sweetpotato and cassava production will probably be offset by increased reliance on imported feed grains.15/ Feed grain import demand calculations must be adjusted to take into account the declining production of these crops.

In recent years, demand for molasses has exceeded the supply derived from domestic sugar production, with the difference satisfied out of imports. As a result, changes in domestic sugar production (and thus, molasses production) will also have to be offset by equivalent changes in imports of feed grains or molasses.

Agricultural Trade

Three basic factors lie behind recent changes in Taiwan's demand for imported agricultural commodities, the first two closely related to the island's economic growth. First, income growth has stimulated consumer demand for various food and nonfood agricultural products, notably pork, poultry, eggs, and dairy products, but also wheat flour products, cigarettes, and a wide range of fruits and vegetables. Growth in final demand for meats and other protein foods, together with the increasing commercialization and specialization of the hog and poultry industries, has led in turn to growing demand for feed grains, protein meals, and other feedstuffs. Increased demand for dairy products has been mainly satisfied by imports, and so has had only a minor impact on feed demand.

Second, employment opportunities in the industrial sector have resulted in higher wages and acute labor shortages in agriculture, leading in turn to declining production of domestic substitutes for imported agricultural products, including sweetpotatoes, soybeans, and wheat. These trends have been reinforced by the island's relatively weak barriers to competition from imported substitutes, particularly for wheat and soybeans, and indirectly for sweetpotatoes. Comparison of domestic production levels (table 12) with imports (table 23) helps to convey the island's strong dependence on imports for several key product categories. Aside from a modest production level of corn and sweetpotatoes and some domestic production of molasses, imported feed grains face virtually no competition from domestically produced substitutes. Likewise, domestic soybean production in 1981 came to only 1.4 percent of the quantity imported, while domestic wheat production was a mere 0.5 percent of the quantity imported.

15/ Feeding experiments indicate that each ton of sweetpotatoes is equivalent to 0.25 to 0.3 ton of grain in pork production (25).

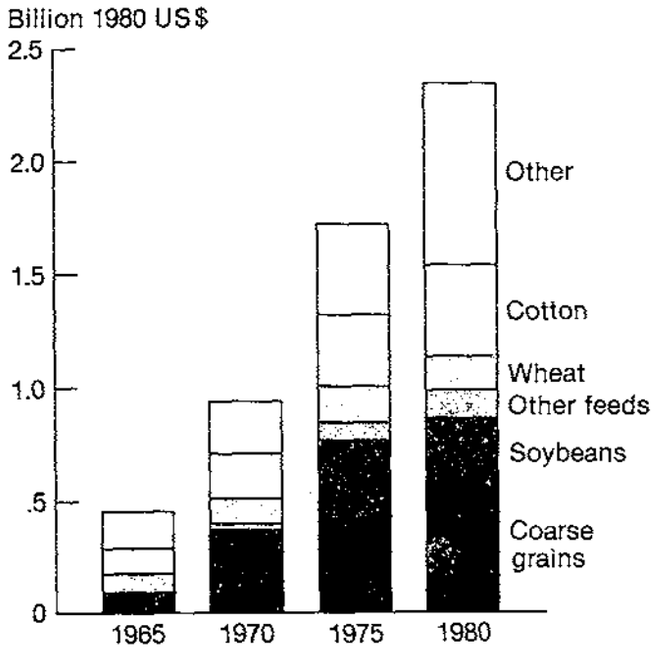
Third, the growth in world demand for Taiwan's textile and footwear exports has led to rising imports of cotton, wool, and cattle hides. In each case, domestic production is sufficiently small to be irrelevant to the demand for imports. Taiwan's textile industry is based on the production of goods made from synthetic fibers; however, producers are responsive to changes in the relative demands for synthetic- and natural-fiber textiles, and vary their demands for cotton and wool accordingly (40).

Taiwan's major imports of agricultural commodities for 1970 through 1981 are shown in table 23 and illustrated in figure 2. The upper part of the table is composed of relatively homogeneous commodities, which together accounted for 78 percent of the island's 1981 agricultural import bill. The lower part covers four additional items of some economic interest to the United States, although they represent a relatively small fraction of the total value of agricultural imports.

Most of the commodities covered in the table fall into four general categories: (1) sources of protein meal for livestock (soybeans, meatmeal, and fishmeal) and for pond fish (fishmeal); (2) feed grains (corn, barley, and sorghum); (3) raw materials for export-oriented manufacturing industries (cotton, wool, and hides); and (4) direct consumption goods (wheat, tobacco, dairy

Figure 2

Composition of Agricultural Imports, Taiwan



Source: (19).

Table 23--Major agricultural commodity imports from all sources, Taiwan

Commodity	1970	1975	1976	1977	1978	1979	1980	1981
				1,000 metric tons				
Principal agricultural imports:								
Corn	601.7	1,388.5	1,861.1	1,993.3	2,169.3	2,601.6	2,605.0	2,611.4
Barley	238.6	163.3	332.9	264.9	335.5	593.8	382.2	304.5
Grain sorghum	0	152.1	254.8	488.2	472.6	486.8	416.5	839.6
Wheat	603.1	542.9	598.5	577.3	674.7	697.0	685.7	593.3
Raw cotton	128.0	188.3	187.4	179.7	245.8	207.6	266.8	204.8
Soybeans	617.5	827.1	793.1	655.1	959.4	1,103.8	938.5	1,113.4
Meatmeal	NA	38.0	42.0	61.3	69.0	32.7	66.9	110.2
Fishmeal	34.9	87.9	77.5	77.8	117.9	139.8	135.5	146.9
Tobacco leaf	6.2	8.5	10.4	11.2	16.8	19.0	15.2	11.3
Beef	.1	25.5	9.3	3.2	8.6	12.0	10.9	17.3
Dairy products	17.1	30.4	42.4	59.9	64.1	70.5	60.9	62.3
Wool	18.3	12.0	19.6	14.1	21.7	25.4	27.8	27.8
Secondary agricultural imports:								
Whole cattle hides, salted	10.5	28.4	35.8	42.7	44.4	39.8	51.3	55.6
Apples	6.2	4.1	5.3	5.1	8.7	35.3	56.1	75.4
Tallow, inedible	5.5	14.0	31.8	32.0	47.5	43.5	54.3	47.7
Meatmeal	*	38.0	42.0	61.3	69.0	32.7	66.9	110.2

NA = Not available.
* = Nil or negligible.

Source: (19).

products, beef, and apples). Although this classification is not precise (a large share of soybeans and a smaller share of corn, barley, and sorghum are consumed by humans, while some powdered milk is fed), it is useful in emphasizing the main trends in Taiwan's agricultural import demand.

Imports of feed grains, accounting for just over a quarter of Taiwan's 1980 agricultural import bill, grew by nearly 24 percent annually between 1975 and 1979, before declining in 1980 in response to low hog prices. Feed grain imports recovered in 1981, increasing by 10.4 percent over their 1980 level. Soybean import growth has been somewhat less steady, though again on a clear upward trend. Low hog prices and excess stocks of soybeans resulted in reduced soybean imports in 1980, while a high base price for imported soybeans caused some switching toward meatmeal and fishmeal. However, imports of soybeans recovered strongly in 1981, exceeding their 1980 level by 18.6 percent.

Cotton imports have been relatively unstable in recent years as a result of sharp fluctuations in world demand for apparel and increased competition from the People's Republic of China and other low-wage producers in cotton textiles; the ease of storing cotton tends to increase the instability of import flows. Imports of cattle hides for footwear manufacture have grown substantially since 1975, although these have also exhibited considerable instability (40).

Wheat flour consumption has shown a gradual upward trend, mainly reflecting population growth, with stock accumulation cycles adding some instability to wheat import flows. Tobacco leaf imports have nearly doubled since 1975, representing increased cigarette consumption and increasing exports of lower-quality domestic tobacco.

Import controls on apples were removed in 1979, resulting in 2 years of very rapid growth in imports despite the retention of high tariff barriers. Taiwan became the largest single export market for U.S. apples in 1981. However, apple imports dropped sharply in 1982, partly as a result of quality problems encountered with U.S. apples in the previous year.16/

U.S. and competitors' market shares--Along with product quality and landed price, several factors influence the trade shares of various suppliers of agricultural commodities in the Taiwan market. First, Taiwan's diplomatic isolation has created a

16/ The 1981 Washington apple crop appears to have been particularly prone to spoilage, a problem compounded by the use of nonrefrigerated containers in shipping apples to Taiwan (56).

strong desire to maintain close relations--economic as well as political--with countries remaining friendly to Taiwan. The primary beneficiary of this situation has been South Africa, whose diplomatic ties with Taiwan have recently helped boost its share in Taiwan's imports of corn. A second recent example of this politically motivated import behavior was the purchase of 50,200 tons of wheat from Uruguay in 1982 (51). In a more general way, the United States also benefits from Taiwan's need for friends in the international sphere; despite withdrawing diplomatic recognition from the Taipei regime, the United States continues to maintain friendly relations with Taiwan on a less formal basis and continues to supply Taiwan with military equipment.

Second, policymakers in Taiwan have come to fear that the island's large and persistent bilateral trade surpluses with several major trading partners might provoke increased trade barriers against Taiwan's exports or lead to political friction. In 1977, the authorities began promoting the purchase of U.S. agricultural commodities, partly as a means of reducing this trade surplus. A second beneficiary of such policies (though on a much smaller scale) has been Canada, which recently expanded its shares in the markets for wheat, cattle hides, and apples.

Third, Taiwan's leaders are reported to have some second thoughts about the wisdom of relying so heavily on the United States for many of its basic food and feed imports, especially n the absence of formal diplomatic ties. While this pattern of reliance originally developed in part because of a conviction that the United States would be an especially reliable source of supply, there appears now to be some feeling that things may have gone too far, and that Taiwan should diversify its sources of supply in the interest of food security (38). In many cases, the diversification motive coincides with the diplomatic and trade balance factors noted above. The purchase of large amounts of Thai corn in 1981 and 1982 may in part represent a desire for supply diversification, though price competition played an important role as well. Factors affecting market shares of some major commodities are given below:

- Corn--The U.S. share expanded from a negligible level before 1973 to 84 percent in 1979 (table 24); it thereafter fell slightly in 1980 (to 82 percent), and more sharply in 1981 (to 59 percent). The drop in the U.S. market share mirrors gains by South Africa and Thailand. In 1981, South Africa tripled its previous year's sales of corn to Taiwan, through a combination of political pressure and price inducements aimed at disposing of a particularly large corn crop. Taiwan renewed a 3-year agreement (June 1982-May 1985)

with South Africa in February 1982, which specifies minimum purchases of 600,000 metric tons of corn per year.17/

Thailand also increased its market share in Taiwan's corn market between 1978 and 1981 in an apparent effort to rebuild its (previously large) sales to the island through aggressive price competition. However, quality problems and doubts about Thailand's reliability as a supplier may cut into its future corn sales to Taiwan. Purchases from Thailand are made on the basis of annual agreements, which currently specify purchases of 200,000 metric tons per year.

A group of 18 U.S. suppliers renewed a 5-year corn agreement with the Taiwan Maize Importers Joint Committee in September 1981, calling for minimum purchases to increase from 1.60 million metric tons in 1981/82 to 1.85 million metric tons in 1985/86, in increments of 50,000 tons per year. Attache estimates put corn imports from the United States at around 2.0 million tons for the 1982/83 marketing year (51), which would imply a U.S. share of 71 percent if the island buys minimum quantities from South Africa and Thailand. This share may increase somewhat during the rest of the 1980's if Thailand cannot solve its quality and reliability problems.

The longrun competitive position of the United States in the markets for corn and other feed grains should be improved by the Far Eastern Silo in Kaohsiung (opened in 1980), which can unload 60,000-ton vessels operating from the U.S. west coast, resulting in quicker and less expensive shipping (39).

- Sorghum--The United States increased its market share dramatically in 1980 and 1981, when Argentina diverted supplies to the USSR in response to the U.S. grain embargo. Use of west coast ports rather than those on the Gulf of Mexico has also helped U.S. sales by reducing shipping costs. No minimum purchase agreements cover Taiwan's imports of U.S. sorghum at present (55).

  South Africa, which sold large amounts of sorghum to Taiwan in 1979-81, dropped out of the market in 1982 (51). Australia, which recently emerged as a strong competitor due to its advantage in shipping costs to the island, took over much of South Africa's former market share and may enlarge this share further at the expense of the United States.

17/ South Africa's 1983 sales of corn will be severely limited by a drought-related shortfall in production.

Table 24 --Chief suppliers of major agricultural imports, Taiwan

Commodity and country	1975	1976	1977	1978	1979	1980	1981
	1,000 metric tons 1/						
Corn:	1,388.5	1,861.1	1,993.3	2,169.3	2,601.6	2,605.0	2,611.4
Argentina	*	*	100.8 (5.1)	*	*	*	*
Indonesia	138.5 (10.0)	182.9 (9.8)	*	*	*	*	*
South Africa	476.9 (34.3)	435.8 (23.4)	325.7 (16.3)	567.7 (26.2)	372.6 (14.3)	345.5 (13.3)	919.9 (35.2)
Thailand	173.2 (12.5)	393.5 (21.1)	434.7 (21.8)	8.7 (0.4)	39.1 (1.5)	95.7 (3.7)	157.3 (6.0)
United States	513.2 (37.0)	835.6 (44.9)	1,130.9 (56.7)	1,592.6 (73.4)	2,188.4 (84.0)	2,136.0 (82.0)	1,533.6 (58.7)
Sorghum:	152.1	254.8	488.2	472.6	486.8	416.5	839.6
Argentina	26.9 (17.7)	166.0 (65.1	421.8 (86.4)	334.1 (70.7)	222.6 (45.7)	3.0 (0.7)	42.4 (5.0)
Australia	42.7 (28.1)	*	11.1 (2.3)	49.0 (2.3)	120.5 (10.6)	98.4 (24.7)	209.7 (23.6)
South Africa	15.0 (9.8)	*	*	2.5 (0.5)	113.0 (23.2)	133.9 (32.1)	121.5 (14.5)
Thailand	67.3 (44.3)	86.7 (34.0)	32.7 (6.7)	1.6 (0.3)	12.5 (2.6)	12.8 (3.1)	13.0 (1.6)
United States	*	*	*	59.1 (12.5)	14.4 (3.0)	168.3 (40.4)	426.7 (50.8)
Barley:	163.3	332.9	264.9	335.5	593.8	382.2	304.5
Australia	145.8 (89.3)	219.2 (65.8)	250.8 (94.7)	143.1 (42.6)	496.7 (83.7)	211.6 (55.4)	12.9 (4.2)
United States	17.5 (10.7)	91.8 (27.6)	1.1 (0.4)	163.5 (48.7)	83.2 (14.0)	164.0 (42.9)	280.7 (92.2)

Continued--

Table 24 --Chief suppliers of major agricultural imports, Taiwan--Continued

Commodity and country	1975	1976	1977	1978	1979	1980	1981
	1,000 metric tons 1/						
Wheat:	542.9	598.5	577.3	674.7	697.0	685.7	593.3
Australia	67.7 (12.5)	66.8 (11.2)	51.8 (9.0)	33.6 (5.0)	*	*	*
Canada	*	20.7 (3.5)	37.4 (6.5)	*	24.9 (3.6)	53.7 (7.8)	*
United States	475.2 (87.5)	511.0 (85.4)	488.0 (84.5)	640.7 (95.0)	672.1 (96.4)	632.0 (92.2)	593.3 (100.0)
Raw cotton:	188.3	187.4	179.7	245.8	207.6	266.8	189.8
United States	118.9 (63.2)	89.6 (48.1)	97.1 (54.0)	123.6 (68.8)	105.6 (50.9)	153.1 (57.4)	70.8 (37.3)
Tobacco leaf:	8.5	10.3	11.2	16.8	19.0	15.2	11.3
Korea	2.2 (26.3)	3.5 (33.9)	2.5 (22.3)	1.7 (10.0)	1.6 (8.5)	* (.1)	1.2 (10.4)
Malagasy Republic	.3 (2.9)	* (.4)	* (.5)	1.4 (8.1)	.8 (4.1)	1.1 (7.3)	*
South Africa	*	1.7 (16.2)	*	1.2 (7.1)	2.1 (10.9)	2.0 (13.2)	*
United States	5.6 (65.7)	4.8 (46.4)	7.6 (68.3)	11.9 (70.8)	13.2 (69.8)	10.8 (71.5)	5.8 (51.0)
Zimbabwe	*	*	*	*	*	*	2.5 (22.1)

* = Nil or negligible.
1/ Numbers in parentheses are percentages.

Source: (19).

- Barley--The U.S. share in Taiwan's barley market rose dramatically in 1981 because of Australian supply problems resulting from drought. Australia appears to have since redirected much of its barley sales to markets in the Middle East, opening the way to increased U.S. barley sales (55). Offsetting this, Canada began shipping large quantities of barley to Taiwan in 1982. The current 5-year barley agreement between Taiwan and U.S. exporters calls for annual purchases of 200,000 metric tons per year through 1985/86, which will probably keep the U.S. share around 50 percent (51).

- Feed grains (total)--Forecasts in 1981 by the U.S. Feed Grains Council/Taiwan projected the U.S. share of Taiwan's total feed grain imports to fall to 64 percent in 1981 and 1982, then rise to 65 percent in 1983, 67 percent in 1984, 68 percent in 1985, and 69 percent in 1986, assuming recommended promotional efforts. Without promotion, the projected U.S. shares over the period were all forecast at 3 to 4 percent lower than the estimates with promotion (54). Political considerations could help South Africa boost its share in the island's corn and sorghum markets at the expense of the United States, while Australian price competition in sorghum may prove unexpectedly vigorous.

- Soybeans--Soybeans are not included in the trade share tables because the United States has maintained a virtual monopoly on soybean sales to Taiwan in recent years, with the exception of 25,000 tons (2 percent) imported from Canada in 1979. This strong position is likely to be maintained. The current 5-year agreement specifies minimum soybean purchases of 950,000 metric tons in 1982/83 and 1983/84, rising to 1.0 million metric tons in each of the following 2 years..

- Wheat--Canada is at present the primary competitor with the United States in the market for Taiwan's wheat imports; competition from Australia's lower quality wheat has been largely eliminated as a side effect of Taiwan's uniform import price policy for wheat. Canada's share in this market during the remainder of the decade will be influenced by Taiwan's desire to diversify its sources of supply and to reduce its trade surplus with Canada, as well as by considerations of price and quality. Although it is difficult to predict with any precision the net effect of these factors on Canada's future trade share, there is little reason to believe that it will much exceed 10 percent during the 1980's.

Taiwan's purchase of 50,200 tons of wheat from Uruguay in 1982 primarily reflected political considerations. Future purchases from Uruguay are doubtful because of the low protein content of that country's wheat (47).

- Cotton—Taiwan has an official target of buying 55-60 percent of its raw cotton from the United States (50). This target is generally met, although the U.S. share fell short in 1981 because of high export prices relative to those offered by other suppliers (especially India, Turkey, and Upper Volta). The island spreads the remainder of its cotton imports among a very wide range of exporting countries. The large number of potential suppliers of cotton—particularly among the less developed countries—gives Taiwan an opportunity to maintain trade contacts with many countries with few other exportable products of interest. Raw cotton purchases also present the island with a means of acknowledging and rewarding friendly diplomatic treatment from certain countries. Along with these political considerations, strong price competition is an important determinant of market shares. The U.S. share will probably continue to fall in or near the target range in the foreseeable future.

- Tobacco leaf--As their real incomes grow, smokers in Taiwan increasingly favor brands of cigarettes containing a large proportion of high-quality tobacco. As a result, the U.S. share in the island's tobacco imports rose gradually during the 1970's, remaining around 70 percent in 1978-80. The U.S. share fell sharply in 1981, as the lifting of international sanctions against Zimbabwe allowed Taiwan to purchase competitively priced, high-quality leaf from that country. January-August data for 1982 suggest that the U.S. share will rebound to near its previous level, although Zimbabwe remains an important competitor in the market for high quality leaf (53). As with cotton, Taiwan spreads its residual tobacco leaf purchases among various minor suppliers, with political considerations playing a role.

- Apples--The United States has been the principal beneficiary of the liberalization of apple imports in 1979, driving out competition from Japan and South Korea. Potential competitors for this market are South Korea, Chile, and Canada (which has retained a small market share in apples since liberalization).18/ However, the net effect of competition from these suppliers on the U.S. market share is likely to remain small (table 25).

18/ South Korea and Chile both have close political ties with Taiwan, though only South Korea maintains formal diplomatic relations.

Table 25--Quantity shares imported from major suppliers, Taiwan

Commodity and supplier	1975	1976	1977	1978	1979	1980	1981
	Percent of imported total						
Apples:							
Canada	*	10	23	7	4	6	4
Chile	*	*	*	*	*	3	*
Japan	19	8	17	10	*	1	*
Korea	19	43	25	31	*	*	*
United States	62	36	32	46	96	86	95
Cattle hides (salted, wet):							
Australia	17	17	17	26	16	9	13
Canada	4	6	13	13	21	25	19
United States	71	65	56	55	58	63	61
Meatmeal:							
Australia	54	52	34	43	49	7	13
New Zealand	43	39	20	13	24	*	5
United States	5	5	40	41	24	93	81
Inedible tallow:							
Australia	32	43	27	41	34	5	13
Canada	*	3	6	4	*	3	1
New Zealand	32	31	43	13	15	12	29
United States	32	20	20	38	44	78	55

* = Nil or negligible.

Source: (19).

- Livestock products--Australia and, to a lesser extent, New Zealand dominate Taiwan's markets for a number of imported livestock products. These two countries enjoy a production cost advantage over the United States in powdered milk and other dairy products, mutton, wool, and medium-quality beef. Their relative proximity to the island reinforces their cost advantage. It is unlikely that the U.S. share in any of these markets will expand greatly in the near future, though exclusion of high-quality beef from the forthcoming increase in tariffs on beef could improve the U.S. share in the island's beef market.

Major buyers--Taiwan purchases a number of imported agricultural commodities--particularly important bulk commodities--through officially supervised industry associations. Most other products are imported and sold by individual wholesalers, directly or through trading companies.

- Soybeans--Imports are restricted to member firms of the Taiwan Soybean Importers Joint Committee and to public enterprises such as the Provincial Food Bureau; the former is made up of crushers and grain traders, and is chaired by a public official. Most soybean purchases are arranged during the annual buying missions to the United States. Import needs of individual users are coordinated within the committee and passed on to the Board of Foreign Trade (BOFT) at yearend for the next calendar year. Import quotas for individual firms are then allocated on the basis of these requests. In theory, the importer cannot import more than its quota, and a maximum of 115 percent of this year's actual imports can be applied for in the following year. However, the authorities have shown considerable flexibility in revising the quotas when market conditions in midyear seem to warrant it. Individual buying firms apply for their own import licenses to BOFT and open their own letters of credit for their purchases (2, 52).

- Corn--Imports are handled in a manner similar to that affecting soybeans. Imports are restricted to members of the Maize Importers Joint Committee, which is made up of the Taiwan Feed Industry Association, the Taiwan Industrial Corn Association, the Provincial Farmers' Association, the Taiwan Sugar Corporation, and the traders' association. Most corn purchases are made through the annual buying missions to the United States and through agreements with the Governments of South Africa and Thailand; supplemental purchases may be made through international tender (51, 54).

- Wheat--Imports are purchased by the Taiwan Flour Millers Association on behalf of its member firms, primarily during the buying missions to the United States. As with soybeans and corn, buying decisions and quota allocations are made in conjunction with the Board of Foreign Trade (39).

- Barley--Imports from the United States are purchased by the Taiwan Barley Industry Association on behalf of its member firms. Individual firms import directly from the Australian barley board. Again, quota allocations are negotiated with BOFT (51, 54).

- Sorghum--Imports may be purchased by feed millers themselves through private negotiations with trading companies; sorghum

importers thus have somewhat more flexibility than importers of other bulk commodities. An importer or miller may obtain a license from BOFT to import any amount desired during the next year, as long as it actually imported 90 percent of its quota for the current year, and as long as BOFT concurs with the foreign exchange expenditure and the export sources (54).

- Cotton--Imports from the United States are purchased by individual mills through local import agents representing the central market merchants and cotton cooperatives. An import quota is allocated to each mill following annual negotiations between the authorities and the industry association, the Cotton Shippers Association. Official participation in this association gives the authorities a voice in the allocation of purchases among exporting countries.

- Tobacco and tobacco products, beer, wine, and liquor--These products are imported and sold to retailers by the Taiwan Tobacco and Wine Monopoly Board, an official monopoly (46).

Cooperators' activities--Three U.S. cooperators maintain permanent offices in Taiwan--the U.S. Feed Grains Council, the American Soybean Association, and the U.S. Wheat Associates. Together these cooperators represent by far the greater part of U.S. agricultural exports to Taiwan. The resident cooperators carry out a number of activities intended to increase demand for the products they represent. Each performs an ongoing trade service effort to ensure that their customers' import needs are filled smoothly and that any problems encountered with U.S. products are dealt with promptly. Second, the cooperators give technical assistance to processors to ensure that their products are utilized as efficiently as possible; activities in this area include sponsoring visits from foreign experts to discuss new processing techniques, sponsoring brief technical courses for plant managers and technicians, and disseminating to industry members Chinese-language technical information. Third, the cooperators attempt to develop and popularize new uses for their products; for example, the American Soybean Association has sponsored feeding trials aimed at developing eel feed using soy isolate to supplement or replace fishmeal, as well as research to develop margarine and shortening based on soy oil for use in bakeries (2). Finally, efforts are made to stimulate consumer demand for products derived from the cooperators' commodities through seminars, cooking demonstrations and contests, advertising, and other types of promotion.

It is difficult to evaluate quantitatively the net effect of the cooperators' activities on U.S. exports to Taiwan. However, given the large scale of the trade flows in question, even a

modest relative increase in overall demand can be valuable. Moreover, the ongoing trade service activities of these offices help reinforce the image of the United States as a reliable source of supply. Such an image is likely to be of particular value in the market for feed grains, where the U.S. market share appears to be more at risk than in the soybean and wheat markets.

Trade Policies and Other Constraints on Imports

Tariffs are Taiwan's primary instrument of trade control over most imported products (table 26).19/ The island has in recent years lowered trade barriers on a number of agricultural products of interest to the United States, in exchange for U.S. concessions on industrial products exported by Taiwan. Bilateral trade negotiations between the United States and Taiwan, held in parallel to the Tokyo Round of Multilateral Trade Negotiations (MTN), were concluded in a 1979 exchange of letters between Taiwan's Coordination Council for North American Affairs and the U.S. American Institute in Taiwan. Items receiving tariff concessions by Taiwan included eggs, poultry for breeding purposes, other tallow, and a number of horticultural products (table 27). Most of these reductions were scheduled to take effect in stages beginning January 1, 1980, with the last stage scheduled for January 1, 1987.

Several additional aspects of this agreement should be noted. First, nominally temporary tariff reductions on wheat, corn, soybeans, and raw cotton, in force since the early 1970's, were made permanent. Second, the negotiations laid the groundwork for the removal of import controls on apples in 1979, a move whose effects far exceeded those of the reduction in the tariff rate on apples. Third, seasonal tariff reductions were achieved on grapes, fresh oranges, and fresh lemons, facilitating exports of these products outside their marketing seasons on the island. Finally, in several cases (poultry for breeding, sorghum for feed purposes, other tallow), specific products of interest to the United States were isolated from broader categories and given reduced tariff rates.

A subsequent round of trade discussions, held in December 1981, led to additional tariff concessions on both sides. Taiwan agreed to accelerated tariff reductions on several products covered in the previous agreement, including eggs, walnuts, fresh cherries, prunes, almonds, and other tallow. The island also reduced its tariff on frozen orange juice concentrate.

19/ For three important exceptions--corn, soybeans, and wheat--the role of tariffs is largely superseded by uniform import price plans, instituted for purposes of price stabilization. These policies are described in the following section.

Table 26--Tariffs on selected agricultural imports, Taiwan

Commodity and code	Tariff rate effective July 1, 1982	Value of imports, 1981	U.S. share in 1981 imports
	Percent 1/	US$ million	Percent
Grains:			
Wheat 2/ 1001	6.5	132.7	100.0
Barley 1003	5	59.2	88.6
Corn 2/ 1005	3	498.0	58.7
Rice 3/ 1006	0	*	*
Sorghum			51.0
(for fodder) 1007.11	3	153.0	
(other) 1007.12	5		
Oilseeds:			
Peanuts 3/ 1201.01	20	*	*
Soybeans 2/ 1201.04	7	381.9	100.0
Rapeseed 1201.09	20	.5	*
Meats:			
Beef 0201.1	23.80 SP 4/	48.7	7.5
Pork 3/ 0201.3	75	*	*
Turkey 0202.11	60	.1	100.0
Chicken 0202.12	65	.2	100.0
Eggs:			
Fresh 0405.011	39	*	*
Other 0405.019	61	*	2.0
Yolks 0405.02	61	*	*
Dairy:			
Powdered milk			
(for food) 0402.212	25	119.9	10.8
(for fodder) 0402.220	10	.1	*
Fruits and preparations:			
Oranges 5/ 0802.21	25 Mar.-Sept. 75 Oct.-Feb.	.6	100.0
Raisins:			
(in bulk) 0804.021	21.00 SP	2.7	81.5
(in boxes) 0804.022	24.00 SP	1.8	100.0
Grapes, fresh 5/ 0804.1	50 Oct.-Feb. 75 Mar.-Sept.	2.2	91.1

See footnotes at end of table.

Continued--

Table 26--Tariffs on selected agricultural imports, Taiwan--Continued

Commodity and code	Tariff rate effective July 1, 1982	Value of imports, 1981	U.S. share in 1981 imports
	Percent 1/	US$ million	Percent
Fruits and preparations, continued:			
Apples 0806.1	75	40.1	93.5
Cherries, fresh 0807.03	40	.1	100.0
Prunes 0812.2	43	.7	94.8
Peaches, canned 2006.011	65	1.0	78.5
Nuts:			
Walnuts, shelled 0805.21	38	.9	57.8
Almonds 1208.021	38	1.9	98.9
Other:			
Tallow:			
Inedible 1502.22	10	*	*
Other 1502.21	23	22.9	55.3
Meatmeal 2301.1	5	39.3	82.1
Fishmeal 2301.2	5	92.3	2.8
Tobacco:			
Raw leaf 2401.1	35	54.6	65.0
Manufactured products 2402	75	3.3	37.6
Cow hides, salted wet 4101.0113	3.00 SP	75.3	66.3
Cotton, raw 5501	0	323.8	36.2

* = Nil or negligible.

1/ Rates followed by "SP" represent specific duties, in NT$/kg.
2/ Role of tariffs largely superseded by uniform import price plan (see text).
3/ Imports subject to controls and normally not allowed.
4/ New specific duty on beef of NT$30/kg announced but not implemented as of January 1983.
5/ Lower tariff rate applies outside of the marketing season for domestic output.

Sources: (26; 19, 1981).

Table 27--Recent changes in tariff rates on selected agricultural commodities, Taiwan

Commodity and code	Pre-MTN rate in effect 1/16/78 1/	Rate in effect 7/1/82 2/	Final rate effective 1/1/87 3/
		Percent 4/	
Meats:			
Beef 0201.1	30	23.80 SP 5/	23.80 SP 5/
Pork 6/ 0201.3	78	75	75
Turkey 7/ 0202.11	65	50	35
Chicken 0202.12	65	65	65
Live animals:			
Poultry:			
(for breeding) 4/ 0105.01	13	0	0
(other) 0105.02	13	5	5
Other live animals 0101-0104	13	10	10
Eggs:			
Fresh 0405.011	52	39	30
Other 0405.019	78	61	40
Yolks 0405.02	78	61	40
Horticultural products:			
Lemons, fresh 8/ 0802.11	78	25 Mar.-Sept.	25 Mar.-Sept.
Oranges, fresh 8/ 0802.21		75 Oct.-Feb.	75 Oct.-Feb.
Raisins:			
(in bulk) 0804.021	30.00 SP	27.00 SP	27.00 SP
(in boxes) 0804.022	33.00 SP	24.00 SP	24.00 SP
Grapes, fresh 8/ 0804.1	78	50 Oct.-Feb.	50 Oct.-Feb
		75 Mar.-Sept.	75 Mar.-Sept.
Walnuts, shelled 0805.21	78	38	25
Apples 0806.1	78 6/	75	75
Cherries, fresh 0807.03	78	40	40
Prunes 0812.2	78	43	30
Almonds 1208.021	78	38	35
Peaches, canned 2006.011	85	65	65
Orange juice, frozen 2007.021	75	60	60
Tallow:			
Inedible 1502.22	10	10	10
Other 1502.21	39	23	10

1/ Rate in effect prior to first round of reductions negotiated in 1979 bilateral talks.

2/ Rates include new concessions arrived at in December 1981 bilateral talks.

3/ Rates scheduled to take effect as final stage of concessions agreed upon in both rounds of talks.

4/ Rates followed by SP represent specific duties, in NT$/kg.

5/ New specific duty on beef of NT$30/kg. announced but not implemented as of January 1983.

6/ Imports subject to controls and normally not allowed.

7/ Concession involved breaking product out from broader category and reducing its tariff rate.

8/ Concession involved applying lower tariff rate outside of marketing season for domestic output.

Sources: (18, 26, 37).

In 1982, Taiwan announced its intention to raise its specific duty on imported beef from NT$23.80 to NT$30.00 per kilogram; implementation was then delayed until July 1983. However, Taiwan signed a bilateral trade agreement with the United States in 1978 fixing the tariff on high-quality beef at NT$23.80, and is expected to abide by this agreement. This exclusion for high-quality beef could provide a significant boost to the U.S. market share in Taiwan's beef imports.

Despite recent concessions on some products, tariffs remain high on many agricultural items, including meats and offals, eggs, apples and other fruits, nuts, orange juice, and many categories of processed foods. For some of these products, notably pork and offals, tariffs are reinforced with import controls which largely exclude imports. These high tariffs do not in all cases represent real barriers to trade; the fact that Taiwan is a heavy net exporter of pork, chicken meat, eggs, and some types of offals suggests that the island would not import large quantities of these products even if its trade barriers were dropped. In other cases, however, tariffs pose significant barriers to imports. The absence of detailed domestic price data for many products, including most processed foods, precludes estimation of the impact of tariffs on import demand.

Uniform import price plans--Three of the leading U.S. agricultural exports to Taiwan--corn, soybeans, and wheat--are covered by price stabilization schemes known as "uniform import price plan" (UIPP's). The price paid by domestic users for a UIPP commodity is set by administrative fiat at a level known as the "import base price" or "stabilization price." The base price is set with reference to the international price of the commodity prevailing at the time, but thereafter remains fixed for a period ranging anywhere from a few months to over a year. Because international prices are meanwhile free to vary, the UIPP sometimes effectively subsidizes imports of the covered commodity, and at other times acts as a strong trade barrier. For this reason, it is difficult to compute the average impact of the UIPP's on import demand, but their effects generally dominate those of the formal tariff rates described above. The three plans, each of which differs somewhat from the others, operate as follows:

- Under the UIPP for soybeans, tariffs, harbor fees, and the contribution to the Grains and Feeds Development Foundation are added to the c.&f. price to arrive at the full landed cost. As long as this falls within US$20 per ton of the prevailing base price, the difference between the two is added to or withdrawn from a Soybean Stabilization Fund, so that the importer ends up paying only the base price. When the full landed cost exceeds the base price by more than US$20 per ton, the importer pays the base price plus that

excess amount; conversely, when the full landed cost falls more than US$20 below the base price, the importer pays the base price, US$20 goes to the Stabilization Fund, and the difference between the base price less US$20 and the landed cost goes toward repayment of official "loans" (in the form of subsidies) made to importers during the 1973-74 soybean boom. Between 1977 and 1980, the base price on soybeans was raised from US$273 per metric ton to US$320, and raised further to US$335 in December 1980. This price was maintained until July 1982, when it was lowered to US$300; in October 1982, the base price was lowered further to US$280.

- Wheat is imported under a uniform price plan somewhat different from that applied to soybeans. The base price is generally set somewhat above the prevailing landed price, and the difference goes toward the repayment of import subsidy loans made between 1972 and 1975. However, no stabilization fund has been established for wheat. The base price on imported wheat was lowered from US$220 to US$206 per ton in November 1981.

  Wheat imports pay a special harbor duty of 2 percent, half the normal rate. However, they are also assessed US$0.80 for the Taiwan Wheat Institute, plus NT$40 (US$1.05) for the Grains and Feeds Development Foundation. Exports and imports of all wheat milling byproducts are subject to administrative controls, and are normally not allowed.

- Corn imports are subject to a third uniform price plan, begun in 1980. This plan is solely addressed to price stabilization: any difference between full landed cost and the base price is paid out of or into a Corn Equalization Fund. The base price was initially set at US$160 per ton in July 1980, and raised to US$185 in October of the same year. The base price was lowered to US$160 early in 1981, to US$150 later in the same year, and to US$138 early in 1982.

Effects of the UIPP's on import demand--The uniform import price policies have several effects on Taiwan's import demand behavior. First, importers are more or less completely insulated from international price fluctuations as long as the base price is fixed.20/ As long as the import quotas fixed under the Bulk Commodity Import Regulation do not impinge on the quantity to be imported (and in general they do not), insulation from world price changes should be fully passed along to consumers. This situation reduces the elasticity of Taiwan's

20/ And, in the case of soybeans, as long as the full landed cost does not exceed the $20 upper band.

aggregate demand for commodities covered by UIPP's with respect to changes in the international prices of those commodities. On the other hand, between adjustments in the import base price, the real cost of the commodity to the importer tends to decline over time in response to general inflation.

A second result of the UIPP's is that importers are given an incentive to buy the highest grade of any commodity covered by one of the plans because the plans make no provision for price differences among grades. This effect has tended to increase the market share of the United States in Taiwan's imports of wheat, primarily at the expense of Australia.

Third, the UIPP's inject a strong element of instability into the demand for particular feed grains and protein meal sources, for the following reason. Competition in world markets for feed grains and sources of protein meal leads to a relatively high correlation among the international prices of substitute commodities. On the other hand, each UIPP more or less fixes the nominal internal price of the covered commodity, while prices of substitute commodities--barley and sorghum, in the case of corn; meatmeal, fishmeal, powdered milk, and peanut meal in the case of soybeans--are free to vary in response to market forces. If the base price of a UIPP-covered commodity remains fixed while the world prices of uncovered substitutes fall, importers may shift their purchases toward these substitutes. At times this effect has been quite dramatic: maintenance of the soybean base price at US$335 throughout 1981 led to strong substitution toward meatmeal, fishmeal, and powdered milk as the prices of these substitutes declined along with world soybean prices. Similarly, sorghum and barley enjoyed a strong price advantage over corn in the 1981/82 marketing year because of the high base prices on corn during this period (47).

Finally, the demand for imports of a commodity covered under a UIPP is typically quite insensitive to the level of tariffs and other charges levied against that commodity because these charges affect only the payment into or out of the associated stabilization fund, while the cost to the importer is not directly affected.

Prospects for further import liberalization—Taiwan may be approaching a limit in the process of liberalizing its agricultural tariff structure. Recent changes in tariffs have been quite responsive to U.S. interests; while some further concessions may be given in noncompetitive horticultural products, Taiwan seems to be running out of items on which significant new concessions to U.S. interests can be made without direct harm to domestic agricultural producers. In view of the growing gap between farm and nonfarm incomes, the authorities are unlikely

to risk harm to those few areas of the agricultural sector that have shown significant growth potential in recent years, including most fruits and vegetables. Indeed, resistance to tariff concessions may even extend to items not produced in Taiwan because of concern over possible competition to domestically grown substitutes. In other cases, including pork and poultry meat, the efficiency of domestic production is probably sufficiently high to deter competition from imports even in the absence of tariffs. Taiwan may resist pressure for tariff reductions on these items as well, fearing that domestic producers might face competition from imports of specific items within the broad product category receiving concessions. Similarly, Taiwan seems unlikely to respond to the U.S. argument that specialty poultry meat items (e.g., turkey or chicken rolls and patties) are not competitive with domestic production of fresh meats.

The results of the 1979 removal of import controls on apples suggest one reason for official caution in approaching further tariff concessions. The tremendous increase in apple imports that followed this decision clearly exceeded Taiwan's expectations and brought forth bitter complaints from domestic producers. Consideration of resumed quantitative restrictions on apples has been met by vigorous protests from the United States. Having seen that moves to liberalize trade cannot be easily reversed, the authorities are likely to examine proposals for further liberalization carefully for possible harm to domestic producers.

Moreover, Taiwan's tariffs do not function solely as a means of controlling import flows. Unlike the United States, Taiwan derives a large share of its public revenues from customs duties, about 22 percent in 1980. In the short run at least, this gives the authorities a direct stake in maintaining tariffs, and reduces their willingness to consider tariff reductions in terms only of the balance between producer and consumer interests.

Further tariff reductions may be possible on the noncompetitive fruits and nuts that have already received concessions since 1979. In some cases the schedule of staged tariff reductions could be accelerated, while in others the final tariff levels could be further reduced. Another area where progress may be possible is processed foods, especially the convenience foods suggested by Taiwan authorities as likely items for expansion of U.S. exports to the island (17). The potential for progress on particular items will likely depend on the present state of the corresponding processing industries in Taiwan, and on the degree to which the processed item is seen as competing with unprocessed domestic substitutes. In any case, a considerable amount of market research and promotion will probably be needed to

determine what types of processed foods have real market potential in Taiwan. Once the existence of a market is established, efforts to gain tariff concessions can be better focused.

Finally, one should recall that between 1980 and 1986 the tariff uplift device, whereby tariffs were previously calculated on the basis of 120 percent of c.i.f. value, is scheduled to be phased out. As a result, overall tariff barriers for all products will eventually be reduced significantly, even in the absence of changes in formal tariff rates.

There exists a small probability of at least a temporary major setback in the area of trade policy toward feed grains and soybeans. Farmer groups periodically renew a call for a dramatic increase in crop prices in order to increase domestic production of crops, raise farm sector incomes, and reduce the island's dependence on agricultural imports. The usual policy measures demanded include strong trade barriers and increased guarantee prices. It appears unlikely that producer interests will ever again carry sufficient weight to push through such policies on a broad basis, since this would result in immediate and serious harm to the island's consumers and livestock producers, as well as to many of its export industries should such steps lead to retaliation by its trading partners. It is possible, however, that Taiwan might reverse some recent trade concessions on particular items where imports have had an unexpectedly strong effect on domestic producers.

Other constraints to increased U.S. exports--An indirect constraint on Taiwan's demand for soybeans has been the restriction placed on exports of soybean oil, which has resulted in excess stocks of soy oil and has reduced the profitability of crushing. This restriction may soon be relaxed at the behest of local crushers (52).21/ The American Soybean Association in Taiwan has emphasized the development of new uses for soybean oil to help bring growth in oil demand into line with that of demand for meal.

Imports of agricultural commodities from the United States are generally not constrained by Taiwan's infrastructure. Port facilities are good and have recently been enhanced by the completion of the Far Eastern Silo in Kaohsiung. Taiwan's internal transportation system is quite extensive, allowing easy access to the interior of the island. Sales of fresh fruits such as apples and cherries are inhibited, however, by the inadequacy of

21/ Clearly, removal of this constraint would be a mixed blessing for the United States. Soybean exports to Taiwan would increase, but the United States would then compete with Taiwan's exports of soy products in other markets.

existing storage facilities. The development of controlled-atmosphere storage could have a major impact on marketing of imported apples in the future, and this impact would likely extend to other fruits as well.

The level of technology in some of Taiwan's food- and feed-processing industries is not as high as might be desired. U.S. cooperators have made valuable efforts to help clients in Taiwan make full use of available processing techniques.

Product quality problems are rarely an issue in U.S. agricultural exports to Taiwan. Importers of U.S. apples have complained that dry shipments of apples have been subject to widespread spoilage during shipment (particularly during 1981), resulting in consumer dissatisfaction. For a time, the Board of Foreign Trade and the Ministry of Economic Affairs considered restricting apple imports to those shipped in refrigerated containers. However, the island's apple importers appear to have concluded that the additional cost involved in refrigerated shipment would be excessive, and have continued to opt for dry van shipment. Spoilage problems are also said to pose a serious problem for imports of fresh cherries (16, 56). Importers of wheat have occasionally complained of what they regard as excessive levels of dirt and contamination (dockage) and of low protein levels in U.S. shipments of wheat, claims which are disputed by U.S. exporters. This problem remains to be resolved (51).

Finally, credit availability does not appear to be a serious constraint to Taiwan's imports of major agricultural products. Importing firms have access to a variety of sources of credit to finance their purchases, including the U.S. Export-Import Bank and local commercial banks. The commercial banking industry in Taiwan is highly competitive and bank financing is available on relatively easy terms. In addition, importers of bulk commodities are generally eligible for trade credit from local official agencies. U.S. exporters of agricultural products to Taiwan have received neither GSM-5 direct credits, GSM-102 loan guarantees, nor blended credit.22/

Future Agricultural Imports

Increased sales of feed grains, soybeans, and other bulk commodities will continue to represent the largest source of absolute growth in U.S. agricultural exports to Taiwan during the 1980's.

22/ The GSM-5 program of the Commodity Credit Corporation provides interest-free trade finance to exporters of agricultural products, while GSM-102 provides protection from financial loss due to foreign bank default. The blended credit program, introduced in 1982, combines GSM-5 and GSM-102 into a single package.

Forecasts of Taiwan's total imports of major agricultural products are calculated for the period 1981-89 as the difference between projected demand and domestic supply (table 28). Total imports of feed grains are projected to increase at an average annual rate of 4.0 percent, slightly higher than the rate forecast by the U.S. Feed Grains Council for the period 1982-86 (54). Forecasting the breakdown among individual grains and the U.S. share of total imports of feed grains is very difficult because of the complex set of economic and political forces bearing on these import decisions. Between 1978 and 1981, corn imports averaged 73 percent of total feed grain imports, with sorghum and barley averaging 15 percent and 12 percent, respectively. The mix over the remainder of the 1980's is likely to resemble this general pattern, but will vary with the relations among the landed prices of sorghum and barley and the base price assigned to imported corn.

The U.S. share of Taiwan's feed grain imports will depend in part on the prices offered by alternative suppliers and in part on whether the informal political relationship between the United States and Taiwan erodes further. A serious downgrading in ties with the United States would increase Taiwan's sense of political isolation, strengthening its desire to rely on politically friendly suppliers for key agricultural imports and to diversify its sources of supply in general. Increased reliance on South African corn would likely be the most visible result, although supply limitations in South Africa could reduce the growth of its sales in the short run. In the absence of such changes, it appears that the U.S. share of total feed grains will average between 60 and 70 percent during the 1980's. To the extent that political conditions allow, the well-established role of U.S. cooperators in Taiwan as providers of technical assistance and trade servicing should prove an important asset in maintaining demand for U.S. feed grains.

Imports of soybeans are also expected to expand at an average of 4.0 percent between 1981 and 1989, with the United States maintaining a share close to 100 percent. Changes in the base price for imported soybeans will continue to shift import demand between soybeans on the one hand and meatmeal and fishmeal on the other. If present demand patterns continue, such shifts will not have a strong effect on the value of total U.S. exports to Taiwan, since most meatmeal imports have been supplied by the United States in recent years, while expanded use of fishmeal in livestock feeding is constrained by technical considerations. The table is calculated on the assumption that meatmeal and fishmeal will maintain their 1981 share in total protein meal demand. Efforts by the American Soybean Association to introduce new uses for soybean products should prove helpful in maintaining the growth of U.S. soybean sales.

Table 28--Projections of import quantities of major agricultural commodities, Taiwan

Item	1981	1982	1983	1984	1985	1986	1987	1988	1989
				1,000 metric tons					
Total feed grains	3,722	3,825	3,992	4,209	4,317	4,428	4,590	4,842	5,108
Soybeans	1,132	1,164	1,215	1,282	1,315	1,350	1,400	1,466	1,547
Wheat	706	708	723	739	753	770	787	805	819
Meatmeal	67	69	72	76	78	80	83	87	92
Fishmeal	147	151	158	167	171	176	183	192	203
Raw cotton	230	237	244	251	259	267	275	283	291
Tobacco leaf	11.3	11.8	12.2	12.7	13.2	13.7	14.2	14.7	15.3
Milk products (fresh equiv.) 1/	515	533	576	613	665	720	781	848	921
Beef	16.6	17.2	18.5	20.3	21.9	23.7	25.6	27.5	29.4

Note: Projections are derived from the projections of aggregate consumption (table 19) and of production (table 22).

1/ Dairy products are converted to their fresh milk equivalents at the rates used in table 19.

Annual wheat imports are projected to rise from 706,000 to 819,000 tons over the 1981-89 period, largely reflecting population growth. The predicted 1981 import figure substantially exceeds actual 1981 imports, but this difference is expected to be made up in later years. Demand analysis based on historical data suggests only a weak upward trend in per capita consumption of wheat flour. However, significant opportunities may be developing to expand the market for wheat products through the introduction of convenience foods such as hot breakfast cereals in instant form. Such new products could give an important boost to per capita wheat consumption relative to the projections made here. The U.S. share of Taiwan's wheat imports is likely to remain between 90 and 100 percent during the 1980's.

Projections of import demand for raw cotton and cattle hides are difficult because of Taiwan's deteriorating competitive position in world markets for textiles, apparel, and footwear. Cotton imports are assumed to reach 230,000 tons in 1982, and to grow at a rate of 3 percent per year thereafter as indicated by official projections (40). Even this modest growth may be overly optimistic, as recent international negotiations on textile and apparel import quotas threaten to limit severely the growth of Taiwan's export opportunities for these products. Purchases of U.S. cotton will depend heavily on the growth in demand for exports of textile and apparel from Taiwan, which will depend in turn on whether protectionist sentiment in Europe and the United States undercuts Taiwan's markets. This issue is largely out of the hands of U.S. agricultural policymakers. In the long run, the outlook for sales of cotton to Taiwan is poor because of growing competition from low-wage textile exporters; however, Taiwan's competitors would in this case tend to take up much of the slack in the demand for U.S. cotton. In any case, the U.S. share of Taiwan's import demand for raw cotton is expected to remain between 55 and 60 percent for the rest of the decade. Available information on prospects for exports of leather goods is considered insufficient to support projections of import demand trends for cattle hides.

Imports of tobacco leaf are forecast to rise at an average rate of 3.7 percent through 1989, with the United States maintaining a share between 50 and 65 percent depending on prices. Considerations of price and quality will dominate the determination of tobacco trade shares; increasing quality consciousness among smokers in Taiwan will tend to raise the U.S. share of this market over time.

Imports of milk products are expected to continue their rapid rise for the remainder of the decade, with growth averaging 7.5 percent. Although shown in terms of fresh milk equivalent for consistency with the production and consumption projections, a very large share of Taiwan's dairy imports are in the form of

powdered and evaporated milk. The U.S. share of dairy imports in 1981 was about 10 percent in value terms, and is not expected to rise substantially during the decade.

Taiwan's imports of beef are expected to increase rather rapidly over the decade, with annual growth averaging 7.4 percent per year. Faced by strong price competition from Australia and New Zealand, U.S. exports are at a disadvantage and should not be expected to average more than a 10-percent share. The U.S. market share might increase somewhat, however, if Taiwan excludes high-quality beef from the forthcoming tariff increase on beef; it is generally assumed that most such beef would be consumed in hotels and restaurants, largely by foreign visitors.

Although they are unlikely to attain a large share of U.S. agricultural exports to Taiwan, horticultural products--especially nuts but including also some fruits--appear to offer considerable potential for relative growth in sales. Substantial progress has been made in recent years in reducing tariff barriers to U.S. horticultural products, but further gains may be achievable for specific products that do not compete with Taiwan's domestic products. This group includes almonds, walnuts, dates, fresh cherries, and some other products. Expanded sales of fresh cherries will also require that serious problems in maintaining product quality during shipment be solved. Similarly, the reputation of U.S. apples for high quality would be enhanced by the use of refrigerated containers for shipping to Taiwan, but the island's distributors have thus far not been willing to incur the additional costs this would entail. This is likely to change as rising incomes lead to increasing quality consciousness among consumers.

Processed foods are a second group of products that may present opportunities for rapid growth in sales. Because a growing number of women in Taiwan are combining homemaking with a job outside the home, there appears to be a growing potential for sales of convenience foods to save on preparation time. Frozen vegetables (including those packaged with a sauce in boilable bags), frozen prepared meals (that is, TV dinners), freeze-dried fruits, sophisticated soup mixes, instant hot cereals, and other items deserve examination. Tariff barriers are generally high on these items at present, but the authorities would likely be amenable to concessions on products mainly exported from the United States. Alternatively, processing techniques could be transferred to Taiwan through direct investment or licensing arrangements (17).

For horticultural products as well as processed foods, vigorous market development efforts will be needed to expand sales. Market research is needed to identify consumer needs and

preferences for new types of products in Taiwan's rapidly changing social and economic environment, while advertising is needed to make consumers aware of the availability of new products to meet their wants and needs.

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PB83-252999

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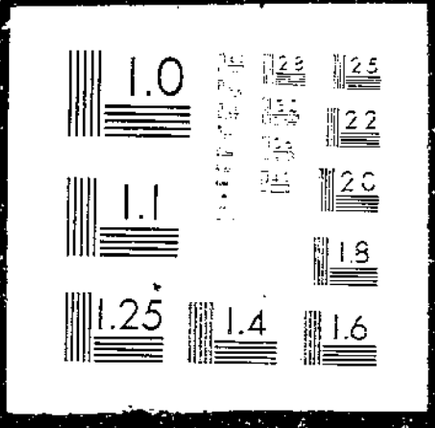

Agriculture in Western Europe

Western Europe accounted for $11.8 billion or 27 percent of U.S. agricultural exports in 1981. The European Community (EC), a grouping of 10 countries within Western Europe, is the largest customer for U.S. agricultural exports. The value of our farm commodities shipped to the EC totaled $9.1 billion in 1981. Spain is our major market in Western Europe outside the EC, although other non-EC countries are important outlets. Sweden, for example, took $187 million of U.S. ag products in 1981. With U.S. agricultural policy and exports so closely linked to events and trends in the European market, a number of research studies have been carried out to gain a fuller understanding of agricultural policies and future developments in Western Europe. Three reports available through GPO examine the effects of EC and Swedish agriculture on U.S. agricultural policy and exports:

Developments in the Common Agricultural Policy of the European Community examines the directions the EC's Common Agricultural Policy (CAP) may take in order to avert a budget crisis and reports the implications for trade with the U.S. and other countries. According to authors Timothy Josling and Scott Pearson, the ever-increasing farm subsidies prescribed by the CAP will seriously harm the EC's ability to meet other policy needs and will hinder enlargement of the Community to include Spain and Portugal. EC policymakers may have to either keep prices low directly or with producer taxes, or limit quantities covered by subsidies. June 1982. 88 pp. $5.50.

The EC Market for U.S. Agricultural Exports: A Share Analysis assesses the market potential for all major U.S. ag exports to the EC. Author Harold McNitt finds that the United States will continue as a leading supplier to the EC of soybeans, sunflowerseed, corn and corn gluten feed, peanuts, citrus pulp, some animal products, and soybean meal during 1981-85. EC trade policies, however, sharply restrict imports of most fruits and vegetables, processed foods, and meats. March 1983. 92 pp. $5.00.

Sweden's Agricultural Policy, one of the few English sources on contemporary Swedish agricultural policy, covers the major provisions of Sweden's 1982-84 farm program. "An accurate and concise presentation," says the Swedish Ambassador to the United States. Sweden's policy objectives are to reduce government subsidies for agricultural exports (a major aim of U.S. world trade policy), to cut back on consumer food subsidies and farmer compensation programs, and to make the levies on imports more responsive to market conditions. Chief U.S. exports to Sweden include fruits, vegetables, nuts, and tobacco, which are relatively unaffected by Swedish import levies, and grains. October 1982. 44 pp. $4.25.

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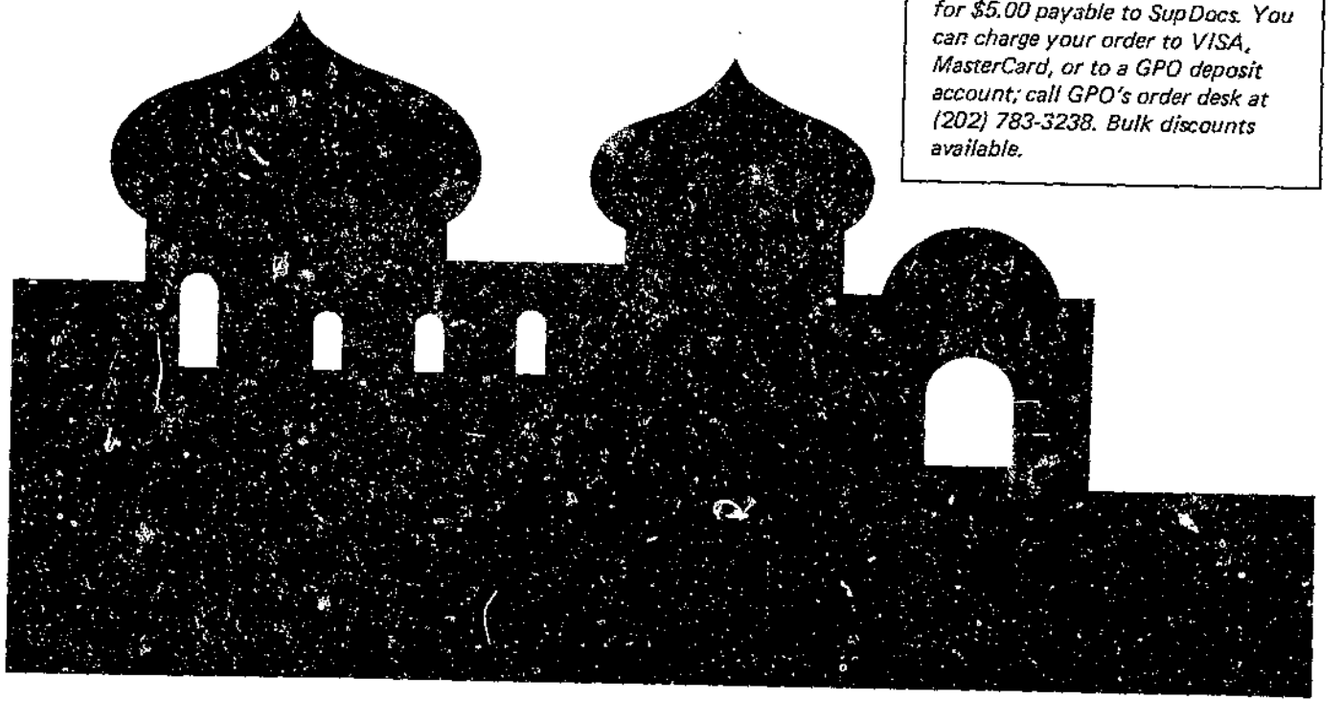

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